

SPIE Photonics West

Conferences + Courses: 24–29 January 2009

BiOS Exhibition: 24–25 January 2009

Photonics West Exhibition: 27–29 January 2009

San Jose Convention Center
San Jose, California, USA

Technical
Program



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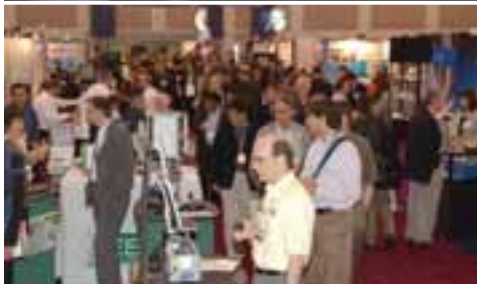
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Photonics West

Conferences + Courses: 24–29 January 2009
BiOS Exhibition: 24–25 January 2009
Photonics West Exhibition: 27–29 January 2009

San Jose Convention Center
 San Jose, California, USA

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Photonics West • BiOS

Technical Conferences

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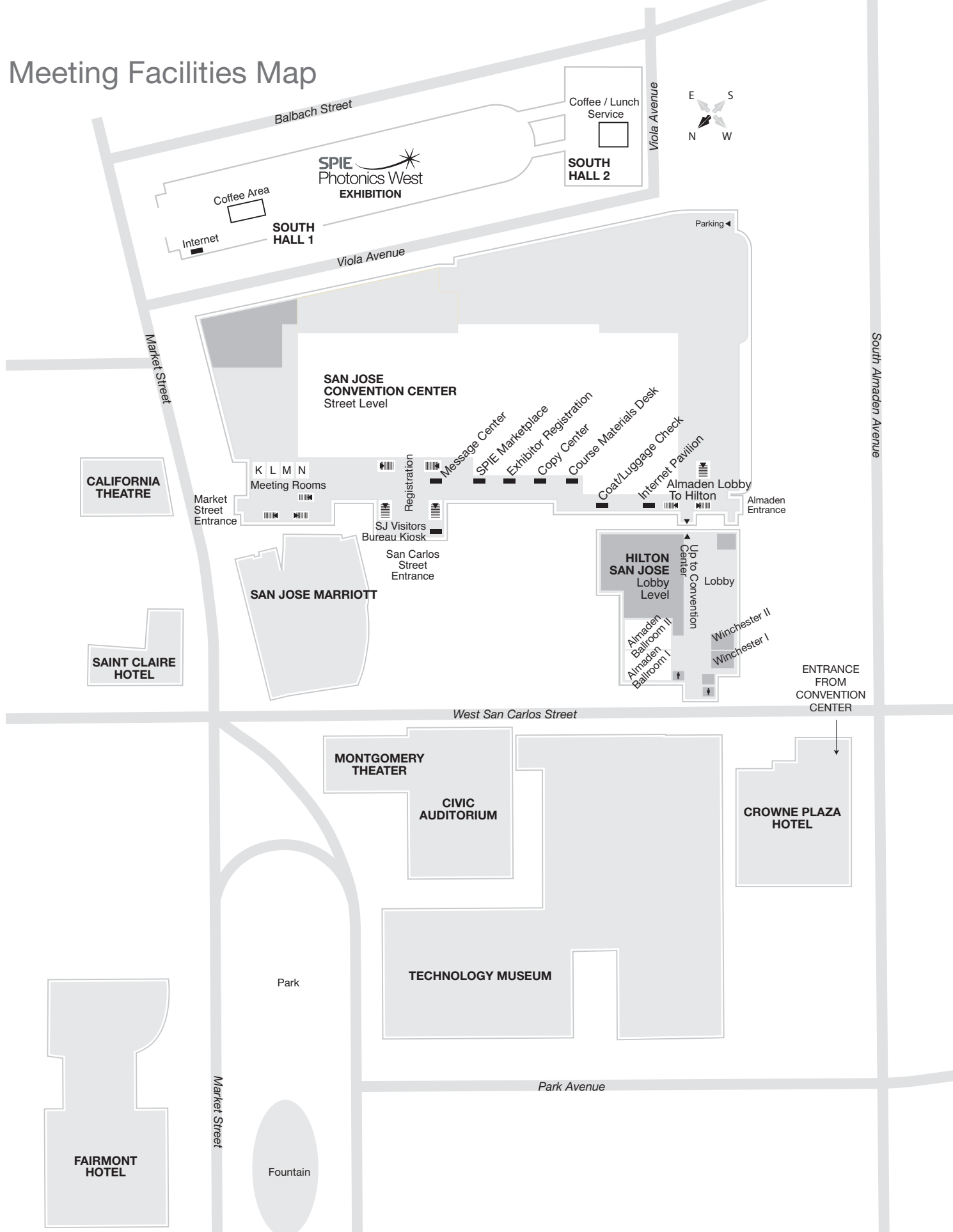
Professional Development

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SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.

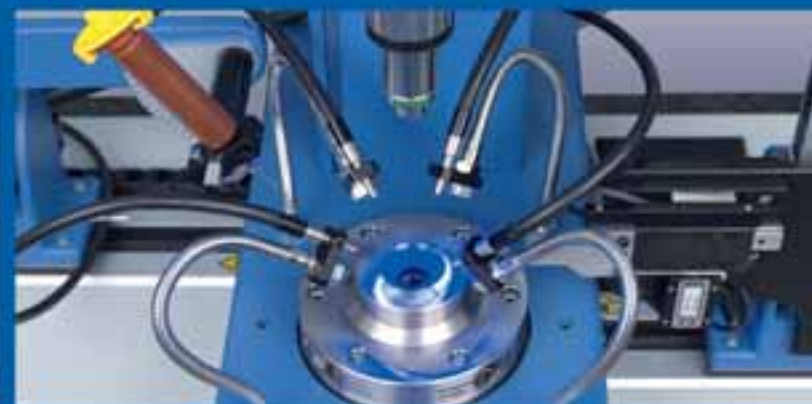
The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

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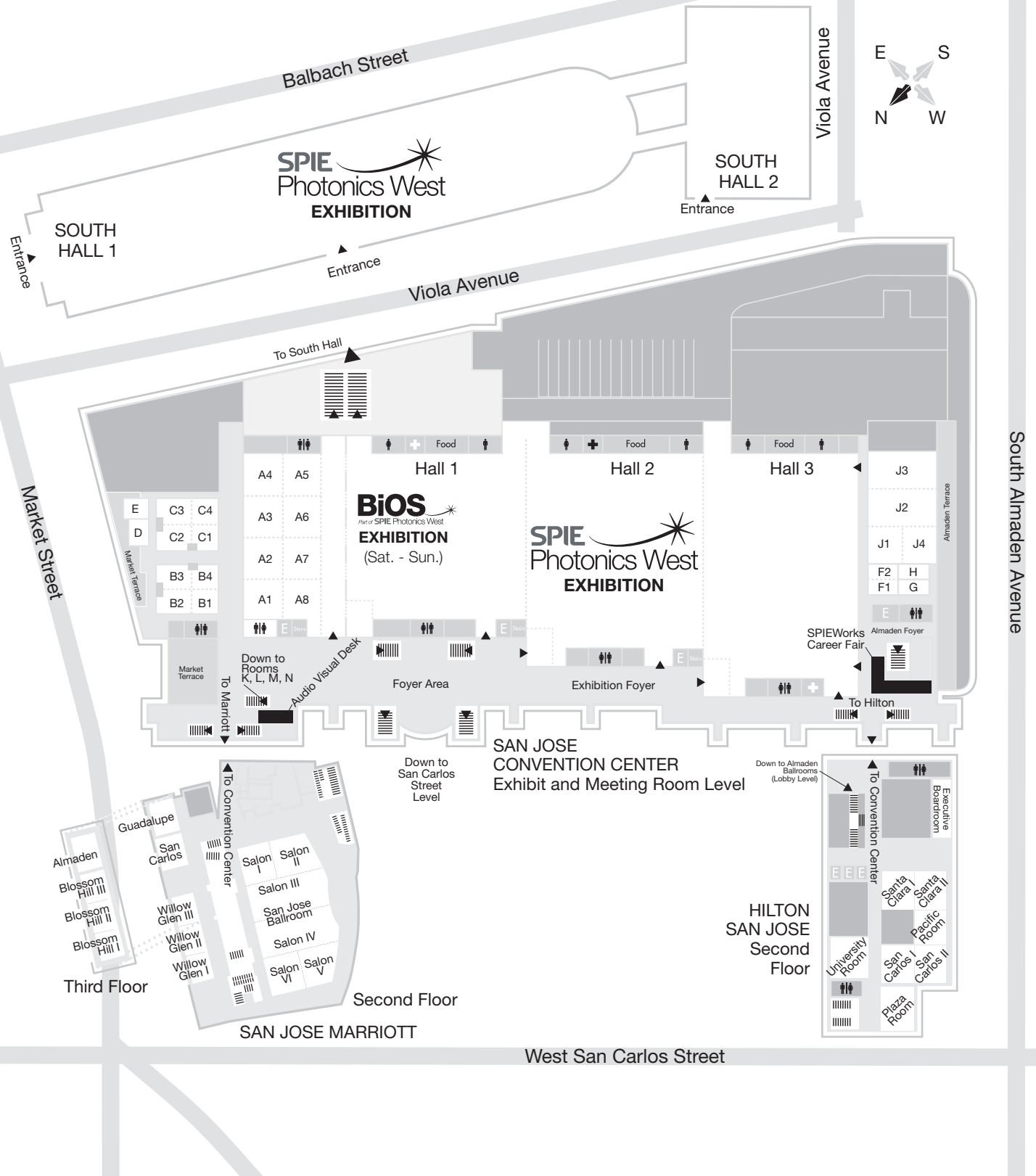
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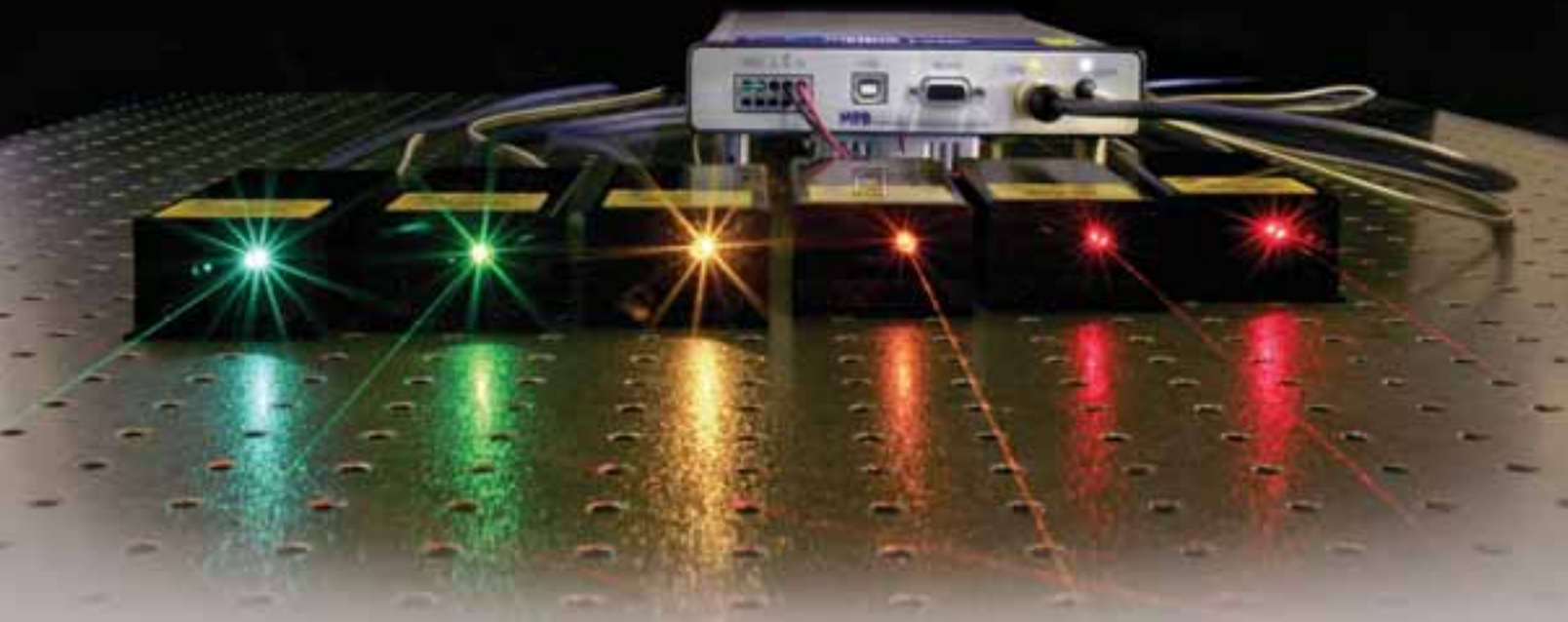


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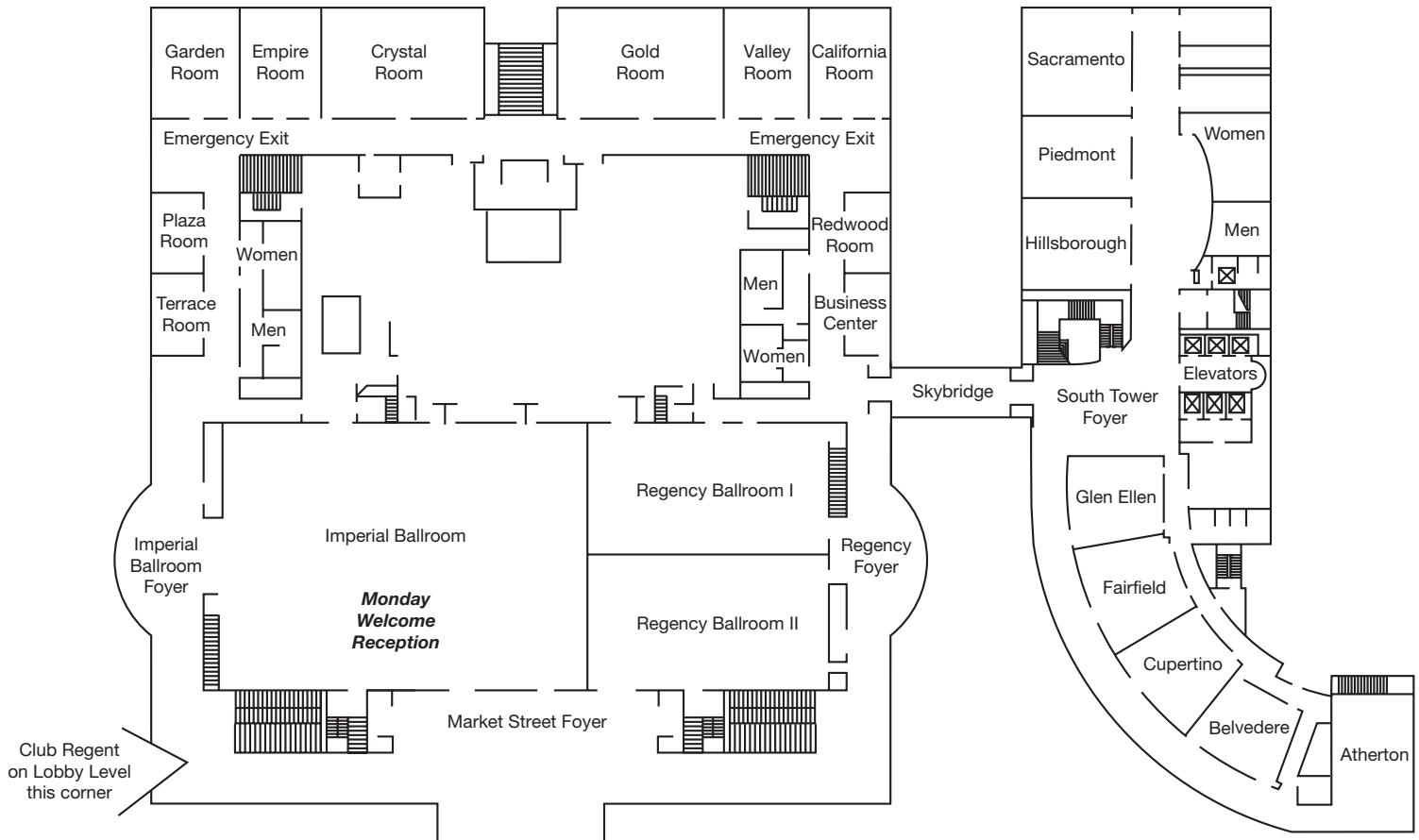
the future is bright

Bios - # 8420

Photonics West - # 6114 South Hall

Fairmont Hotel Map

Ballroom Level (2nd Floor)



Technical Program Room Lists



Symposium Chairs:



James Fujimoto, Massachusetts Institute of Technology (USA)



R. Rox Anderson, M.D., Wellman Center for Photomedicine, Massachusetts General Hospital and Harvard School of Medicine (USA)

Key

- CC = Convention Center
- M = Marriott
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- SC = St. Claire

Photonic Therapeutics and Diagnostics

Program Chair: **Reza S. Malek M.D.**, Mayo Clinic

- 7161A Photonics in Dermatology and Plastic Surgery** (Kollias/Choi/Zeng) CC-A5. 55
- 7161B Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy** (Malek) CC-B1. 57
- 7161C Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technolog** (Wong/Ilgner) CC-E. 59
- 7161D Diagnostic and Therapeutic Applications of Light in Cardiology** (Gregory/Marcu/Tearney) CC-A1. 60
- 7161E Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology** (Hirschberg/Madsen) CC-A4. 62
- 7162 Lasers in Dentistry XV** (Rechmann/Fried) CC-B3. 65
- 7163 Ophthalmic Technologies XIX** (Manns/Söderberg/Ho) CC-A7/A8. 67
- 7164 Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XVIII** (Kessel) CC-C1 71

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Technical Program Room Lists

BiOS continued

- 7165 **Mechanisms for Low-Light Therapy IV** CC-A3. 73
(Hamblin/Waynant/Anders)
- 7166 **Optics in Bone Biology and Diagnostics** (Mandelis) CC-C4 74
- 7167 **Frontiers in Pathogen Detection: From Nanosensors to Systems** (Fauchet) CC-A6. 76

Clinical Technologies and Systems

Program Chairs: Tuan Vo-Dinh, Duke Univ.;
Anita Mahadevan-Jansen, Vanderbilt Univ.

- 7168 **Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIII** (Fujimoto/Izatt/Tuchin) CC-A7/A8 78
- 7169 **Advanced Biomedical and Clinical Diagnostic Systems VII** (Mahadevan-Jansen/Vo-Dinh/Grundfest) CC-B3. 83
- 7170 **Design and Quality for Biomedical Technologies II** (Raghavachari/Liang) CC-C1 86
- 7171 **Multimodal Biomedical Imaging IV** (Azar/Intes) CC-D 88
- 7172 **Endoscopic Microscopy IV** (Tearney/Wang) CC-A3. 90
- 7173 **Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications IX** (Gannot) CC-C2 92
- 7174 **Optical Tomography and Spectroscopy of Tissue VIII** (Tromberg/Yodh/Tamura/Sevick-Muraca/Alfano) CC-A2. 94
- 7203 **Commercial and Biomedical Applications of Ultrafast Lasers IX** (Neev/Nolte/Heisterkamp/Trebino) CC-F2. 180
- 7207 **Microfluidics, BioMEMS, and Medical Microsystems VII** (Wang) H-Santa Clara I-II 190

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: Steven Jacques, Oregon Health and Science Univ.;
William P. Roach, Air Force Research Lab.

- 7175 **Optical Interactions with Tissue and Cells** (Jacques/Jansen/Roach) CC-A3. 98
- 7176 **Dynamics and Fluctuations in Biomedical Photonics VI** (Tuchin/Wang/Duncan) CC-B4. 101
- 7177 **Photons Plus Ultrasound: Imaging and Sensing 2009** (Oraevsky/Wang) CC-A1. 103
- 7178 **Biophotonics and Immune Responses IV** (Chen) CC-B2. 107
- 7179 **Optics in Tissue Engineering and Regenerative Medicine III** (Kirkpatrick/Wang) CC-C3 109
- 7180 **Photons and Neurons** (Mahadevan-Jansen/Jansen) M-Willow. 110
Glen II-III
- 7181 **Energy-based Treatment of Tissue and Assessment V** (Ryan) CC-B4. 112

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: Ammasi Periasamy, Univ. of Virginia; Daniel Farkas, Cedars-Sinai Medical Ctr.

- 7182 **Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VII** (Farkas/Nicolau/Leif) M-SJB V-VI. 114
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- 7187 **Biomedical Applications of Light Scattering III** (Wax/Backman) CC-N 131

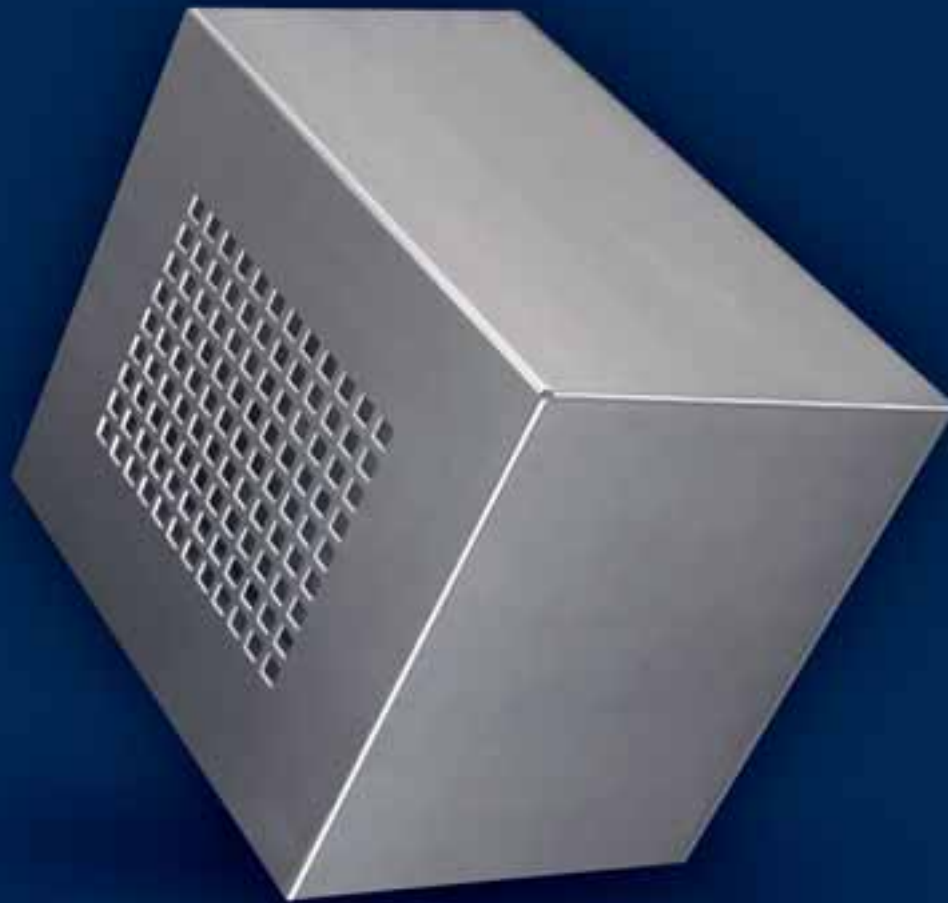
Nano/Biophotonics

Program Chairs: Paras Prasad, SUNY/Buffalo;
Dan Nicolau, The Univ. of Liverpool (United Kingdom)

- 7188 **Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VI** (Cartwright/Nicolau) CC-B4. 134
- 7189 **Colloidal Quantum Dots for Biomedical Applications IV** (Osiriski/Yamamoto/Jovin) CC-M 136
- 7190 **Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications** (Achilefu/Raghavachari) CC-B3. 139
- 7191 **Fluorescence In Vivo Imaging Based on Genetically Engineered Probes: From Living Cells to Whole Body Imaging IV** (Savitsky/Wang) CC-D 142
- 7192 **Plasmonics in Biology and Medicine VI** (Vo-Dinh/Lakowicz) CC-B2. 144

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Symposium Chairs:



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Peter Herman, Univ. of Toronto (Canada)

Symposium Co-Chairs:



Henry Helvajian, The Aerospace Corp. (USA)



Friedrich G. Bachmann, ROFIN-SINAR Laser GmbH (Germany)

Laser Source Engineering

Program Chair: **Gregory J. Quarles**, VLOC

- 7193 Solid State Lasers XVIII: Technology and Devices** (Clarkson/Hodgson/Shori) Sun-Thurs: CC-J4 150
Mon pm: CC-J2
Tues am: CC-J1
- 7194 Laser Resonators and Beam Control XII** (Kudryashov/Paxton/Ilichenko) H-San Carlos II 155
- 7195 Fiber Lasers VI: Technology, Systems, and Applications** (Gapontsev/Kliner) CC-J2 157
- 7196 High Energy/Average Power Lasers and Intense Beam Applications IV** (Davis/Heaven/Schriempf) H-San Carlos I 162
- 7203 Commercial and Biomedical Applications of Ultrafast Lasers IX** (Neev/Nolte/Heisterkamp/Trebino) Sun: CC-C3 180
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Nonlinear Optics

Program Chair: **Peter E. Powers**, Univ. of Dayton

- 7197 Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications VIII** (Powers) CC-J1 164

Semiconductor Lasers and LEDs

Program Chair: **E. Fred Schubert**, Rensselaer Polytechnic Institute

- 7198 High-Power Diode Laser Technology and Applications VII** (Zediker) CC-J3 167
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- 7217 Zinc Oxide Materials and Devices IV** (Teherani/Litton/Rogers) CC-E 219
- 7229 Vertical-Cavity Surface-Emitting Lasers XIII** (Choquette/Lei) CC-B2 247

- 7230 Novel In-Plane Semiconductor Lasers VIII** (Belyanin/Smowton) CC-C2 249
- 7231 LEDs: Materials, Devices, and Applications for Solid State Lighting XIII** (Streubel/Jeon) Tues-Wed: CC-A5 253
Thurs: CC-A1

Laser Communication and Propagation

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- 7200 Atmospheric Propagation of Electromagnetic Waves III** (Korotkova) H-University 172

Laser Micro-/Nanoengineering and Applications

Program Chairs: **Henry Helvajian**, The Aerospace Corp;
James S. Horwitz, U.S. Dept. of Energy

- 7201 Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV** (Meunier/Holmes/Niino/Gu) Mon/Wed: CC-F1 174
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- 7204: Micromachining and Microfabrication Process Technology XIII** (Maher/Chiao/Resnick) H-San Carlos I 185
- 7205: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II** (Suleski/Schoenfeld/Wang) H-Almaden I 186
- 7206: Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices VIII** (Kullberg/Ramesham) H-University 189

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MOEMS- MEMS

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Symposium Chair



Albert K. Henning
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Symposium Co-Chair



Thomas J. Suleski
Univ. of North Carolina/Charlotte
(USA)

Micro/Nanofabrication

- 7204 Micromachining and Microfabrication Process Technology XIII** H-San Carlos I 185
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(Suleski/Schoenfeld/Wang)
- 7201 Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV** . Mon/Wed: CC-F1. 174
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- 7221 Photonics Packaging, Integration, and Interconnects IX** (Glebov/Chen) CC-C3 229

Devices/Applications/Reliability

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- 7207 Microfluidics, BioMEMS, and Medical Microsystems VII** (Wang) H-Santa Clara I-II 190
- 7208 MOEMS and Miniaturized Systems VIII** (Dickensheets/Schenk/Piyawattanametha) H-Almaden II. . 192
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OPTO

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Symposium Chair



James G. Grote,
Air Force Research Lab.
(USA)

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E. Fred Schubert
Rensselaer Polytechnic Institute
(USA)

Optoelectronic Materials and Devices

Program Chair: James G. Grote, Air Force Research Lab.

- 7211 Physics and Simulation of Optoelectronic Devices XVII** CC-M 200
(Osirski/Witzigmann/Henneberger/Arakawa)
- 7212 Optical Components and Materials VI** CC-D 203
(Jiang/Digonnet/Glesener/Dries)
- 7213 Organic Photonic Materials and Devices XI** (Nelson/Kajzar/Kaino) CC-C1 206
- 7214 Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIII** (Tsen/Song) CC-K. 209
- 7215 Terahertz Technology and Applications II** (Linden/Sadwick/O'Sullivan) CC-D 212
- 7216 Gallium Nitride Materials and Devices IV** (Morkoç/Litton) CC-A4. 214
- 7217 Zinc Oxide Materials and Devices IV** CC-E. 219
(Teherani/Litton/Rogers)

Photonic Integration

Program Chair: Yakov Sidorin, Bromberg Sunstein LLP

- 7218 Integrated Optics: Devices, Materials, and Technologies XIII** (Broquin/Greiner) CC-B1. 221
- 7219 Optoelectronic Integrated Circuits XI** CC-C3 224
(Eldada/Lee)
- 7220 Silicon Photonics IV** (Kubby/Reed) CC-N 226
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Program Chair: Ali Adibi, Georgia Institute of Technology

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- 7205 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II** (Suleski/Schoenfeld/Wang) H-Almaden I . . 186



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OPTO continued

Advanced Quantum and Optoelectronic Applications

Program Chair: Zameer U. Hasan, Temple Univ.

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- 7227 Complex Light and Optical Forces III** . . CC-B4 245
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- 7228 Laser Refrigeration of Solids II** M-San Jose . . 246
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Semiconductor Lasers and LEDs

Program Chair: E. Fred Schubert, Rensselaer Polytechnic Institute

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- 7230 Novel In-Plane Semiconductor Lasers VIII** (Belyanin/Smowton) CC-C2 249
- 7231 LEDs: Materials, Devices, and Applications for Solid State Lighting XIII** (Streubel/Jeon) Tue-Wed: CC-A5 253
 Thurs: CC-A1
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- 7217 Zinc Oxide Materials and Devices IV** (Teherani/Litton/Rogers) CC-E 219
- 7198 High-Power Diode Laser Technology and Applications VII** (Zediker) CC-J3 167

Displays and Holography

Program Chair: Liang-Chy Chien, Kent State Univ.

- 7232 Emerging Liquid Crystal Technologies IV** (Chien) CC-C4 256
- 7233 Practical Holography XXIII: Materials and Applications** (Bjelkhagen/Kostuk) CC-L 259

Optical Communications: Systems and Sub-systems

Program Chair: Benjamin B. Dingel, Nasfne Photonics, Inc.

- 7234 Broadband Access Communication Technologies III** (Dingel/Jain/Tsukamoto) CC-E 261
- 7235 Optical Metro Networks and Short-Haul Systems** (Weiershausen/Dingel/Dutta/Srivastava) CC-K 262
- 7236 Quantum Communications Realized II** (Arakawa/Sasaki/Sotobayashi) CC-C4 263
- 7221 Photonics Packaging, Integration, and Interconnects IX** (Glebov/Chen) CC-C3 229
- 7199 Free-Space Laser Communication Technologies XXI** (Hemmati) H-Santa Clara I . 170



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PHOTONICS MEDIA



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BiOS Exhibition: 23 – 24 January 2010

Photonics West Exhibition: 26 – 28 January 2010

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A photograph of the Golden Gate Bridge in San Francisco, taken at sunset. The bridge's towers and suspension cables are silhouetted against a sky filled with soft, orange and yellow clouds. The water below reflects the warm light of the setting sun. The bridge spans across the water, with another tower visible in the distance.

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Special Events Daily Schedule

Saturday 24 January	Sunday 25 January	Monday 26 January
		<p>Workshop: Basic Optics for Non-Optics Personnel (Harding) 8:30 to 11:00 am, p. 32</p> <p>Workshop: The Nuts and Bolts of Patenting (Reingand) 8:30 am to 12:30 pm, p. 32</p> <p>Workshop: Effective Technical Presentations (Doumont) 8:30 am to 12:30 pm, p. 33</p> <p>MOEMS/MEMS Plenary Session: Massively Parallel Soft Pen (Mirkin), 9:10 to 10:00 am, p. 24</p> <p>MOEMS/MEMS Plenary Session: The High Versatility of Silicon Based Micro-Optical Modulators (Schenk), 10:20 to 11:10 am, p. 24</p> <p>MOEMS/MEMS Plenary Session: Subwavelength Optical Elements and Nanoimprint Technology for Chip Integration of Optical Systems and MEMS (Chou), 11:10 am to 12:00 pm, p. 24</p>
<p style="text-align: center;">BiOS Exhibition, p. 41-49 San Jose Convention Center, Exhibition Hall 1 1:00 to 5:00 pm 10:00 am to 4:00 pm</p>		<p>Best Paper Award: Colloidal Quantum Dots for Biomedical Applications IV (Conf. 7189) 11:50 am to 12:00 pm, p. 20</p> <p>SPIE Fellows Luncheon, 12:00 to 1:30 pm, p. 30</p>
<p>BiOS Hot Topics, 7:00 to 9:30 pm, p. 20</p>	<p>Workshop: Hands-On Optics (HOO)—Making an Impact with Light (Baine) 8:30 am to 11:30 pm, p. 33</p>	<p>Workshop: Effective Scientific Papers (Doumont) 1:30 to 5:30 pm, p. 33</p>
	<p>Workshop: Creating a New Technology Venture (Pape) 8:30 am to 5:30 pm, p. 32</p>	<p>Early Career Networking Social, 5:00 to 6:00 pm, p. 30</p>
	<p>A BiOS Student Networking Event: Lunch with the Experts, 12:30 to 1:30 pm, p. 30</p>	<p>Interactive BiOS Poster Session, 5:30 to 7:00 pm, p. 21</p>
	<p>Professional Development Speaker Series, 1:30 to 5:00 pm, p. 31</p>	<p>All-Symposium Welcome Reception, 6:30 to 8:00 pm, p. 30</p>
	<p>Workshop: Understanding Laser Beam Performance Specifications (Sukuta) 1:30 to 5:30 pm, p. 32</p>	<p>SPIE Members Reception, (For SPIE Members Only), 6:30 to 8:00 pm, p.30</p>
	<p>Best Paper Award: Single Molecule Spectroscopy and Imaging II (Conf. 7185) 5:45 to 5:55 pm, p. 20</p>	<p>“No Ties” Student Social, 8:00 to 10:00 pm, p. 30</p>
	<p>Best Paper Award: Ophthalmic Technologies XIX (Conf. 7163), 5:45 to 6:00 pm, p. 20</p>	
	<p>NIH Workshop on Brain Imaging, (Riley/Fantini), 6:30 to 8:00 pm, p. 21</p>	
		
<p>SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible.</p> <p>The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.</p>		

Special Events Daily Schedule

Tuesday	Wednesday	Thursday
27 January	28 January	29 January
Photonics West Exhibition, p. 41-49 <i>San Jose Convention Center, Exhibition Halls 1-3, Exhibition Foyer and South Halls 1 & 2</i>		
10:00 am to 5:00 pm	10:00 am to 5:00 pm	10:00 am to 4:00 pm
 SPIE Works 10:00 am to 3:00 pm	Career Fair, p. 29 10:00 am to 3:00 pm	
<i>Workshop: Technology Roadmapping (McAleese)</i> 8:30 am to 12:30 pm, p. 33	<i>Student Competition and Awards: Commercial and Biomedical Applications (Conf. 7203)</i> 8:00 am to 9:00 am and 10:00 to 10:30 am, p. 23	<i>Best Student Paper Awards: Solid State Lasers (Conf. 7193)</i> 2:50 to 3:00 pm, p. 23
<i>Workshop: Intellectual Property for High-Tech Business (Gortych)</i> 8:30 am to 12:30 pm, p. 32	<i>Workshop: Essential Skills for Engineering Project Leaders (Hinkle)</i> 8:30 am to 12:30 pm, p. 33	<i>Best Student Paper Awards: Fiber Lasers VI: Technology, Systems, and Applications (Conf. 7195)</i> 4:50 to 5:00 pm, p. 23
<i>OPTO Plenary Session: Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics (Ploog)</i> , 8:05 to 8:40 am, p. 26	<i>LASE Plenary Session: A High-Power Fiber Diet (Payne)</i> , 10:30 to 11:10 am, p. 22	
<i>OPTO Plenary Session: Photonics for Novel High-Performance Computing (Beausoleil)</i> , 8:40 to 9:20 am, p. 26	<i>LASE Plenary Session: Tailored Light - Innovation by New Laser Concepts and New Applications (Poprawe)</i> , 11:10 to 11:50 am, p. 22	
<i>OPTO Plenary Session: Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century (Prasad)</i> , 9:20 to 10:00 am, p. 26	<i>LASE Plenary Session: Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics (Borden)</i> , 11:50 am to 12:30 pm, p. 22	
<i>Workshop: Intellectual Property for High-Tech Business (Gortych)</i> 8:30 am to 12:30 pm, p. 32	<i>Workshop: Project Management for Rapid Product Development (Hinkle)</i> 1:30 to 5:30 pm, p. 32	
Student Lunch with the Experts—A Networking Event, 12:30 to 1:30 pm, p. 30	<i>Executive Perspective on The World of Photonics</i> , 2:00 to 3:00 pm, p. 28	
<i>Workshop: Complying with the ITAR: A Case Study (Scarlott)</i> 1:30 to 5:30 pm, p. 32	<i>Executive Panel on Applications of High-Power Solid State Lasers</i> , 3:30 to 4:30 pm, p. 28	
<i>Executive Panel on Silicon Photonics and Optical Interconnects</i> , 2:00 to 3:00 pm, p. 28	<i>Best Paper Awards: Photons Plus Ultrasound: Imaging and Sensing 2009 (Conf. 7177)</i> 4:50 to 5:10 pm, p. 21	
<i>Industry Perspectives: Hot Markets in Photonics: Solar</i> , 3:30 to 4:30 pm, p. 28	Interactive OPTO Poster Session , 6:00 to 7:30 pm, p. 27	
Women in Optics Presentation and Reception , 4:30 to 6:00 pm, p. 30	<i>Panel Discussion: Progress and Prospects in Microfluidics (Henning, Wang)</i> , 7:00 to 8:30 pm, p. 25	
Interactive LASE and MOEMS/MEMS Poster Sessions , 6:00 to 7:30 pm, pp. 23, 25	The Power of Procrastination (Cham) , 7:30 to 8:30 pm, p. 31	
<i>Workshop: A Novel Standardized Open-Source eXTensible Imaging Platform (XIP) for the Rapid Development of Advanced Applications (Paladini, Azar)</i> , 6:30 to 9:30 pm, p. 21	<i>Panel Discussion: Getting Hired in 2009 and Beyond</i> , 8:30 to 10:00 pm, p. 31	
IBOS—International Biomedical Optics Society , 7:30 to 9:00 pm, p. 21		
Laser Communications Technical Event (Korotkova, Hemmati) 7:30 to 9:00 pm, p. 23		
Holography Technical Event (Bjelkhagen) , 7:30 to 9:00 pm, p. 27		

BIOS

LASE

MOEMS-MEMS

OPTO

Courses

Hot Topics · Saturday 24 January · 7:00 to 9:30 pm
Convention Center, Room J1-J4

Welcome and Introduction

Saturday 24 January 7:00 to 7:05 pm



James Fujimoto,
Massachusetts Institute of
Technology (USA)
BIOS 2009 Symposium Chair



R. Rox Anderson,
Wellman Ctr. for
Photomedicine,
Massachusetts General
Hospital and Harvard School
of Medicine (USA)
BIOS 2009 Symposium Chair

Hot Topics Moderator

Saturday 24 January 7:05 to 7:10 pm



Sergio Fantini,
Tufts Univ. (USA)

Nanoscopy with Far-Field Optics

Saturday 24 January 7:10 to 7:25 pm



Stefan W. Hell,
Max-Planck-Institut für
Biophysikalische Chemie
(Germany)

Advanced Studies in Photoporation

Saturday 24 January 7:25 to 7:40 pm



Kishan Dholakia,
Univ. of St. Andrews (United
Kingdom)

Targeting the Cancer Stem Cell

Saturday 24 January 7:40 to 7:55 pm



Chris Contag,
Stanford Univ. (USA)

Tracking Stem Cells In Vivo

Saturday 24 January 7:55 to 8:10 pm



Charles P. Lin, Wellman
Ctr. for Photomedicine,
Massachusetts General
Hospital and Harvard Medical
School (USA)

First-in-Human Clinical Trial of the FLARE Image-Guided Surgery System

Saturday 24 January 8:10 to 8:25 pm



Summer L. Gibbs-Strauss,
Beth Israel Deaconess Medical
Ctr. (USA)

OCT and Fluorescence Spectroscopy for Cancer Detection

Saturday 24 January 8:25 to 8:40 pm



Jennifer K. Barton,
The Univ. of Arizona (USA)

Diffuse Optics for Acute Stroke Management

Saturday 24 January 8:40 to 8:55 pm



Arjun G. Yodh,
Univ. of Pennsylvania (USA)

Biodegradable Silk Optics

Saturday 24 January 8:55 to 9:10 pm



Fiorenzo G. Omenetto,
Tufts Univ. (USA)

Single Molecule Spectroscopy and Imaging II (Conf. 7185)

PicoQuant Young Investigator Award

Marriott, San Jose Ballroom, Salon V/VI

Sunday 25 January 5:45 to 5:55 pm

We are pleased to announce that a prize in the amount of \$750.00 US will be awarded to the best oral presentation by a presenter under the age of 35 within conference 7185: Single Molecule Spectroscopy and Imaging II, at SPIE's Photonics West BIOS Symposium taking place in January in San Jose, California. The prize money has been donated by PicoQuant GmbH Berlin, Germany.

Prize donated by:



Ophthalmic Technologies XIX

(Conf. 7163)

Pascal Rol Award Announcement

Convention Center, A7/A8

Sunday 25 January 5:45 to 6:00 pm

The Pascal Rol Award will be given to the Best Paper in Ophthalmic Technologies.

Award Sponsor:



Topcon Advanced Biomedical Imaging
Laboratory, through the Pascal Rol Foundation

Colloidal Quantum Dots for Biomedical Applications IV

(Conf. 7189)

Ocean Optics Young Investigator Award

Convention Center, M

Monday 26 January . . . 11:50 am to 12:00 pm

For conference 7189: Colloidal Quantum Dots for Biomedical Applications IV, the Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a \$1,000 cash prize to the Young Investigator and \$1,000 Ocean Optics equipment credit to the laboratory where the work was performed.

Award Sponsor:



BiOS Interactive Poster Session

Civic Auditorium

Monday 26 January 5:30 to 7:00 pm

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors: set-up posters between 10:00 am and 5:00 pm on Monday. See p. 311 for instructions.

NIH Workshop on Brain Imaging

Speakers and panelists explore latest developments in traumatic brain injury assessments

Convention Center, A7/A8

Sunday 25 January 6:30 to 8:00 pm

Workshop Chairs: Jason A. Riley, National Institutes of Health (United States); Sergio Fantini, Tufts Univ. (United States)

The session focuses on brain imaging issues related to the growing field of patients with traumatic brain injury and how optical imaging can provide a valuable tool in functional clinical assessments.

Traumatic Brain Injury

Sunday 25 January 6:40 to 7:00 pm

David F. Moore, Deputy Director for Research, Defense and Veterans Brain Injury, Walter Reed Army Medical Center, Washington, DC and the DVVIC-AFIP, TBI Research Center.

Dr. Moore is also the TBI Scientific Advisor to the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury

Hemispherectomy Patients

Sunday 25 January 7:30 to 8:00 pm

Jason Riley, Eunice Kennedy Shriver, National Institute of Child Health and Human Development, National Institutes of Health, Division of Intramural Research, Washington, DC.

Panel Discussion

Sunday 25 January 7:30 to 8:00 pm

Panel Moderators: Sergio Fantini, Tufts Univ. (United States); Jason A. Riley, National Institutes of Health (United States).

Panel Members: David F. Moore, Walter Reed Army Medical Center (United States); Enrico Gratton, Beckman Laser Institute and Medical Clinic (United States); Martin Schweiger, Univ. College London (United Kingdom); Brian R. White, Washington Univ. in St. Louis School of Medicine (United States); Lorenzo Spinelli, Politecnico di Milano (Italy)

IBOS—International Biomedical Optics Society

Fairmont, Gold Room

Tuesday 27 January 7:30 to 9:00 pm

Chairs: Jennifer K. Barton, The Univ. of Arizona (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States)

Biomedical optics is a major growth area in modern medicine. The International Biomedical Optics Society is a nonprofit interdisciplinary group that provides a unique channel for communications among physicians and clinicians employing optics in medicine and the scientists and engineers who provide foundations for advancements in this field. The BiOS symposium, where IBOS meets, is the premier annual international forum for discussions and announcements of technical/clinical and educational/pedagogical developments in the use of lasers, optical fibers, spectroscopic diagnostic techniques, and related areas of optical medicine.

The 2009 IBOS meeting will feature tutorials by two renowned experts in biomedical optics.

IBOS Tutorials:

- **Biosensors and Nanoprobes for Medical Diagnostics**, Tuan Vo-Dinh, Duke Univ. (United States)
- **Photoacoustic Tomography**, Lihong V. Wang, Washington Univ. in St. Louis (United States)

All registered conference participants are encouraged to attend this evening session. Attendees are requested to wear their conference badges.

A Novel Standardized Open-Source eXtensible Imaging Platform (XIP) for the Rapid Development of Advanced Applications

Tuesday 27 January 6:30 to 9:30 pm

WS927; FREE to conference attendees. You must register to attend. Please see SPIE Cashier to register.

The National Institutes of Health (NIH) has recently developed XIP (eXtensible Imaging Platform), a new open-source software platform for the development of medical imaging applications. XIP can be used to rapidly develop imaging applications designed to meet the needs of the optical imaging community.

XIP is a state-of-the-art set of visual 'drag and drop' programming tools and associated libraries for the rapid development of imaging and visualization applications. The tools include modules tailored for medical imaging, many of which are hardware accelerated (OpenGL). They also provide a friendlier environment for utilizing popular toolkits such as ITK and VTK, and enable the visualization and processing of any type of optical imaging data and of standard DICOM data.

XIP applications can run "stand alone", including in client/server mode for remote access. XIP also supports the DICOM WG23 "Application Hosting" standard, which will enable plug-in XIP applications to run on any DICOM compliant PACS workstation. Such interoperability will enable the optical imaging community to develop modular applications optimized for their specific imaging needs and widely deploy them across all academic/clinical/industry partners with standard-compliant imaging workstations.

This workshop will enable you to:

- learn about the open-source foundation that increases the pool of software development vendors, reduces costs, speeds the translation of advanced algorithms from universities, and increases potential for collaboration
- learn how plug-in standard enables institution and vendor-interoperable solutions, increasing uniformity of imaging applications
- learn how to use XIP through a hands-on tutorial, and the use of example applications

PRESENTERS: Gianluca Paladini, Fred S. Azar, Siemens Corporate Research

NOTES: Participants are highly encouraged to bring their laptops (running MS Windows). CD-ROMs or USB keys containing the installer for the XIP Platform will be made available during the workshop, and participants will be directed on how to install and use the platform. The demonstration will be projected for those who can not bring a computer to the presentation. Interested participants are encouraged to attend the talk given by Gianluca Paladini on Saturday January 24th, 10:40 am, entitled "An Extensible Imaging Platform for Optical Imaging Applications" (BIOS Conference B0115 – Multimodality Optical Imaging)

FOR MORE INFORMATION:

Gianluca Paladini: Program Manager, Imaging Architectures research program; Gianluca.Paladini@siemens.com

Fred S. Azar: External Projects Lead for the Imaging and Visualization Dept.; Fred.Azar@siemens.com

Photons Plus Ultrasound: Imaging and Sensing 2009

(Conf. 7177)

Best Paper Award and Best Poster Award

Convention Center, A1

Wednesday 28 January 4:50 to 5:10 pm

The Best Paper Award and Best Poster Award for conference 7177: Photons Plus Ultrasound: Imaging and Sensing 2009 will be announced by Alexander Oraevsky, Fairway Medical Technologies, Inc. and Lihong V. Wang, Washington Univ. in St. Louis.

Award Sponsored by:



A High-Power Fiber Diet

Wednesday 28 January. . . 10:30 to 11:10 am



David N. Payne,
Univ. of Southampton,
Optoelectronics Research Ctr.
(United Kingdom)

Abstract: The high power fiber laser was born out of the optical telecoms revolution. It challenges currently held views on how to make things, how to repair things, and how to destroy things. With small size, maintenance-free operation, high thermal and electrical efficiency and outstanding beam quality, it has the potential to change every industry and discipline it encounters.

The remarkable control of light achieved in optical telecoms brings unprecedented opportunities for industrial laser applications, such as welding, drilling and cutting. Remarkably, the milliwatts of telecommunications can be scaled to powers of many kilowatts in fiber amplifiers. Thus, the preferred high-power fiber laser configuration uses an easily controllable seed laser, followed by multiple stages of amplification. This concept also leads to possibilities for beam combination of multiple fiber lasers perhaps into the megawatt regime.

There are also signs that the industrial laser market is benefiting immeasurably from the telecommunications reliability culture through innovative engineering and extensive pre-release testing. The talk will review optical component developments across a number of areas, with particular emphasis on recent innovations, such as microstructured fibers, highly non-linear glasses and large-core, damage resistant fibers. It will explore the limits of present components and the prospects for building new high power laser technologies through harnessing the properties of alternative optical materials and structures.

Biography: Professor David N. Payne is the Director of the Optoelectronics Research Centre at the University of Southampton, one of the world's most respected photonics research laboratories. He is also a Director and Founder of SPI Lasers Ltd. He led the team that pioneered the fibre laser and the erbium-doped fibre amplifier and he has made many other key advances in optical fibre devices over the last forty years. His career has spanned both the commercial and the academic. In 2007 he received the IEEE Photonics Award and in 2008 the Marconi Prize and Fellowship.

Tailored Light - Innovation by New Laser Concepts and New Applications

Wednesday 28 January. . . 11:10 to 11:50 am



Reinhart Poprawe,
Fraunhofer-Institut für
Lasertechnik ILT (Germany)

Abstract: Application demands on process parameters for laser applications are under intense investigation worldwide. The availability and ongoing development of a wide spectrum of new laboratory lasers as well as industrially available systems allow relevant research and innovation out of these concepts. The trend of increasing diversity of lasers and corresponding applications is strong and stable over the last years. In this process the parallel consideration of application demands on the laser parameters and their influence on the development of new lasers are considered key innovation factors in the technology. In particular his presentation covers:

- Ultrafast INNOSLAB - multi 100 W fs amplifiers, single stage amplification from single W input to multi 100 W output for high ablation rate structuring of moulds up to 50 mm³/min, nano-surfaces, solar cell processing
- Rod - kW class fiber coupled Q-switched lasers for high throughput surface treatment, e.g. high rate cleaning (1.8 kW / 500 kW / 400 µm fiber)
- kW - class Fiber Lasers with linear polarized output (850 W pump power limited) for 1µm-wavelength metal cutting and high speed scanner - welding of polymers, "injection" pulsed fiber lasers up to 100 kW peak power and linear polarized output (tunable pulse duration by diode seeding) and ps-Lasers for double- and multiple pulse train ablation
- Super - pulsed Diode Lasers (5-10 times of CW peak power) for direct materials processing, e.g. marking applications and high average power UV sources based on THG with more than 60 W average power at 355 nm for precision cutting will be displayed.
- Furthermore, the innovation process itself will be characterized in terms of partnering networks, early industrial integration and the creation of a sound research infrastructure.

Biography: Dr. Reinhart Poprawe studied Physics at the Univ. of Mainz, received a Masters degree from California State University/Fresno, then went on to study Physics at the Technische Hochschule Darmstadt receiving a PhD in 1980. Since February 1996 he has been the head of the Fraunhofer-Institute for Lasertechnology/Aachen and Professor for Lasertechnology at the RWTH Aachen. Dr. Poprawe's area's of expertise include: laser development, laser applications, and plasma technology.

Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics

Wednesday 28 January 11:50 am to 12:30 pm



Peter Borden,
Applied Materials Solar
Business Group (United
States)

Abstract: Laser processing is attractive for photovoltaics manufacturing, providing low cost, high throughput and non-contact patterning. This talk surveys some of the most important applications.

Two mainstream PV approaches are in the market today: thin film and wafer-based silicon. Thin film panels use semiconductors such as amorphous and microcrystalline silicon, CdTe or CIGS on low cost substrates with areas up to 5.7 m². With insulating substrates such as glass, the semiconductor is patterned into a series string to provide a high voltage, low current output. This is most commonly done with laser processing. We will review the most common interconnect design, how lasers are used to fabricate it, key issues with the process, and how these are overcome.

Wafer-based silicon, with its higher efficiency and greater maturity, comprises the bulk of the PV market. The primary application for lasers in wafer-based silicon is edge isolation to disconnect the front diffusion from the back side, a process used today in the fabrication of most solar cells.

There is considerable market pressure to improve efficiency without adding cost. This drives a host of emerging applications, including

- Ablation of dielectrics to form openings for doping and contacts,
- Laser firing to form point contacts,
- Drilling vias and channels for contacts or to make back-contact structures, and
- Laser soldering for panels using thin cells.

The talk will survey work in these areas and their prospects.

Biography: Dr. Peter Borden is a leading technologist and Distinguished MTS with the Solar Business Group of Applied Materials. He began his career at Varian Associates where, he led the Photovoltaics Group, working on III-V and silicon concentrators. In this role, he and his group set performance records for cells, modules and arrays. After Varian he founded two start-ups, including High Yield Technology, where, he pioneered the first commercially successful in situ particle monitoring systems for VLSI process equipment, and Boxer Cross, Inc., where, he developed, marketed and sold metrology systems for VLSI process control. He joined Applied Materials in 2003 with its acquisition of Boxer Cross.

He holds Ph.D. and MS degrees in Applied Physics from Stanford and BS degrees in Physics and EE from MIT. Dr. Borden has authored over 80 publications and has over 30 patents.

LASE Interactive Poster Session

Civic Auditorium

Tuesday 27 January 6:00 to 7:30 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions

Poster authors: set-up posters between 10:00 am and 5:00 pm on Tuesday. See p. 311 for instructions.

Laser Communications Technical Event

Fairmont, Hillsborough Room

Tuesday 27 January 7:30 to 9:00 pm

Chairs: Olga Korotkova, Univ. of Miami (United States) and Hamid Hemmati, Jet Propulsion Lab. (United States)

This technical event on Laser Communications will hold its annual meeting in conjunction with the Free-Space Laser Communication Technologies XXI and Atmospheric Propagation of Electromagnetic Waves III conferences. All professionals involved in applications of free-space laser communications and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

Commercial and Biomedical Applications of Ultrafast Lasers IX (Conf. 7203)

Student Paper Competition and Best Student Award Presentation

Convention Center, F2

Wednesday 28 January

Competition 8:00 am to 9:00 am

Award 10:00 to 10:30 am

For conference 7203: Commercial and Biomedical Applications of Ultrafast Lasers IX, we are pleased to announce that a cash prize of \$1,000 US will be awarded to the best student presentation in the conference (both poster or oral papers considered).

Papers submitted by graduate and undergraduate students are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during a special student competition session held during the conference. Here the students present a brief 5 minute summary of their original talk or poster presented at the conference. The winner and runner-up will be announced and awarded a cash prize during the Student Competition Award Ceremony.

Solid State Lasers XVIII: Technology and Devices

(Conf. 7193)

Student Paper Competition and Best Student Award Presentation

Convention Center, J4

Thursday 29 January 2:50 to 3:00 pm

For conference 7193: Solid State Lasers XVIII: Technology and Devices, we are pleased to announce that two prizes in the amounts of \$1,500 US and \$500 US will be awarded to the best student oral presentation and the best student poster presentation, respectively. The prize money has been donated by Coherent, Inc. and the awards will be presented by Norman Hodgson, Vice President of Engineering.

Qualifying student presentations will be evaluated by a conference steering committee. To be eligible, a student must be listed as an author on an accepted paper, must have conducted the majority of the work being presented, and must make the oral or poster presentation. The prizes will be awarded based on the quality of the presentation and not on the content of the submitted abstract. The winners of the Best Student Presentation Awards will be announced during the Student Award Session.

Award Sponsored by:



Fiber Lasers VI: Technology, Systems, and Applications

(Conf. 7195)

Student Paper Competition and Best Student Award Presentation

Convention Center, J2

Thursday 29 January 4:50 to 5:00 pm

For conference 7195: Fiber Lasers VI: Technology, Systems, and Applications, we are pleased to announce that a prize in the amount of \$1,000 US will be awarded to the best student oral presentation in the conference. The award money has been donated by IPG Photonics Corp. and the award will be presented by an IPG Photonics representative.

Qualifying student presentations will be evaluated by a conference steering committee headed by the 2008 student prize winner, Oleksiy Andrusyak. To be eligible for consideration a student must be listed as an author on an accepted paper, must have conducted the majority of the work being presented, and must make the oral presentation. The prize will be awarded based on the quality of the presentation and not on the content of the submitted abstract. Any student papers presented in the Late Breaking Developments session will also be eligible for this award. The winner of the Best Student Presentation Award will be announced during the Student Award Session scheduled to take place on Thursday afternoon.

Award Sponsor:



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MOEMS-MEMS Plenary Session · Monday 26 January
9:00 am to 12:00 pm · Marriott Hotel, San Jose Ballroom Salon III

Welcome and Opening Remarks

Monday 26 January. 9:00 to 9:10 am

Massively Parallel Soft Pen Nanolithography

Monday 26 January. 9:10 to 10:00 am



Chad Mirkin,
Northwestern Univ. (United States)

Abstract: We report the invention of a high throughput, cantilever-free scanning probe lithographic method, termed

Soft Pen Lithography. Soft Pen Lithography uses a soft elastomeric tip array, with as many as approximately eleven million pyramid-shaped pens, to deliver inks to a surface in a “direct write” manner. This technique merges many of the attributes of Dip-Pen Nanolithography (DPN) and contact printing, while avoiding many of their drawbacks, to yield a new inexpensive patterning method that spans the nanometer, micrometer and macroscopic length scales with high throughput. The novel force dependence of Soft Pen Lithography provides an important and tunable parameter that distinguishes it from the many nano- and microfabrication approaches that have been developed to date.

Biography: **Chad Mirkin** is the Director of the International Institute for Nanotechnology, the George B. Rathmann Professor of Chemistry, Professor of Medicine, and Professor of Materials Science and Engineering at Northwestern University. Professor Mirkin is a chemist and a world renowned nanoscience expert who is known for his development of nanoparticle-based biodetection schemes, the invention of Dip-Pen Nanolithography, and contributions to supramolecular chemistry. He is the author of over 335 manuscripts and over 335 patents (71 issued), and the founder of two companies, Nanosphere and NanoInk, which are commercializing nanotechnology applications in the life science and semiconductor industries. At present, he is listed as one of the top 10 most cited chemists in the world, and is the most cited nanomedicine researcher in the world.

Dr. Mirkin holds a B.S. degree from Dickinson College (1986, elected into Phi Beta Kappa) and a Ph.D. degree in chemistry from the Pennsylvania State University (1989). He was an NSF Postdoctoral Fellow at the Massachusetts Institute of Technology prior to becoming a chemistry professor at Northwestern University in 1991.

The High Versatility of Silicon Based Micro-Optical Modulators

Monday 26 January. 10:20 to 11:10 am



Harald Schenk,
Fraunhofer Institute Photonic Microsystems (Germany)

Abstract: “One product, one process”. This MEMS law is true for micro-optical modulators, too and thus puts a high load

on every product and technology development team. On the other hand the law expresses nothing but the high versatility of the underlying usually silicon based technology. A huge variety of applications were an electromagnetic wave experiences a spatial-temporal modulation makes use of this technology: High resolution as well as ultra-compact displays, optical switches in telecommunication as well as data storage devices, spectrometers e. g. for quality control, as well as adaptive optics and pattern generation to mention only a few. The applications completely differ with regard to the requirements in almost all aspects. The most important drivers to use silicon based micro-optical modulators are high accuracy, high bandwidth and high miniaturization. A continuous further development of the technology can be reported. Novel optical, mechanical and electrical working principles are investigated to meet future requirements. After a short overview of the worldwide research and development activities in silicon based micro-optical modulators the high versatility of this technology is detailed by means of selected devices and applications. Single 1D and 2D micro mirrors with diameters up to 4 mm e. g. for projection, imaging and spectroscopy are as well presented and discussed as micro mirror arrays comprising up to 1 million analog deflectable mirrors for image generation and phase modulation in microlithography and adaptive optics.

Biography: **Harald Schenk** is deputy director of Fraunhofer IPMS and head of the business unit Micro Scanner Devices. His work is focused on the development of CMOS-compatible MOEMS devices. Under his leadership several devices were designed, developed and fabricated in small and medium volumes. He is co-founder of HiperScan, a company dedicated to the commercialization of NIR micro spectrometers.

Harald Schenk holds a diploma-degree in physics and PhD-degrees in electrical engineering and physics. He is member of SPIE and VDI/VDE, member of the editorial board of Journal of Micro/nanolithography, MEMS and MOEMS (JM3) and chair of the “MOEMS and Miniaturized Systems” conference as part of SPIE Photonics West. He is author/co-author of more than 80 journal and conference papers and he has 5 issued and more than 20 pending patents in the field of MOEMS. Since 2006 he is teaching at Brandenburg Technical University.

Subwavelength Optical Elements and Nanoimprint Technology for Chip Integration of Optical Systems and MEMS

Monday 26 January. . . 11:10 am to 12:00 pm



Stephen Y. Chou,
Princeton Univ. (United States)

Abstract: To shrink bulk optical systems, integrate them on a chip, and fabricate them monolithically, two new platform technologies (besides guided-wave

integrated optics) are crucial: (a) subwavelength optical elements (SOEs) --a new class of optical devices well suited for miniaturization and wafer level integration, and (b) nanoimprint --an enabling low-cost nanopatterning method.

Subwavelength optical elements (SOEs) are optical devices with the feature size less than the wavelength of light, hence having no non-zero order diffraction. SOEs behave fundamentally different from bulk (i.e. ray) optics or diffraction optics. First, SOEs can create new optical functions that are unavailable in bulk (free-space) or diffractive optics. Second, SOEs can perform an optical function of bulk (free-space) optics, but with a size over three orders of magnitude smaller. And third, SOEs perform different optical functions using different features geometries (shape and size) but the same materials; rather than different materials as in bulk optics. The last two properties of SOEs make them particularly suited for integration of optical systems on a chip. To fabricate SOEs and harvest their potentials, a ultra-high-resolution large-area nanopatterning with high-throughput and low-cost is essential. Among all available nanopatterning methods, nanoimprint lithography (NIL), demonstrated large area 6 nm half-pitch, appears to be one of the most promising technology for SOE fabrication and many other disciplines.

The talk will present principles, applications and commercialization in SOEs and NIL. Using SOEs as optical elements and NIL as the manufacturing technology, our dream of optical systems on a chip—a revolution similar to the vacuum-tube-to-transistor revolution in electronics will be greatly accelerated.

Biography: **Stephen Y. Chou,** Joseph C. Elgin Professor of Engineering, the head of the NanoStructure Laboratory at Princeton University, PhD MIT (1986). Dr. Chou’s pioneering research and inventions have helped shaping new paths in the fields of nanofabrication, nano-scale electronics, optoelectronics, magnetics, biotechnology and materials, and have brought significant impacts to industry. As an entrepreneur, he founded Nanonex and NanoOpto, and is a co-Founder of BioNanoMatrix. Among other awards and honors, Dr. Chou is a member of National Academy of Engineering, IEEE Fellow, Packard Fellow, an Inductee of New Jersey High Technology Hall of Fame, and received IEEE Brunetti Award.

MOEMS/MEMS Interactive Poster Session

Civic Auditorium

Tuesday 27 January 6:00 to 7:30 pm

Conference attendees are invited to attend the MOEMS/MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors: set-up posters between 10:00 am and 5:00 pm on Tuesday. See p. 311 for instructions.

Panel Discussion:

Progress and Prospects in Microfluidics

Fairmont, Gold Room

Wednesday 28 January 7:00 to 8:30 pm

Moderators: **Albert K. Henning**, NanoInk, Inc. (United States); **WanJun Wang**, Louisiana State Univ. (United States)

In the past decade, microfluidics has rapidly emerged and become main stream. Some of the microfluidic products have becoming commercially available with many more to come in the near future. Most microfluidic devices today are made of glass and polymer materials. The main reason for this trend is that the biomedical researchers and analytical chemists have been using these materials for many years and accumulated enough know-how and knowledge. As a matter of fact, this rapid development of microfluidics has been driven by compelling applications in analytical chemistry and biomedical sciences, with enormous potential in developing new technologies and reducing costs. Recent years have seen a number of microfluidic chips brought to market, including those by Agilent and Fluidigm. One little-addressed aspect of microfluidics, however, is on-chip synthesis of microfluidics with optical detection techniques. Another important trend in the recent years is the integration of nanosensing technologies with the MEMS technologies for enhanced system performances. This panel discussion will provide an overview of microfluidics over the past decade, with particular emphasis on progress related to the integration of optical detection and nanosensing technologies in microfluidic systems.



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Introduction and Opening Remarks

Tuesday 27 January 8:00 to 8:05 am

Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics

Tuesday 27 January 8:05 to 8:40 am



Klaus H. Ploog,
Paul Drude Institute for Solid State Electronics (Germany)

Abstract: Progress in the development of novel device functionalities relies heavily on the discovery, the design, and

the fabrication of new materials. Here, I will illustrate the importance of research on materials by means of a examples taken from the field of III-Nitrides. Despite the breakthrough in the field of conventional III-Nitrides (AlN, GaN, and InN binaries and alloys) for device applications more than 15 years ago, there are still numerous open questions to be solved. They have mainly to do with the understanding and control of the materials, including the inferior quantum efficiency of green light emitters, the fabrication of nonpolar heterostructures which are free of internal piezo-electric fields, the growth of bulk III-Nitride crystals as substrate material, the improvement of the InN layer quality, etc. The application of dilute III-Nitrides, which include (Ga,In)(N,P,As) alloys lattice-matched to GaAs, GaP, or Si, in infrared emitters, in multi-junction solar cells, and in heterostructure lasers monolithically integrated with Si-CMOS circuits relies profoundly on the capability to grow these metastable alloys with low defect densities. The addition of small amounts of N to ternary As-rich Ga(P,As) alloys allows to generate quasi-direct-gap material. The successful operation of Ga(N,P,As) quantum well lasers on GaP and Si has recently paved the way to monolithically integrated silicon photonics.

Biography: **Klaus H. Ploog** has been the director of the Paul Drude Institute for Solid State Electronics in Berlin from its foundation in January 1992 until his retirement in September 2006, and he had a position as full professor at the Physics Department of the Humboldt University Berlin from 1993 to 2006. The Paul Drude Institute (PDI) is a government-funded research institution with 80 employees, that is devoted to fundamental and applied research on semiconductor and magnetic nanostructures for novel device concepts and new functionalities. Before that Klaus H. Ploog worked for 17 years at the Max Planck Institute in Stuttgart, where he pioneered the molecular beam epitaxy (MBE) of nanostructured semiconductors which exhibit novel quantum size effects. His scientific achievements have been published in more than 1500 papers in peer-reviewed international journals.

Photonics for Novel High-Performance Computing

Tuesday 27 January 8:40 to 9:20 am



Ray Beausoleil,
HP Labs. (United States)

Abstract: Moore's Law has set great expectations that the performance of information technology will improve exponentially until the end of

the next decade. Although the physics of silicon transistors alone might allow these expectations to be met, the physics of the metal wires that connect these transistors almost certainly will not. We will describe a Si-compatible global interconnect architecture that could precipitate an "optical Moore's Law" and allow exponential performance gains until the transistors themselves become the bottleneck. Based on similar fabrication techniques and technologies, we will also present an approach to an optically-coupled quantum information processor for computation beyond Moore's Law, encouraging the development of practical applications of quantum information technology for commercial utilization.

Biography: **Ray Beausoleil** is a Distinguished Scientist in the Information and Quantum Systems Laboratory at HP Laboratories in Palo Alto, California. He received a B.S. in physics from Caltech in 1980 and the Ph.D. degree in physics from Stanford in 1986. At HP Labs, he performs basic research in microscale and nanoscale quantum optics for classical and quantum information processing.

Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century

Tuesday 27 January 9:20 to 10:00 am



Paras N. Prasad,
State Univ. of New York at Buffalo (United States)

Abstract: This talk will present research being conducted at our Institute showing how photonics is playing

a pivotal role in advancing Nano/Bio/Info Technology by creating new interfaces with them. These interfaces will hold promise to meet many technical challenges of 21st century. Nanophotonics utilizing novel optical manifestations, control of light propagation, and judicious channeling of energy flow on a nanoscale, provides opportunities for high-density integration in information technology and for efficient harvesting of solar energy. Biophotonics deals with utilization of optical interaction for imaging, sensing and therapy, offering exciting opportunities for fundamental research to probe intracellular interactions as well as to produce novel biotechnology to advance human health, particularly in the new field of nanomedicine. New advances in nanobiophotonics provide nanoprobes for biomedical imaging and therapy for cancer as well for other major unmet medical needs such as infectious disease (e.g. bird flu), genetic disorders, drug addiction and obesity.

Biography: **Paras N. Prasad** is a SUNY Distinguished Professor of Chemistry, Physics, Medicine and Electrical Engineering, the highest rank in the New York State university system. He also holds the Samuel P. Capen Chair at the University at Buffalo and is the Executive Director of the Institute for Lasers, Photonics and Biophotonics. He has published over 605 scientific papers, co-edited six books and authored three monographs: *Introduction to Nonlinear Optical Effects in Molecules and Polymers*, with D.J. Williams; *Introduction to Biophotonics and Nanophotonics*. Professor Prasad has been extremely active in transitioning basic research to novel technologies leading to new businesses. He is also a leader in promoting international scientific infrastructures, in Photonics and Nanotechnology particularly to benefit developing countries.

Holography Technical Event

Fairmont Hotel, Atherton Room

Tuesday 27 January 7:30 to 9:00 pm

Chair: **Hans I. Bjelkhagen**, Centre for Modern Optics, OpTIC (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNNT), computer-generated holography (CGH), electro- and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

OPTO Interactive Poster Session

Civic Auditorium

Wednesday 28 January 6:00 to 7:30 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors: set-up posters between 10:00 am and 5:00 pm on Wednesday. See p. 311 for instructions.



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Executive Panel

Silicon Photonics and Optical Interconnects

Convention Center, A6

Tuesday 27 January • 2:00 to 3:00 pm

Demand for smaller and cheaper optical interconnections inside computers is a main driver for silicon photonics, which will create a new market of miniaturized, low-cost photonic components that can leverage the scale of CMOS manufacturing. Learn what industry leaders have discovered at the frontier of silicon photonics and hear how this will revolutionize industries from computing and communication, to biomedicine and imaging.

Panel Moderator:

Peter Hallett, SPIE

Panel Members:

Intel Corp.

Mario Paniccia, Intel Fellow,
Director Photonics Technology Lab.

IBM Zürich Research Lab.

Bert Jan Offrein, Manager Photonics

Hewlett-Packard Labs.

Ray Beausoleil, Principal Scientist

Massachusetts Institute of Technology

Eugene Fitzgerald, Professor of
Materials Engineering

Sun Corp.

Ashok Krishnamoorthy, Distinguished
Engineer

Industry Perspectives

Hot Markets in Photonics: Solar

Convention Center, A6

Tuesday 27 January • 3:30 to 4:30 pm

Photovoltaics technology is enjoying high growth and substantial investment because of worldwide focus on the long-term importance of renewable energy. Delivering on the great promise of solar technology is one of the major opportunities of our time. But many technical challenges remain: efficiency, reliability, cost per watt, and commercialization, to name a few. Explore future directions and promising approaches in ongoing technological development.

Speakers:

Eric Wesoff, Greentech Media

Lawrence Gasman, NanoMarkets

These Free Industry Sessions are open to all registered attendees.

Learn the direction of the industry and priorities for your business

Executive Panel

Executive Perspectives on the World of Optics and Photonics

Convention Center, A6

Wednesday 28 January • 2:00 to 3:00 pm

These top executives representing different aspects of the marketplace will share their insight regarding trends and opportunities in optics and photonics. With the extraordinary experience and resources these experienced executives in technology development, global sales, marketing and manufacturing, you are sure to learn new things about the direction of the industry and priorities for your business.

Panel Moderator:

Tom Hausken, Director, Components Practice at Strategies Unlimited

Panel Members:

CVI Melles Griot

Stuart Schoenmann, President and CEO

Hamamatsu

Kenneth Kaufmann, Vice President

TRUMPF, Inc.

Timothy Morris, Managing Director

Edmund Optics Inc.

Robert Edmund, CEO and Chairman of the Board

COHERENT

Mark Sobey, Senior Vice President, Specialty Laser Systems

Newport Corp.

Randy Heyler, Sr. Director, Strategic Marketing

Bookham Inc.

Kenneth Ibbes, Executive Vice President

Executive Panel

Applications of High-Power Solid State Lasers

Convention Center, A6

Wednesday 28 January • 3:30 to 4:30 pm

Come join a lively discussion of the pros, cons, and the state of the art of high-power lasers, from disc to fiber to diode. Experts in these areas will discuss where they see new applications for high-power lasers emerging and what new markets will be enabled by the adaptable semiconductor laser.

Panel Moderator:

Andrew Brown, SPIE

Panel Members:

IPG Photonics Corp.

Bill Shiner, Vice-President of Industrial Markets

TRUMPF, Inc.

Friedhelm Dorsch, Managing Director, Diode Lasers

Coherent

Sri Venkat, Marketing Director, Materials Processing

Spectra-Physics/Newport

Jim Harrison, Senior Director

ROFIN-SINAR Laser GmbH

Ulrich Hefter, Technical Director



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Attend the Career Fair at Photonics West

Two Days Only – Free Admission – Registration Required

Exhibition Level, Convention Center
Almaden Concourse near the Hilton Hotel Entrance

Tuesday 27 January 10:00 am-3:00 pm

Wednesday 28 January 10:00 am-3:00 pm

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- Learn more about opportunities in our industry
- Network!

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Special Events

Networking Events • Student Events • SPIE Member Events

Make the most of your time at SPIE Photonics West through these social and networking events, and sharpen your career skills through professional development workshops and special events for students.



Fellows Luncheon

Fairmont, Club Regent

Monday 26 January 12:00 to 1:30 pm

All Fellows of SPIE are invited to join your colleagues for an SPIE hosted luncheon. The new SPIE Fellows attending Photonics West will be introduced and recognized. Please join us for this informal gathering and a chance to interact with other Fellows.

Lunch with the Experts

A BIOS Student Networking Event

Marriot Hotel, San Jose Ballroom, Salon III

Sunday 25 January 12:30 to 1:30 pm

Seating Limited. Ticket Required (supplied with badge).

Enjoy a casual meal with colleagues at this engaging networking opportunity, hosted by SPIE Student Services. This event features experts willing to share their experience and wisdom on career paths in biomedical optics. Lunch is complimentary to all BIOS students.

Early Career Networking Social

Fairmont, Sacramento

Monday 26 January 5:00 to 6:00 pm

Open to All Early Career Professionals

Meet distinguished SPIE contributors for a casual pre-dinner social. This event promises one on one networking opportunities with some of SPIE's most influential volunteers from committees and leadership.

All-Symposium Welcome Reception

Fairmont, Imperial Ballroom

Monday 26 January 6:30 to 8:00 pm

All attendees are invited to relax, socialize, and enjoy refreshments at the Fairmont Hotel, Imperial Ballroom. Please remember to wear your conference registration badges. Dress is casual.

SPIE Member Reception

California Theatre • 345 S. First Street

Monday 26 January 6:30 to 8:00 pm

(For SPIE Members Only)

All SPIE Members are invited to this reception in their honor. Come relax and talk with your colleagues. Refreshments will be served. Please note: this reception is limited to SPIE Members only. Membership cards or invitations will be requested at the entrance. If you join SPIE on-site, please bring your registration receipt. Dress is casual or business attire.

“No Ties” Student Social

Monday 26 January 8:00 to 10:00 pm

Student Conference Attendees Only.

Relax and hang out with new friends and peers while enjoying the atmosphere of a great off-site venue. No ties required but please bring photo ID—this is a licensed event (21 and older).

Directions to Student Social:

The Loft Bar and Bisto
90 S. 2nd St.

From the Convention Center:
Turn right onto W San Carlos St.
Turn left onto S 2nd St.
Continue past E San Fernando St.

The Loft Bar and Bisto will be on your right.



Women in Optics Calendar

Pick-up a free copy of the 2009 SPIE Women in Optics Monthly Planner at the SPIE Marketplace while supplies last. The planning calendar spotlights university professors, business owners, an astronaut, and other women in photonics making a difference in the world through their work in optics.

Student Lunch with the Experts—A Networking Event

Tuesday 27 January 12:30 to 1:30 pm

Advance sign-up by 5:00 pm Monday in the Marketplace required. Location is available upon sign-up.

Enjoy a casual meal with colleagues at this engaging networking opportunity. This event features experts willing to share their experience and wisdom on career paths in optics and photonics and an awards presentation for Newport Spectra-Physics travel grant winners. Lunch is complimentary to all students.

Sponsored by:



Newport and Spectra-Physics Research Excellence Travel Awards

The Newport Spectra-Physics Research Excellence Travel Awards Program provides financial support for university students to attend the two largest SPIE meetings in order to present their research. These travel grants are open to any student who has an accepted paper for presentation at Photonics West or Optics + Photonics. Recipients will be selected based on both the quality of the original research described in the submitted paper(s) and financial need.

For application information for this and other SPIE travel grants visit Scholarships and Grants online at spie.org/scholarships.

Women in Optics Presentation and Reception

Fairmont, Atherton Room

Tuesday 27 January 4:30 to 6:00 pm

Open to all conference attendees.

Join us for an evening of networking and inspiration. Connect with others in our industry while enjoying wine and cheese refreshments.

Speaker: Persis S. Drell
Director, Stanford Linear Accelerator Center,
Stanford University

Presentation to be announced





Professional Development Speaker Series

Fairmont, Sacramento

Sunday 25 January 1:30 to 5:00 pm

Open to All Attendees

Join us for a professional development speaker series exploring issues of entrepreneurship, career development, and skills to help you get there.

1:30-2:30: **Delivery of Successful Professional Conference Presentations**

Dr. Richard Youngworth, Light Capture

The importance of communicating ideas and information in the technical community remains very high. In this presentation, a number of different facets of planning and delivery of conference presentations and posters will be highlighted. Strategy, preparation, delivery, and follow-through for conference presentations will all be covered. The important topic of specific slide design is covered in other SPIE offerings and is only cursorily covered in this presentation.

2:35-3:20: **Managing Career and Family**

Dr. Theresa Axenson, Lockheed Martin Missiles & Fire Control

The prospect of simultaneously managing a career and a family can be daunting. Dr. Axenson will talk about her career experiences, including her perspective on when to make career changes and how to maintain equilibrium between a successful career and a family. Dr. Axenson currently balances her duties as the PI on two IRAD efforts along with being a loving mother of her two young children.

3:25-4:10: **The Business of Engineering: Managing the Transition from Academia**

Dr. Siavash Yazdanfar, GE Research

4:15-5:00: **Professional Networking for Scientists**

Dirk Fabian, SPIE

Making connections is vital to success in any field, but scientists and engineers face some special challenges. This active workshop will present several tools that you can use to get your name and work noticed the right way.

Attend the SPIEWorks Career Fair!

SPIE Works

A Special 2-Day Event

Exhibition Level, Convention Center, Almaden Concourse near the Hilton Hotel Entrance

Tuesday 27 January . . . 10:00 am to 3:00 pm

Wednesday 28 January. 10:00 am to 3:00 pm

Top employers are coming together to interview and hire engineers and scientists like you. The SPIEWorks Career Fair at Photonics West is a great place to:

- Get 'face to face' time with employers and interview on the spot
- Learn more about the jobs available in our industry
- Network!

Free Admission; Registration Required.

Whether you are looking for a better job, re-entering the workforce or just starting your career, the SPIEWorks Career Fair is the place to start!

In addition to the onsite recruitment activities listed above, SPIEWorks offers you online services to help you with your search for employment before, during, and after the conference. Visit spieworks.com to post your resume, view jobs, or sign-up for "Job Alerts."

Free Services for Employers

- Stop by the SPIEWorks booth in the Career Fair and gain access to our proprietary resume database at no charge.
- Post jobs for free. That's right, there's no charge to post jobs to the Photonics West Career Fair. Go to spieworks.com, create an account and sign-in to post jobs online. Your free job(s) will be live 26 January-1 February.

For information on future recruiting events contact Dave Baggenstos at +1 360 715 3705 or email sales@spieworks.com



The Power of Procrastination

Fairmont, Club Regent

Wednesday 28 January 7:30 to 8:30 pm

Get a dose of humor! A recent survey by U.C. Berkeley found that 95% of all graduate students feel overwhelmed, and over 67% have felt seriously depressed at some point in their careers. In this talk, Jorge Cham, creator of the popular comic "Piled Higher & Deeper," recounts his experiences bringing humor into the lives of stressed out academics, examines the source of their anxieties and explores the guilt, the myth, and the power of procrastination.

Sponsored by: SPIE Works 



Getting Hired in 2009 and Beyond

Fairmont, Club Regent

Wednesday 28 January 8:30 to 10:00pm

Join us for a panel discussion on careers in optics and photonics outside the academic world. Learn about getting hired at tech-based companies and non-academic jobs directly from human resource professionals in the optics and photonics sector. Bring your questions for the panelists and stay for refreshments and networking after the event.

Panelists:

Marisa Edmund, VP of Marketing & Communications, Edmund Optics

David Gentes, Recruiting Manager, MIT Lincoln Laboratory

Mark Martella, Engineering Manager, Ball Aerospace

Linda Usher, President, ESG

Join Jorge in the SPIE Marketplace for a book signing 3:30 to 4:30 pm Wednesday

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Courses

Industry Workshops



Basic Optics

Basic Optics for Non-Optics Personnel

WS609 Course level: Introductory
CEU .20 \$125 / \$175 USD
Monday 8:30 to 11:00 am

This course will provide the technical manager, sales engineering, marketing staff, or other non-optics personnel with a basic understanding of the terms, specifications, and measurements used in optical technology to facilitate effective communication with optics professionals on a functional level.

Instructor: **Kevin Harding** has been active in the optics industry for over 30 years, and has taught machine vision and optical methods for over 25 years in over 70 workshops and tutorials.

Understanding Laser Beam Performance Specifications

WS847 Course level: Introductory
CEU .35 \$340 / \$395 USD
Sunday 1:30 to 5:30 pm

This workshop will provide attendees with a basic understanding of laser beam performance specifications.

Instructor: **Sydney Sukuta** started his teaching career at California State University Fresno in 1990 while he was a physics graduate student, and he has now taught at numerous academic institutions that include the University of Nevada Reno, the University of Phoenix's Reno and Online campuses.



Business, Patents + IP

Project Management for Rapid Product Development

WS936 Course level: Intermediate
CEU .35 \$340 / \$395 USD
Wednesday 1:30 to 5:30 pm

This half-day course is designed to meet the specific needs of engineering leads who must deliver results in challenging environments. You'll learn the most important aspects of project management for reducing cycle time by applying proven methods and tools to your product development process.

Instructor: **Gary Hinkle** is president and founder of Auxilium, Inc. His experience includes a broad variety of management and staff assignments with small, medium, and large companies involved in the development and manufacturing of high-tech products.

Complying with the ITAR: A Case Study

WS933 Course level: Introductory
CEU .35 \$340 / \$395 USD
Tuesday 8:30 am to 12:30 pm

This workshop will begin with a brief contextual overview of U.S. export controls. Real world situations and lessons learned will be shared. You will also learn about current enforcement trends and best practices for avoiding violations.

Instructor: **Kerry Scarlott** is a partner at Posternak Blankstein & Lund LLP, where he focuses his practice on business law and international trade.

The Nuts and Bolts of Patenting

NEW

WS934 Course level: Introductory
CEU .35 \$340 / \$395 USD
Monday 8:30 am to 12:30 pm

This course will provide attendees with key working skills crucial to the patenting process.

Instructor: **Nadya Reingand** is an Intellectual Property Counsel at CeLight, Inc. Dr. Reingand has over 10 years of experience in patent filing and prosecution; she has been a part of the USPTO team of frontiers that assists the PT Office with the electronic filing system.

Intellectual Property for High-Tech Business

WS412 Course level: Introductory
CEU .35 \$340 / \$395 USD
Tuesday 8:30 am to 12:30 pm

The main aim of this course is to provide the audience with an overview of how IP is used in high-tech business, with an emphasis on providing a realistic and grounded perspective on what IP is and how it is generated, developed, protected and leveraged by sophisticated high-tech businesses.

Instructor: **Joseph Gortych** is a registered patent attorney and is president Opticus IP Law, PLLC, an IP law firm based in Sarasota, Florida. He specializes in the strategic development, management and protection of intellectual property for optics, photonics and semiconductor technologies.

Creating a New Technology Venture

WS967 Course level: Introductory
CEU .65 \$565 / \$675 USD
Sunday 8:30 am to 5:30 pm

This course will explore the entrepreneurial process of creating a new technology venture.

Instructor: **Dennis Pape** has over twenty five years of experience with high technology companies from research scientist to manager to start-up founder to entrepreneur, corporate, and investor advisor.

Registration is required.
See SPIE Cashier to Register.

Professional Development Workshops

Hands-On Optics (HOO)- Making an Impact with Light: Terrific Telescopes Workshop

WS852 Course level: Introductory
CEU .30 \$10 / \$20 USD
Sunday 8:30 to 11:30 am

This workshop will train attendees on the use of Terrific Telescopes, a hands-on activity kit intended to engage and enrich the math/science learning experience for students in the middle grades.

Instructor: **Celeste Baine** runs the popular website EngineerInGedu.com where she promotes science and engineering learning for all ages.

Effective Technical Presentations

WS897 Course level: Introductory
CEU .35 \$125 / \$175 USD
Monday 8:30 am to 12:30 pm

This course proposes a five-step methodology that will take you from scratch to an effective technical presentation.

Instructor: **Jean-luc Doumont** runs lectures, workshops, and training programs in oral, written, and graphical communication for engineers, scientists, and managers worldwide. He is an engineer from the University of Louvain and a doctor in applied physics from Stanford University. This course is based on his popular lecture on oral presentations at over 15 top-ranked engineering schools (MIT, Stanford U, UC Berkeley, Caltech, Harvard, etc.).

Effective Scientific Papers

WS908 Course level: Introductory
CEU .35 \$125 / \$175 USD
Monday 1:30 to 5:30 pm

Strong writing skills are a key to success for researchers. This course proposes a methodology that will take you from scratch to an effective scientific or technical document—a question of structure, not style.

Instructor: **Jean-luc Doumont** runs lectures, workshops, and training programs in oral, written, and graphical communication for engineers, scientists, and managers worldwide.

Technology Roadmapping

WS941 Course level: Introductory
CEU 0.35 \$100 / \$150 USD
Tuesday 8:30 am to 12:30 pm

This course provides attendees with a methodology to generate a Product Technology Roadmap. These high level-planning tools support technology management in a rapid development environment. Such maps are effective communication tools as they allow the user to visualise the evolution of markets, products and technologies – and the linkages between them.

Instructor: **John McAleese** is a freelance consultant who has delivered this type of training to various international audiences in countries such as England, the USA and Russia; to enterprises large and small.



Essential Skills for Engineering Project Leaders

WS846 Course level: Introductory
CEU .35 \$340 / \$395 USD
Wednesday 8:30 am to 12:30 pm

This workshop teaches skills needed to lead technical projects, drive innovation, and influence others.

Instructor: **Gary Hinkle** is President and founder of Auxilium, Inc. His experience includes a broad variety of management and staff assignments with small, medium, and large companies involved in the development and manufacturing of high-tech products.

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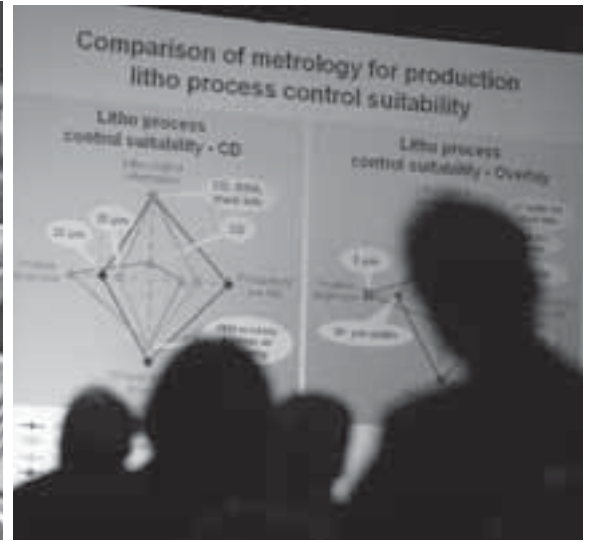
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Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Biomedical Spectroscopy, Microscopy, and Imaging					
SC819 Multiphoton Microscopy (MM) - Basics, Technology Development, and Applications (Periasamy, So) 8:30 am to 5:30 pm, \$565 / \$675	SC868 Optical Design for Biomedical Imaging (Liang) 8:30 am to 12:30 pm, \$340 / \$395		SC865 Microscope Design (Seward) 8:30 am to 12:30 pm, \$340 / \$395	SC823 Diagnostic Endoscopy (Zeng) 8:30 am to 12:30 pm, \$340 / \$395	
Clinical Technologies and Systems					
	SC312 Principles and Applications of Optical Coherence Tomography (Fujimoto) 1:30 to 5:30 pm, \$340 / \$395		Registration is required. See SPIE Cashier to Register.		
Devices/Applications/Reliability					
			SC386 Advanced Thermal Management Materials for Optoelectronic and MEMS/MOEMS Packaging (Zweber) 8:30 am to 5:30 pm, \$565 / \$675		
Laser Communication and Propagation					
			SC188 Laser Beam Propagation for Applications in Laser Communications, Laser Radar, and Active Imaging (Phillips, Andrews) 8:30 am to 5:30 pm, \$680 / \$790		
Laser Micro-/Nanoengineering and Applications					
		SC743 Micromachining with Femtosecond Lasers (Nolte, Schaffer) 1:30 to 5:30 pm, \$340 / \$395	SC869 Process Fundamentals of Industrial Laser Welding (Havrilla) 8:30 am to 5:30 pm, \$565 / \$675		
			SC689 Introduction to microMachining Using Lasers (Schaeffer) 1:30 to 5:30 pm, \$340 / \$395		
			SC386 Advanced Thermal Management Materials for Optoelectronic and MEMS/MOEMS Packaging (Zweber) 8:30 am to 5:30 pm, \$565 / \$675		



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Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Laser Source Engineering					
SC752 Solid State Laser Technology (Hodgson) 8:30 am to 5:30 pm, \$680 / \$785	SC861 The Basics of Physics and Engineering of Lasers (Kalisky) 8:30 am to 12:30 pm, \$340 / \$395		SC931 Applied Nonlinear Frequency Conversion (Paschotta) 8:30 am to 5:30 pm, \$565 / \$675	SC860 Resonator Design for Solid State Lasers (Paschotta) 8:30 am to 5:30 pm, \$565 / \$675	
	SC748 High-Power Fiber Sources (Nilsson) 1:30 to 5:30 pm, \$340 / \$395		SC869 Process Fundamentals of Industrial Laser Welding (Havrilla) 8:30 am to 5:30 pm, \$565 / \$675	SC744 Ultrafast Fiber Lasers (Fermann) 1:30 to 5:30 pm, \$340 / \$395	
	SC746 Introduction to Ultrafast Technology (Trebino) 1:30 to 5:30 pm, \$340 / \$395		SC386 Advanced Thermal Management Materials for Optoelectronic and MEMS/MOEMS Packaging (Zweben) 8:30 am to 5:30 pm, \$565 / \$675		
	SC818 Laser Beam Quality (Paschotta) 1:30 to 5:30 pm, \$340 / \$395				
Micro/Nanofabrication					
		SC743 Micromachining with Femtosecond Lasers (Nolte, Schaffer) 1:30 to 5:30 pm, \$340 / \$395	SC386 Advanced Thermal Management Materials for Optoelectronic and MEMS/MOEMS Packaging (Zweben) 8:30 am to 5:30 pm, \$565 / \$675		SC532 Micro- and Nanofluidics - Technology and Applications (Gaertner) 8:30 am to 12:30 pm, \$340 / \$395
			SC689 Introduction to MicroMachining Using Lasers (Schaeffer) 1:30 to 5:30 pm, \$340 / \$395		
Nano/Biophotonics					
	SC309 Fluorescent Markers: Usage and Optical System Optimization (Levi) 8:30 am to 12:30 pm, \$340 / \$395	SC463 Biophotonics (Prasad) 8:30 am to 5:30 pm, \$635 / \$745		SC790 Liquid Crystals: From Fundamentals to Applications (Smalyukh) 8:30 am to 5:30 pm, \$565 / \$675	SC727 Nanoplasmonics (Stockman) 8:30 am to 5:30 pm, \$565 / \$675
	SC461 Bio-Optical Detection Systems (Levi) 1:30 to 5:30 pm, \$340 / \$395	SC742 Nano-Photonics: Physics and Techniques (Scherer) 8:30 am to 12:30 pm, \$340 / \$395			
Nanotechnologies in Photonics					
		SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (Johnson) 1:30 to 5:30 pm, \$385 / \$440			

Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Nonlinear Optics					
		SC047 Introduction to Nonlinear Optics (Fisher) 8:30 am to 5:30 pm, \$565 / \$675	SC931 Applied NEW Nonlinear Frequency Conversion (Paschotta) 8:30 am to 5:30 pm, \$565 / \$675		
Optics and Optical Engineering					
	SC935 Introduction to NEW Lens Design (Bentley) 8:30 am to 12:30 pm, \$340 / \$395	SC156 Basic Optics for Engineers (Ducharme) 8:30 am to 5:30 pm, \$600 / \$710	SC003 Practical Optical System Design- EXPANDED 2-Day Format (Fischer) 8:30 am to 5:30 pm, \$1125 / \$1380	SC912 Intermediate NEW Lens Design (Bentley) 8:30 am to 5:30 pm, \$650 / \$760	SC690b Optical System Design: Layout Principles and Practice (Greivenkamp) 8:30 am to 5:30 pm, \$670 / \$780
	SC690a Optical System Design: Layout Principles and Practice (Greivenkamp) 8:30 am to 5:30 pm, \$670 / \$780	SC720 Cost-Conscious Tolerancing of Optical Systems (Youngworth) 8:30 am to 12:30 pm, \$340 / \$395	SC206 Polarized Light: A Practical Hands-on Introduction (Fisher) 8:30 am to 5:30 pm, \$565 / \$675	SC552 Aspheric Optics: Design, Fabrication, and Test (Fischer) 1:30 to 5:30 pm, \$340 / \$395	
	SC212 Modern Optical Testing (Wyant) 1:30 to 5:30 pm, \$370 / \$420	SC702 Optics and Optical Quality of the Human Eye (Roorda) 8:30 am to 12:30 pm, \$340 / \$395	SC011 Design of Efficient Illumination Systems (Cassarly) 1:30 to 5:30 pm, \$340 / \$395		
		SC003 Practical Optical System Design - EXPANDED 2-Day Format (Fischer) 8:30 am to 5:30 pm, \$1125 / \$1380			
		SC017 Principles of NEW Fourier Optics and Diffraction (Gaskill) 8:30 am to 5:30 pm, \$670 / \$780			
		SC321 Thin Film Optical Coatings (Macleod) 8:30 am to 5:30 pm, \$565 / \$675			
		SC932 Ophthalmic Adaptive Optics (Miller) 1:30 to 5:30 pm, \$340 / \$395			
		SC384 The Design of Plastic Optical Systems (Schaub) 1:30 to 5:30 pm, \$340 / \$395			

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Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Optoelectronic Materials and Devices					
		SC864 Introduction to Optical Simulation Using the Finite-Difference Frequency-Domain Method (Rumpf) 1:30 to 5:30 pm, \$340 / \$395	SC386 Advanced Thermal Management Materials for Optoelectronic and MEMS/MOEMS Packaging (Zweben) 8:30 am to 5:30 pm, \$565 / \$675	SC790 Liquid Crystals: From Fundamentals to Applications (Smalyukh) 8:30 am to 5:30 pm, \$565 / \$675	
				SC547 Terahertz Wave Technology and Applications (Zhang) 8:30 am to 12:30 pm, \$340 / \$395	
					SC822 Principles of GaN-based Devices (Pipek) 1:30 to 5:30 pm, \$450 / \$500
Optomechanics					
	SC013 Precision Mounting of Optical Components (Yoder) 8:30 am to 5:30 pm, \$650 / \$760	SC015 Structural Adhesives for Optical Bonding (Daly) 8:30 am to 12:30 pm, \$340 / \$395	SC010 Introduction to Optical Alignment Techniques (Ruda) 8:30 am to 5:30 pm, \$955 / \$1110		
			SC781 Optomechanical Analysis (Hatheway) 8:30 am to 5:30 pm, \$565 / \$675		
Photonic Integration					
			SC817 Silicon Photonics (Michel, Saini) 1:30 to 5:30 pm, \$340 / \$395		
Photonic Therapeutics and Diagnostics					
		SC702 Optics and Optical Quality of the Human Eye (Roorda) 8:30 am to 12:30 pm, \$340 / \$395			
		SC932 Ophthalmic Adaptive Optics (Miller) 1:30 to 5:30 pm, \$340 / \$395			

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Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Semiconductor Lasers and LEDs					
	SC448 Diode Lasers: How to Select the Best Laser for Your Application (Linden) 1:30 to 5:30 pm, \$340 / \$395	SC657 Accurate Measurement of LED Optical Properties (Tirpak) 8:30 am to 12:30 pm, \$340 / \$395	SC869 Process Fundamentals of Industrial Laser Welding (Havrilla) 8:30 am to 5:30 pm, \$565 / \$675	SC877 Introduction to High Power Diode Laser Technology (Roh) 8:30 am to 12:30 pm, \$340 / \$395	
		SC052 Light-Emitting Diodes (Schubert) 1:30 to 5:30 pm, \$400 / \$460	SC011 Design of Efficient Illumination Systems (Cassarly) 1:30 to 5:30 pm, \$340 / \$395	SC822 Principles of GaN-based Devices (Piperek) 8:30 am to 12:30 pm, \$450 / \$500	
			SC053 Testing and Reliability of Semiconductor Lasers (Lear) 1:30 to 5:30 pm, \$340 / \$395		
Standards					
		SC700 Understanding Scratch and Dig Specifications (Aikens) 1:30 to 5:30 pm, \$390 / \$445		SC863 Understanding ISO-10110: The Optics Drawing Standard (Aikens) 8:30 am to 5:30 pm, \$740 / \$850	
				SC862 Updated US and International Laser Product Certification Requirements (Stoev) 8:30 am to 5:30 pm, \$565 / \$675	
Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering					
SC768 Optoacoustic Systems for Medical Imaging: From Principles to Clinical Applications (Oraevsky) 1:30 to 5:30 pm, \$340 / \$395	SC029 Tissue Optics (Jacques) 1:30 to 5:30 pm, \$340 / \$395			SC824 Diffuse Light Transport in Tissue and Diffuse Tomography Reconstruction using MATLAB (Dehghani, Pogue) 8:30 am to 5:30 pm, \$565 / \$675	



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Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Displays and Holography					
			SC821 Holographic Techniques for Advanced Photonic Systems <i>(Kostuk)</i> 8:30 am to 12:30 pm, \$340 / \$395	SC790 Liquid Crystals: From Fundamentals to Applications <i>(Smalyukh)</i> 8:30 am to 5:30 pm, \$565 / \$675	
			SC386 Advanced Thermal Management Materials for Optoelectronic and MEMS/MOEMS Packaging <i>(Zweben)</i> 8:30 am to 5:30 pm, \$565 / \$675		
Industry Workshops					
Basic Optics					
WS847 Understanding Laser Beam Performance Specifications <i>(Sukuta)</i> 1:30 to 5:30 pm, \$340 / \$395		WS609 Basic Optics for Non-Optics Personnel <i>(Harding)</i> 8:30 to 11:00 am, \$125 / \$175			
Business, Patents + IP					
WS867 Creating a New Technology Venture <i>(Pape)</i> 8:30 am to 5:30 pm, \$565 / \$675		WS934 The Nuts <i>NEW</i> and Bolts of Patenting <i>(Reingand)</i> 8:30 am to 12:30 pm, \$340 / \$395		WS933 Complying <i>NEW</i> with the ITAR: A Case Study <i>(Scarlott)</i> 8:30 am to 12:30 pm, \$340 / \$395	
				WS936 Project <i>NEW</i> Management for Rapid Product Development <i>(Hinkle)</i> 1:30 to 5:30 pm, \$340 / \$395	
				WS412 Intellectual Property for High-Tech Business <i>(Gortych)</i> 8:30 am to 12:30 pm, \$340 / \$395	
				WS941 Technology Roadmapping <i>(McAleese)</i> 8:30 am to 12:30 pm, \$100 / \$150	
Professional Development Workshops					
WS852 Hands-On Optics (HOO) - Making an Impact with Light: Terrific Telescopes Workshop <i>(Baine)</i> 8:30 to 11:30 am, \$10 / \$20		WS897 Effective Technical Presentations <i>(Dumont)</i> 8:30 am to 12:30 pm, \$125 / \$175		WS846 Essential Skills for Engineering Project Leaders <i>(Hinkle)</i> 8:30 am to 12:30 pm, \$340 / \$395	
		WS908 Effective Scientific Papers <i>(Dumont)</i> 1:30 to 5:30 pm, \$125 / \$175			

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Product Demonstrations – Demo Area I – Hall 1

	Tuesday 27 January	Wednesday 28 January	Thursday 29 January	
10:30 am	Calcium Fluoride and Fused Silica for Versatile Optical Applications Daniel Hahn, SCHOTT North America, Inc.	Miniaturized Spectrometer for Online Analysis Thierry Berthou, SILIOS Technologies		
11:30 am	2nd Generation of Gaussian-to-Top-Hat Converters Largely Improve Laser Scribing Oliver Homburg, LIMO Lissotschenko Mikrooptik GmbH	Expanding Applications for Infrared Zoom Jonathan S. Kane, IRZoom.com / Computer Optics, Inc.		
12:30 pm		Integrated Camera Unit Alan Hamill, PHOTONIS		
1:30 pm	How Micromotors Drive New Performance in Smaller Products Dan Viggiano III, New Scale Technologies	High Brightness Solutions for Industrial Applications Michael Kauf, Newport Corporation		JenLas® Disk IR 50 Thin-Disk Laser with Adjustable Laser Parameters Christon Manzella, JENOPTIK Laser, Optik, Systeme GmbH
2:30 pm	Latest Results and New Products for Multi-Pixel Photon Counter Earl Hergert, Hamamatsu Corporation	UV Light - Demands on Optical Systems Thomas Thoeniss, LINOS Photonics, Inc.		
3:30 pm	LED Results. Half the Footprint. Greg McKee, Labsphere	New High Speed, High Resolution InGaAs-NIR Line Scan Camera Doug Malchow, Sensors Unlimited, Inc., part of Goodrich Corporation		

Product Demonstrations – Demo Area II – Hall 3

	Tuesday 27 January	Wednesday 28 January	Thursday 29 January
10:30 am	FLIR Silver IR Camera and ExaminIR Software: Getting Good Data David Bursell, FLIR Systems, Inc.	PicoSpark™: A Clean and Green Picosecond Machining Laser Ludovic Brasse, Teem Photonics	
11:30 am	Next Generation High-Performance Programmable Zoom Imaging William Gilman, Qioptiq Imaging Solutions	Sophisticated Optical Components and Systems Rainer Schuhmann, Berliner Glas	
12:30 pm	High Performance UV Filters Markus Bilger, JDSU	SL Sys Neo: Innovative Solution for Small Lenses Testing Jerome Ballesta, Imagine Optic	
1:30 pm	Continuum Introduces 5J Green Pump Laser Michael LaHa, Continuum	The Optometronic 4000™ Photonics Workstation David Lewis, Nanonics Imaging Ltd.	Structural and Chemical NanoCharacterization—The Interface Between Raman and AFM David Lewis, Nanonics Imaging Ltd.
2:30 pm	Solar Cell Dan Herrmann, RSoft Design Group Solar Cell	Introducing...New Cameras and Spectrographs from PI Ravi Guntupalli, Chris Draves, Manjul Shah, Princeton Instruments	
3:30 pm		High Power Semiconductor Laser Modules Laurent Vaissié, QPC Lasers, Inc.	

Product Demonstrations – Demo Area III – South Hall 1

TIME	Tuesday 27 January	Wednesday 28 January	Thursday 29 January
10:30 am	Smart Future with Flexible Microbolometer Camera from XenICs Luc DeBrouckere, XenICs Agent for US and Canada	Scanning Photon Microscope based on a 2D Microscanner Michael Scholles, Fraunhofer IPMS	Ideal Detector Characteristics for Iris Recognition Bruce True, Intevac Photonics, Inc.
11:30 am	A Highly Flexible and Innovative Adaptive Optics Technology Frederic Rooms, ALPAO	Ultra Compact One-Piece HD Camera with True 1920 x 1080 res. Ian Tobi, Toshiba Imaging	Zaber: Installation is Easy as 1-2-3 Jesse Schuhlein, Zaber Technologies
12:30 pm	A New Series of LUXBEAM® Light Engines for Industrial DLP® Applications Oyvind Tafjord, Visitech AS	Compact ECqCL Products for Mid-IR Detection and Illumination Eric Takeuchi, Daylight Solutions	
1:30 pm	Measure Laser Pulse Energy Over 100,000 pps with New Mach 5 Don Dooley, Spectrum Detector, Inc.	Industry Oriented Femtosecond Laser and its Applications Tetsumi Sumiyoshi, Cyber Laser Inc.	
2:30 pm	Optical Manufacturing in SESO Denis Fappani, SESO	Laser MicroJet® for precision machining applications Notker Kling, Synova	
3:30 pm	Ultra Stable, Ultra Narrow Linewidth, 'Virtual Ring' Fiber Lasers Yaakov Shevy, Orbits Lightwave, Inc.	Measure Laser Pulse Energy Over 100,000 pps with New Mach 5 Don Dooley, Spectrum Detector, Inc.	
4:30 pm	LIRA5S Brian Elias, Cal Sensors, Inc.	Digital Wavefront Sensors Iger Lyuboshenko, PhaseView	

Crosslight Software Tutorial on Optoelectronic Device Simulation

Thursday 1:30 to 5:30 pm

To register for the tutorial and receive a free Crosslight Software software training license, please e-mail your contact information to pirek@nusod.org. More information on the tutorial is available at <http://www.nusod.org/crosslight09pw.html>.

The tutorial gives an introduction to high-end simulation tools for electronic and optoelectronic devices (APSYS, LASTIP, PICS3D by Crosslight Software Inc., see www.crosslight.com). These software packages combine electrical, thermal, optical, and quantum-mechanical models in two or three dimensions. They can be applied to a large variety of semiconductor devices such as laser diodes, light-emitting diodes, solar cells, photodetectors, modulators, amplifiers, and transistors. The tutorial explains and demonstrates the basic operation of these software tools. Model options and material parameters are discussed, and strategies for obtaining realistic simulation results are outlined. Deep insight into micro- and nano-scale physical processes is provided using realistic device examples.

INTENDED AUDIENCE: Students, device engineers, and researchers who are interested in using advanced simulation software for designing and analyzing modern optoelectronic devices.

INSTRUCTOR: Joachim Pirek has been using Crosslight Software tools for more than 10 years in design and analysis of practical devices. He has published three books on semiconductor device simulation, co-chairs the annual conference on Numerical Simulation of Optoelectronic Devices, and gives device simulation courses at universities and companies worldwide. Dr. Pirek is currently president of the NUSOD Institute (www.nusod.org).

To register for the tutorial and receive a free Crosslight Software software training license, please e-mail your contact information to pirek@nusod.org. More information on the tutorial is available at <http://www.nusod.org/crosslight09pw.html>.

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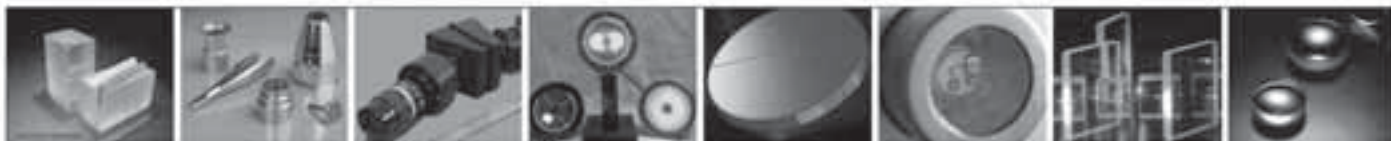
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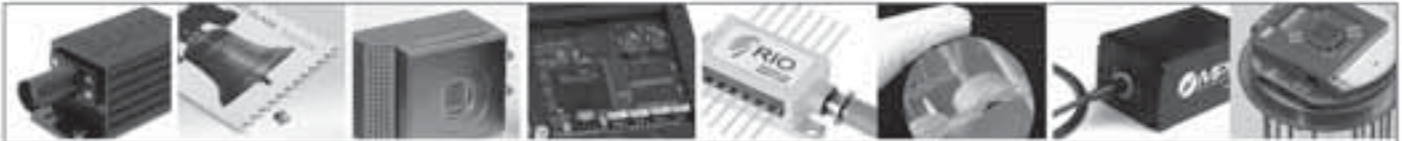


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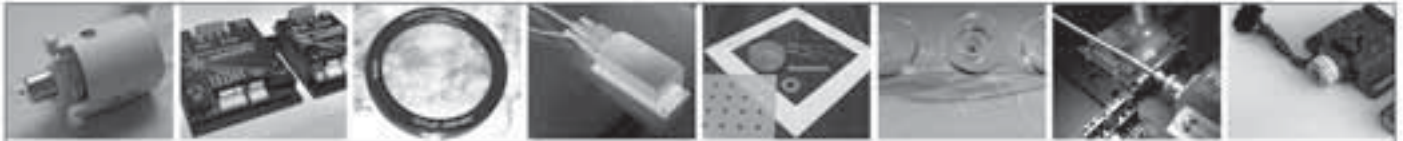
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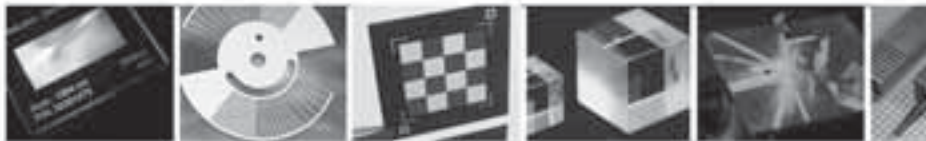


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BIOS

Part of SPIE Photonics West

Conferences + Courses: 24–29 January

BIOS Exhibition: 24–25 January

Photonics West Exhibition: 27–29 January

San Jose Convention Center

San Jose, California USA

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Symposium Chairs:



James Fujimoto, Massachusetts Institute of Technology (United States)



R. Rox Anderson, M.D., Wellman Center for Photomedicine, Massachusetts General Hospital and Harvard School of Medicine (United States)

Photonic Therapeutics and Diagnostics

Program Chair: **Reza S. Malek M.D.**, Mayo Clinic

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh**, Duke Univ.;
Anita Mahadevan-Jansen, Vanderbilt Univ.

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven Jacques**, Oregon Health and Science Univ.;
William P. Roach, Air Force Research Lab.

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia;
Daniel Farkas, Cedars-Sinai Medical Ctr.

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/Buffalo;
Dan Nicolau, The Univ. of Liverpool (United Kingdom)

Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
24 January	25 January	26 January	27 January	28 January	29 January

Photonic Therapeutics and Diagnostics

Program Chair: **Reza S. Malek M.D.**, Mayo Clinic

7161A	Photonics in Dermatology and Plastic Surgery (Kollias, Choi, Zeng) p. 55
7161B	Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy (Malek) p. 57
7161C	Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technology (Wong, Ilgner) p. 59
7161D	Diagnostic and Therapeutic Applications of Light in Cardiology (Gregory, Tearney, Marcu) p. 60
7161E	Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (Hirschberg, Madsen) p. 62
7162	Lasers in Dentistry XV (Rechmann, Fried) p. 65
7163	Ophthalmic Technologies XIX (Manns, Söderberg, Ho) p. 67
7164	Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XVIII (Kessel) p. 71
7165	Mechanisms for Low-Light Therapy IV (Hamblin, Waynant, Anders) p. 73
7166	Optics in Bone Biology and Diagnostics (Mandelis) p. 74
7167	Frontiers in Pathogen Detection: From Nanosensors to Systems (Fauchet) p. 76

75 COURSES AND WORKSHOPS

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See pages 35–40 for course daily schedule.

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
24 January	25 January	26 January	27 January	28 January	29 January

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh**, Duke Univ.; **Anita Mahadevan-Jansen**, Vanderbilt Univ.

		7168 Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIII (Fujimoto, Izatt, Tuchin) p. 78			
	7169 Advanced Biomedical and Clinical Diagnostic Systems VII (Mahadevan-Jansen, Vo-Dinh, Grundfest) p. 83				
		7170 Design and Quality for Biomedical Technologies II (Raghavachari, Liang) p. 86			
7171 Multimodal Biomedical Imaging IV (Azar, Intes) p. 88					
	7172 Endoscopic Microscopy IV (Tearney, Wang) p. 90				
7173 Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications IX (Gannot) p. 92					
	7174 Optical Tomography and Spectroscopy of Tissue VIII (Tromberg, Yodh, Tamura, Sevick-Muraca, Alfano) p. 94				
	7203 Commercial and Biomedical Applications of Ultrafast Lasers IX (Neev, Nolte, Heisterkamp, Trebino) p. 180				
			7207 Microfluidics, BioMEMS, and Medical Microsystems VII (Wang) p. 190		

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven Jacques**, Oregon Health and Science Univ.; **William P. Roach**, Air Force Research Lab.

		7175 Optical Interactions with Tissue and Cells XX (Jacques, Jansen, Roach) p. 98			
7176 Dynamics and Fluctuations in Biomedical Photonics VI (Tuchin, Wang, Duncan) p. 101					
7179 Optics in Tissue Engineering and Regenerative Medicine III (Kirkpatrick, Wang) p. 109	7177 Photons Plus Ultrasound: Imaging and Sensing 2009 (Oraevsky, Wang) p. 103				
	7178 Biophotonics and Immune Responses IV (Chen) p. 107				
	7180 Photons and Neurons (Mahadevan-Jansen, Jansen) p. 110				
	7181 Energy-based Treatment of Tissue and Assessment V (Ryan) p. 112				

Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia; **Daniel Farkas**, Cedars-Sinai Medical Ctr.

		7182 Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VII (Farkas, Nicolau, Leif) p. 114			
	7183 Multiphoton Microscopy in the Biomedical Sciences IX (Periasamy, So) p. 118				
7185 Single Molecule Spectroscopy and Imaging II (Enderlein, Gryczynski, Erdmann) p. 126		7184 Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVI (Conchello, Cogswell, Wilson) p. 123			
		7186 Optical Diagnostics and Sensing IX (Coté) p. 129			
7187 Biomedical Applications of Light Scattering III (Wax, Backman) p. 131					

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/Buffalo; **Dan Nicolau**, The Univ. of Liverpool (United Kingdom)

7189 Colloidal Quantum Dots for Biomedical Applications IV (Osirski, Yamamoto, Jovin) p. 136		7188 Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VI (Cartwright, Nicolau) p. 134			
	7191 Fluorescence In Vivo Imaging Based on Genetically Engineered Probes: From Living Cells to Whole Body Imaging IV (Savitsky, Wang) p. 142	7190 Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications (Achilefu, Raghavachari) p. 139			
		7192 Plasmonics in Biology and Medicine VI (Vo-Dinh, Lakowicz) p. 144			

75 COURSES AND WORKSHOPS

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See pages 35–40 for course daily schedule.

Photonics in Dermatology and Plastic Surgery

Conference Chairs: **Nikiforos Kollias**, Johnson & Johnson CPPW; **Bernard Choi**, Beckman Laser Institute and Medical Clinic; **Haishan Zeng**, The BC Cancer Research Ctr. (Canada)

Program Committee: **Anthony Joseph Durkin**, University of California, Irvine; **Iltefat Hamzavi**, Henry Ford Medical Centre; **Jessica C. Ramella-Roman**, The Catholic University of America

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room A5 Sat. 8:30 to 9:30 am

Skin Diagnosis-Spectroscopy I

Session Chair: **Nikiforos Kollias**, Johnson & Johnson CPPW

8:30 am: **In vivo determination of optical properties and fluorophore characteristics of non-melanoma skin cancer**, Narasimhan Rajaram, The Univ. of Texas at Austin (United States); Dianne Kovacic, Univ. of Texas Medical Branch (United States); Michael R. Migden, Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Jason Reichenberg, Univ. of Texas Medical Branch (United States); Tri Nguyen M.D., Univ. of Texas M.D. Anderson Cancer Ctr. (United States); James W. Tunnell, The Univ. of Texas at Austin (United States). [7161A-101]

8:45 am: **Fluorescence spectroscopy for endogenous porphyrins in human facial skin**, InSeok Seo, Sheng-Hao Tseng, Gabriela O. Cula, Paulo R. Bargo, Nikiforos Kollias, Johnson & Johnson CPPW (United States). [7161A-102]

9:00 am: **Spectroscopic characterization of extracted and in situ collagen and elastin based on multiphoton excitation microscopy and spectroscopy**, Jianxin Chen, Anthony Lee, Jianhua Zhao, Hequn Wang, The BC Cancer Research Ctr. (Canada); Harvey Lui, David I. McLean, Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Research Ctr. (Canada). [7161A-103]

9:15 am: **Determining chromophore concentrations, absorption and scattering properties of human skin in-vivo in the visible and NIR wavelength regions**, Sheng-Hao Tseng, Paulo R. Bargo, Johnson & Johnson CPPW (United States); Anthony J. Durkin, Univ. of California, Irvine (United States); Nikiforos Kollias, Johnson & Johnson CPPW (United States). [7161A-104]

SESSION 2

Room: Conv. Ctr. Room A5 Sat. 9:30 to 10:30 am

Skin Diagnosis-Spectroscopy II

Session Chair: **Haishan Zeng**, The BC Cancer Research Ctr. (Canada)

9:30 am: **Diffuse optical spectroscopy of cutaneous melanocytic lesions**, Kelly Sry, Alexander M. Grant, Frederick R. Ayers, Rolf B. Saager, Beckman Laser Institute and Medical Clinic (United States); David Hsiang M.D., Univ. of California, Irvine (United States) and Chao Family Comprehensive Cancer Ctr. (United States); Kristen M. Kelly, Beckman Laser Institute and Medical Clinic (United States); James Jakowatz, Beckman Laser Institute and Medical Clinic (United States) and Chao Family Comprehensive Cancer Ctr. (United States); Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (United States). [7161A-105]

9:45 am: **Noninvasive skin cancer detection using real-time in vivo Raman spectroscopy: preliminary results**, Jianhua Zhao, The BC Cancer Research Ctr. (Canada); Harvey Lui, David I. McLean, Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Research Ctr. (Canada). [7161A-106]

10:00 am: **In vivo confocal Raman spectroscopy for skin diagnosis and characterization**, Hequn Wang, The BC Cancer Research Ctr. (Canada); Harvey Lui, David I. McLean, Univ. of British Columbia (Canada); Mladen Korbelik, Haishan Zeng, The BC Cancer Research Ctr. (Canada). [7161A-107]

10:15 am: **Enhancement of transdermal delivery of glycerol by micro-needling method combined with sonophoresis**, Jinhee Yoon, Taeyoon Son, Byungjo Jung, Yonsei Univ. (Korea, Republic of). [7161A-108]

Coffee Break 10:30 to 11:00 am

SESSION 3

Room: Conv. Ctr. Room A5 Sat. 11:00 am to 12:15 pm

Skin Diagnosis-Imaging I

Session Chair: **Anthony Joseph Durkin**, Univ. of California, Irvine

11:00 am: **Novel image segmentation of pigmented lesions in human skin**, Kirk W. Gossage, Jesse M. Weissman, Robert Velthuis, Unilever Research & Development (United States). [7161A-109]

11:15 am: **Automated detection of skin cancers using multimodal optical imaging**, Anna N. Yaroslavsky, Rongjing Zhang, Elena V. Salomatina, Massachusetts General Hospital (United States). [7161A-110]

11:30 am: **Hyperspectral imaging of blood perfusion and chromophore distribution in the skin of smokers**, Lise L. Randeberg, Eivind L. P. Larsen, Lars O. Svaasand, Norwegian Univ. of Science and Technology (Norway). [7161A-111]

11:45 am: **Measurement of melanocytic cutaneous lesions with the modulated imaging system**, Frederick R. Ayers, Scott Bogdanoff, Beckman Laser Institute and Medical Clinic (United States); David Hsiang M.D., Kristen M. Kelly, James Jakowatz, Univ. of California, Irvine (United States); Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (United States). [7161A-112]

12:00 pm: **Characterization of pigmented lesions using a SPI imaging system for detection of skin cancer**, Jihoon Kim, Joseph T. Walsh, Jr., Northwestern Univ. (United States). [7161A-113]

Lunch/Exhibition Break 12:15 to 1:45 pm

SESSION 4

Room: Conv. Ctr. Room A5 Sat. 1:45 to 3:00 pm

Skin Diagnosis-Imaging II

Session Chair: **Jessica C. Ramella-Roman**, The Catholic Univ. of America

1:45 pm: **Clinical study of imaging skin cancer margins using polarized light imaging**, Ravikant V. Samatham, Oregon Health & Science Univ. (United States); Reid Fletcher, Univ. of Pennsylvania (United States); Lindsay Severson, Scott N. Isenath M.D., Ken K. Lee M.D., Steven L. Jacques, Oregon Health & Science Univ. (United States). [7161A-114]

2:00 pm: **Three dimensional skin imaging using ultrahigh resolution optical coherence tomography at multiple wavelengths**, Aneesh Alex, Boris Pova_ay, Bernd Hofer, Boris Hermann, Cardiff Univ. (United Kingdom); Sergei V. Popov, Imperial College London (United Kingdom); Christoph Meier, Berne Univ. of Applied Sciences (Switzerland); Wolfgang Drexler, Cardiff Univ. (United Kingdom). [7161A-115]

2:15 pm: **In vivo multiphoton tomography in skin aging studies**, Karsten König, JenLab GmbH (Germany). [7161A-116]

2:30 pm: **Optical discrimination of surface reflection from volume backscattering in speckle contrast for skin roughness measurements**, Lioudmila Tchvialeva, Haishan Zeng, The Univ. of British Columbia (Canada) and BC Cancer Research Ctr. (Canada); Igor Markhvida, Lianne McLean, David I. McLean, The Univ. of British Columbia (Canada); Harvey Lui, Tim K. Lee, The Univ. of British Columbia (Canada) and BC Cancer Research Ctr. (Canada). [7161A-117]

2:45 pm: **Assessing facial wrinkles: automatic detection and quantification**, Gabriela O. Cula, Nikiforos Kollias, Johnson & Johnson CPPW (United States). [7161A-118]

Coffee Break 3:00 to 3:30 pm

Conference 7161A · Room: Conv. Ctr. Room A5

SESSION 5

Room: Conv. Ctr. Room A5 Sat. 3:30 to 4:45 pm

Skin Laser Therapy

Session Chair: Bernard Choi, Univ. of California, Irvine

3:30 pm: **Sebaceous glands targeting selective photothermolysis: a pilot study**, Fernanda H. Sakamoto M.D., Apostolos G. Doukas, William A. Farinelli, Zeina Tannous M.D., Massachusetts General Hospital (United States); Michelle Shinn, Steve Benson, Gwyn Williams, Thomas Jefferson National Accelerator Facility (United States); H. Frederick Dylla, Thomas Jefferson National Accelerator Facility (United States) and American Institute of Physics (United States); R. Rox Anderson M.D., Massachusetts General Hospital (United States) [7161A-119]

3:45 pm: **Accelerated adhesion of grafted skins by laser-induced stress wave-assisted gene transfer of hepatocyte growth factor**, Aizawa Kazuya, Keio Univ. (Japan); Shunichi Sato, Daizoh Saitoh, Hiroshi Ashida, National Defense Medical College (Japan); Minoru Obara, Keio Univ. (Japan) [7161A-120]

4:00 pm: **Pulsed laser treatment for toenail fungus**, David M. Harris, Univ. of Washington (United States); Brian A. McDowell M.D., Northern California Orthopedic Ctrs. (United States); John Strisower, UVaCide Corp. (United States) [7161A-121]

4:15 pm: **Efficient and painless laser skin tightening with Pneumatic Skin Flattening (PSF)**, Dwayne Lett, The Lett Ctr. Aesthetic & Reconstructive Surgery & Medi-Spa (United States); Nathalie Fournier, CLDP (France); Liran Mendel, Jenny Segal, Candela/Inolase Ltd. (Israel) [7161A-122]

4:30 pm: **Pneumatic skin flattening (PSF) with a 532 nm Q-switched laser for more selective, painless and safer treatment of solar lentigines**, Mussarrat Hussain, Skin & Laser Surgery Specialists (United States); Jenny Segal, Liran Mendel, Candela/Inolase Ltd. (Israel); David Goldberg, Skin & Laser Surgery Specialists (United States) [7161A-123]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 6

Room: Conv. Ctr. Room A5 Sun. 8:30 to 9:15 am

Photodynamic Therapy and Low Energy Level Therapy

Session Chair: Haishan Zeng, The BC Cancer Research Ctr. (Canada)

8:30 am: **Necrosis prediction of photodynamic therapy applied to skin disorders**, Félix Fanjul-Vélez, Univ. de Cantabria (Spain); Oleg G. Romanov, Belarusian State Univ. (Belarus); María López-Escobar, Univ. Hospital Marquis de Valdecilla (Spain); Noé Ortega-Quijano, José Luis Arce-Diego, Univ. de Cantabria (Spain) [7161A-124]

8:45 am: **A wearable light source for photodynamic therapy of non-melanoma skin cancer**, Ifor D. W. Samuel, Andrew McNeill, Univ. of St. Andrews (United Kingdom) and Lumicure Ltd. (United Kingdom); James Ferguson, Ninewells Hospital and Medical School (United Kingdom) and Lumicure Ltd. (United Kingdom); Andrea Cochrane, Sasi Attili, Ninewells Hospital and Medical School (United Kingdom) [7161A-125]

9:00 am: **A pressure controlled low level laser probe to enhance photon density in soft tissue**, Changmin Yeo, Taeyoon Son, Heesung Kang, Junghwan Park, Yong-heum Lee, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [7161A-126]

SESSION 7

Room: Conv. Ctr. Room A5 Sun. 9:15 to 10:30 am

Monitoring Skin Therapy I

Session Chair: Iltefat Hamzavi, Univ. of British Columbia (Canada)

9:15 am: **Assessment of skin wound healing with a multi-aperture camera**, Marjan Nabili, Jessica C. Ramella-Roman, The Catholic Univ. of America (United States); Alexander Libin, Suzanne Groah, Loan Kim-Loan, National Rehabilitation Hospital (United States) [7161A-127]

9:30 am: **Evaluation of the response and healing effect after laser hair removal using a multi-spectral dermatoscope**, Herke Jan Noordmans, Ellen Kuijer, Ilva d. Groot, Rowland de Roode, Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands) [7161A-128]

9:45 am: **Measurement of vascular occlusion effects in a pedicle flap model using modulated imaging**, Michael Pharaon M.D., Univ. of California, Irvine (United States); David J. Cuccia, Modulated Imaging, Inc. (United States); Thomas Scholz M.D., Gregory R. D. Evans M.D., David B. Hoyt M.D., Univ. of California, Irvine (United States); Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (United States) [7161A-129]

10:00 am: **Blood flow dynamics after laser therapy of port wine stain birthmarks**, Yu-Chih Y. Huang, Univ. of California, Irvine (United States); Nadia Tran, Beckman Laser Institute (United States); Peter R. Shumaker M.D., E. Victor Ross M.D., Scripps Clinic Carmel Valley (United States); J. Stuart Nelson M.D., Kristen M. Kelly, Bernard Choi, Beckman Laser Institute and Medical Clinic (United States) [7161A-130]

10:15 am: **Quantitative assessment of wound-healing process as a response to laser-induced microinjuries**, Yang Liu, Paulo R. Bargo, Nikiforos Kollias, Johnson & Johnson CPPW (United States) [7161A-131]

Coffee Break 10:30 to 11:00 am

SESSION 8

Room: Conv. Ctr. Room A5 Sun. 11:00 am to 12:00 pm

Monitoring Skin Therapy II

Session Chair: Nikiforos Kollias, Johnson & Johnson CPPW

11:00 am: **Evaluating thermal damage induced by pulsed light with multiphoton microscopy**, Wei Gong, Yimei Huang, Hui Li, Shusen Xie, Fujian Normal Univ. (China) [7161A-132]

11:15 am: **Non-invasive in vivo optical biopsy of skin after fractional microablative laser treatment**, Vladimir G. Lemberg, Dmitry Rozhetskin, Lumenis Ltd. (United States); James Jiang, Thorlabs, Inc. (United States) [7161A-133]

11:30 am: **Monitoring tissue response during non-ablative irradiation of photorejuvenation with optical coherence tomography**, Yimei Huang, Wei Gong, Hui Li, Shusen Xie, Fujian Normal Univ. (China) [7161A-134]

11:45 am: **Photoacoustic monitoring of granulation tissue growth in grafted artificial dermis**, Kousuke Hatanaka, Shunichi Sato, Daizoh Saitoh, Hiroshi Ashida, Toshihisa Sakamoto, National Defense Medical College (Japan) [7161A-135]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

The application of 5-aminolevulinic acid in the treatment of precancerous lesions, skin cancer, and a new approach to the control of therapy, Zbigniew M. Kulas, Elżbieta M. Pawlik, Wrocław Univ. of Technology (Poland); Andrzej Bieniek, Lukasz Matusiak, Wrocław Medical Univ. (Poland) [7161A-136]

Urology: Diagnostics, Therapeutics, Robotics, Minimally Invasive, and Photodynamic Therapy

Conference Chair: **Reza S. Malek**, Mayo Clinic

Program Committee: **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte; **Matthew T. Gettman**, Mayo Clinic; **Patrice Jichlinski**, Ctr. Hospitalier Univ. Vaudois (Switzerland); **Bodo E. Knudsen**, The Ohio State Univ.; **Ed Koulick**, American Medical Systems; **Unyime O. Nseyo**, Univ. of Florida; **Rudolf M. Verdaasdonk**, Univ. Medisch Ctr. Utrecht (Netherlands)

Saturday 24 January

SESSION 9

Room: Conv. Ctr. Room B1 Sat. 8:30 to 10:10 am

Optics and Lasers I

Session Chairs: **Nathaniel M. Fried**,
The Univ. of North Carolina at Charlotte;
Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands)

8:30 am: **Bivariate shrinkage denoising during optical coherence tomography of the cavernous nerves**, Shahab Chitchian, Michael A. Fiddy, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (United States)..... [7161B-201]

8:50 am: **Compact laparoscopic probe for optical stimulation of the cavernous nerves**, Serhat Tozburun, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (United States)..... [7161B-202]

9:10 am: **Bladder cancer diagnosis during cystoscopy using Raman spectroscopy**, Matthijs C. M. Grimbergen, Ronald Draga, Univ. Medisch Ctr. Utrecht (Netherlands); Christiaan van Swol, St. Antonius Ziekenhuis Nieuwegein (Netherlands); Ruud Bosch, Univ. Medisch Ctr. Utrecht (Netherlands)..... [7161B-203]

9:30 am: **Time-gated optical imaging to detect positive prostate cancer margins**, George Alexandrakis, Nimit L. Patel, Zi-Jing Lin, The Univ. of Texas at Arlington (United States); Jeffrey A. Caddeu, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Hanli Liu, The Univ. of Texas at Arlington (United States)..... [7161B-204]

9:50 am: **Multispectral multiphoton lifetime analysis of human bladder tissue**, Riccardo Cicchi, Alfonso Crisci, Gabriella Nesi, Alessandro Cosci, Marco Carini, Francesco S. Pavone, Univ. degli Studi di Firenze (Italy)..... [7161B-205]

Coffee Break 10:10 to 10:40 am

SESSION 10

Room: Conv. Ctr. Room B1 Sat. 10:40 am to 12:20 pm

Optics and Lasers II

Session Chairs: **Rudolf M. Verdaasdonk**,
Univ. Medisch Ctr. Utrecht (Netherlands); **Nathaniel M. Fried**,
The Univ. of North Carolina at Charlotte

10:40 am: **Human bladder cancer diagnosis using multiphoton microscopy**, Sushmita Mukherjee, James S. Wysock, Casey K. Ng, Mohammed Akhtar, Sven Perner, Ming-Ming Lee, Mark A. Rubin, Frederick R. Maxfield, Weill Cornell Medical College (United States); Watt W. Webb, Cornell Univ. (United States); Douglass S. Scherr, Weill Cornell Medical College (United States)..... [7161B-206]

11:00 am: **Detection of early bladder carcinoma by fluorescence cystoscopy with Hexvix: characterization of positive sites by high magnification cystoscopy**, Blaise Lovisa, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Patrice Jichlinski, Daniela Aymon, Ctr. Hospitalier Univ. Vaudois (Switzerland); Hubert van den Bergh, Georges Wagnieres, Ecole Polytechnique Fédérale de Lausanne (Switzerland)..... [7161B-207]

11:20 am: **Optical reflectance spectroscopy for detection of human prostate and kidney cancer**, Aditya V. Mathker, The Univ. of Texas at Arlington (United States); Karim Bensalah, Wareef Kabbani, Altug Tuncel, Jeffrey A. Caddeu, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Hanli Liu, The Univ. of Texas at Arlington (United States)..... [7161B-208]

11:40 am: **Automated and fast histologic characterization in urology: progress towards an unmet clinical need**, Rohit Bhargava, Rohith Reddy, Univ. of Illinois at Urbana-Champaign (United States)..... [7161B-209]

12:00 pm: **Detecting composition of urolithiasis by Raman spectroscopy after minimal invasive urological management**, Yichun Chiu M.D., Hao-Yu Yang, Huihua K. Chiang, National Yang-Ming Univ. (Taiwan)..... [7161B-210]

Lunch/Exhibition Break 12:20 to 1:40 pm

SESSION 11

Room: Conv. Ctr. Room B1 Sat. 1:40 to 4:50 pm

Optics and Lasers III

Session Chairs: **Ed Koulick**, American Medical Systems;
Bodo E. Knudsen, The Ohio State Univ.

1:40 pm: **Introduction of a new laser-scalpel for partial kidney resection based on 1.94 micrometer fiber laser system: initial in vivo-data**, Soenke Tedsen, Univ. Schleswig-Holstein (Germany); Dirk Theisen-Kunde, Univ. zu Lübeck (Germany); Christian Doehn, Ingo Kausch, Dieter Jocham, Univ. Schleswig-Holstein (Germany)..... [7161B-211]

2:00 pm: **532 nm GreenLight™ HPS (high performance system) photoselective laser vaporization of the prostate (PVP) in living canines**, Hyun Wook Kang, American Medical Systems (United States); Reza S. Malek, Mayo Clinic (United States); James E. Coad, West Virginia Univ. (United States); Ed Koulick, American Medical Systems (United States)..... [7161B-212]

2:20 pm: **Thulium fiber laser lithotripsy through small-core optical fibers**, Nicholas J. Scott, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (United States)..... [7161B-213]

2:40 pm: **Quantification of HO:YAG optical tip degradation**, Bodo E. Knudsen M.D., Adam C. Mues M.D., The Ohio State Univ. (United States); Joel M. H. Teichman M.D., The Univ. of British Columbia (Canada)..... [7161B-214]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Characteristics and effectiveness of ball shaped fibers for lithotripsy in view of safety and durability**, Rudolf M. Verdaasdonk, John H. G. M. Klaessens, Tjeerd de Boorder, Rowland de Roode, Univ. Medisch Ctr. Utrecht (Netherlands)..... [7161B-215]

3:50 pm: **Comparison of Ho:YAG and Er:YAG lasers for lithotripsy**, Petr Koranda, Helena Jelinkova, Czech Technical Univ. in Prague (Czech Republic); Oto Kohler M.D., Central Military Hospital in Prague (Czech Republic); Mitsunobu Miyagi, Sendai National College of Technology (Japan); Michal Nemeč, Jan Sulc D.D.S., Martin Fibrich, Czech Technical Univ. in Prague (Czech Republic); Jan Pokorny, Central Military Hospital in Prague (Czech Republic); Katsumasa Iwai, Sendai National College of Technology (Japan); Yuji Matsuura, Tohoku Univ. (Japan)..... [7161B-216]

4:10 pm: **Loss of power output and laser fibre degradation during 120 W Lithium-Triborate HPS laser vaporisation of the prostate**, Thomas Hermanns M.D., Tullio Sulser, Lukas J. Hefermehl, Daniel Strebel, Maurice-Stephan Michel, Michael Muntener, Univ. Hospital Zürich (Switzerland); Alexander H. Meier, ETH Zürich (Switzerland); Hans-Helge Seifert M.D., Univ. Hospital Zürich (Switzerland)..... [7161B-217]

Conference 7161B · Room: Conv. Ctr. Room B1

4:30 pm: **High-power diode laser at 980 nm for the treatment of benign prostatic hyperplasia: ex vivo investigations on porcine kidneys and human cadaver prostates**, Ronald Sroka, Michael Seitz M.D., Oliver Reich, Markus J. Bader, Wael Khoder, Christian G. Stief, Ludwig-Maximilians-Univ. München (Germany) [7161B-218]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 12

Room: Conv. Ctr. Room B1 Sun. 8:30 to 10:10 am

Robotics and New Techniques

Session Chairs: **Bodo E. Knudsen**, The Ohio State Univ.;
Matthew T. Gettman, Mayo Clinic

8:30 am: **Hemostatic hydrodissection of the neurovascular bundles during robotic assisted laparoscopic radical prostatectomy: safety & efficacy trial**, Sijo J. Parekattil M.D., Philipp Dahm M.D., Johannes W. Vieweg M.D., Univ. of Florida (United States) [7161B-219]

8:50 am: **Human robotic assisted bilateral vasoepididymostomy and vasovasostomy procedures: initial safety and efficacy trial**, Sijo J. Parekattil M.D., Marc S. Cohen, Johannes W. Vieweg M.D., Univ. of Florida (United States) [7161B-220]

9:10 am: **Robotic assisted microsurgical allograft nerve grafting for neurovascular bundle repair during robotic assisted laparoscopic prostatectomy: initial experience**, Sijo J. Parekattil M.D., Philipp Dahm M.D., Johannes W. Vieweg M.D., Univ. of Florida (United States) [7161B-221]

9:30 am: **Prostate histotripsy for BPH: initial canine results**, William W. Roberts M.D., Univ. of Michigan (United States); Timothy L. Hall, Univ. of Michigan (United States); Christopher R. Hempel M.D., Charles A. Cain, Univ. of Michigan (United States) [7161B-222]

9:50 am: **Noninvasive laser coagulation of the vas deferens**, Christopher M. Cilip, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (United States) [7161B-223]

Coffee Break 10:10 to 10:40 am

SESSION 13

Room: Conv. Ctr. Room B1 Sun. 10:40 am to 12:20 pm

Photodynamics and Lasers

Session Chairs: **Patrice Jichlinski**, Ctr. Hospitalier Univ. Vaudois (Switzerland); **Unyime O. Nseyo**, Univ. of Florida

10:40 am: **Safety of three sequential whole bladder photodynamic therapy (WBPDT) treatments in the management of resistant bladder cancer**, Unyime O. Nseyo M.D., Maria C. Mejia M.D., North Florida Foundation for Research and Education, Inc. (United States) [7161B-224]

11:00 am: **Study of false positives in 5-ALA induced photodynamic diagnosis of bladder carcinoma**, Ronald Draga, Matthijs C. M. Grimbergen, Esther T. Kok, Trudy N. Jonges, Ruud Bosch, Univ. Medisch Ctr. Utrecht (Netherlands) [7161B-225]

11:20 am: **In vivo hemoglobin spectroscopy of the human prostate using photon time-of-flight spectroscopy**, Tomas Svensson, Erik Alerstam, Lund Univ. (Sweden); Katarina Svanberg M.D., Lund Univ. Hospital (Sweden); Stefan Andersson-Engels, Lund Univ. (Sweden) [7161B-226]

11:40 am: **Advances in clinical and preclinical vascular-targeted photodynamic therapy of prostate cancer**, Brian C. Wilson, John Trachtenberg M.D., Princess Margaret Hospital (Canada); Robert Weersink, Univ. Health Network (Canada) [7161B-227]

12:00 pm: **In-vitro comparison of laser induced lithotripsy on artificial stones and clinical calculi by means of different laser systems**, Ronald Sroka, Volkmar Hecht, Markus J. Bader, Oliver Reich, Michael Seitz M.D., Christian G. Stief, Ludwig-Maximilians-Univ. München (Germany) [7161B-228]

Advanced Technology and Instrumentation in Otolaryngology: Lasers, Optics, Radio Frequency, and Related Technology

Conference Chairs: **Brian Jet-Fei Wong**, Univ. of California, Irvine; **Justus F. R. Ilgner**, Univ. Hospital Aachen (Germany)

Program Committee: **James A. Burns**, Massachusetts General Hospital; **Holger Lubatschowski**, Laser Zentrum Hannover e.V. (Germany); **Udayan K. Shah**, Nemours/Alfred I. duPont Hospital for Children

Saturday 24 January

SESSION 14

Room: Conv. Ctr. Room E Sat. 8:00 to 10:10 am

Lasers and OCT in Otolaryngology

8:00 am: **In vivo study of the ablation of middle ear bone with pulse CO₂ laser**, Xianzeng Zhang, Fujian Normal Univ. (China); Xiaoyan Wang, Qing Ye, Fujian Provincial Hospital (China); Zhenlin Zhan, Shusen Xie, Fujian Normal Univ. (China) [7161C-301]

8:20 am: **The effect of PDT on H. influenza biofilm in vitro**, Chung-Ku Rhee M.D., Sung Hyen Bae, Jae-Yun Jung M.D., Jin-Chul Ahn, Myung-Whan Suh, Dankook Univ. (Korea, Republic of) [7161C-314]

8:40 am: **Operating microscope with spectral-domain optical coherence tomography (OCT) for 3-D intraoperative imaging**, Gereon Hüttmann, David Klinger, Heike H. Müller, Univ. of Lübeck (Germany) [7161C-303]

9:00 am: **Femtosecond laser microstructuring of titanium surfaces for middle ear ossicular replacement prosthesis**, Justus F. R. Ilgner, Slavomir Biedron, Univ. Hospital Aachen (Germany); Elena Fadeeva, Boris N. Chichkov, Laser Zentrum Hannover e.V. (Germany); Martin Westhofen M.D., Univ. Hospital Aachen (Germany) [7161C-304]

9:20 am: **Evaluation of effects of microstructures on titanium surfaces, applied by femtosecond laser, on human auricular chondrocytes by in-vitro cell culture**, Slavomir Biedron, Justus F. R. Ilgner, Univ. Hospital Aachen (Germany); Elena Fadeeva, Boris N. Chichkov, Laser Zentrum Hannover e.V. (Germany); Martin Westhofen M.D., Univ. Hospital Aachen (Germany) [7161C-305]

9:40 am: **Optoacoustic stimulation of the cochlea (Invited Paper)**, G. I. Wenzel, S. Balster, H. H. Lim, Medical Univ. Hannover (Germany); K. Zhang, Laser Ctr. Hannover (Germany); U. Reich, Medical Univ. Hannover (Germany); Holger Lubatschowski, Laser Ctr. Hannover (Germany); W. Ertmer, Leibniz Univ. of Hannover (Germany); T. Lenarz, G. Reuter, Medical Univ. Hannover (Germany) [7161C-306]

Coffee Break 10:10 to 11:00 am

SESSION 15

Room: Conv. Ctr. Room E Sat. 11:00 am to 12:00 pm

Lasers and In Vivo Imaging of the Larynx and Upper Airways

11:00 am: **Endoscopic 3D imaging of the human vocal folds using polarization-sensitive optical coherence tomography and a 2-axis MEMS scanning catheter**, Ki Hean Kim, Wellman Ctr. for Photomedicine (United States); James A. Burns M.D., Massachusetts General Hospital (United States); Jonathan J. Bernstein, Charles Stark Draper Lab., Inc. (United States); Boris H. Park, Mehron Puoris'haag M.D., Wellman Ctr. for Photomedicine (United States); Tommy Lee, Fran J. Rogomentich, Mirela G. Bancu, The Charles Stark Draper Lab., Inc. (United States); James B. Kobler, Steven M. Zeitels M.D., Massachusetts General Hospital (United States); Johannes F. de Boer, Wellman Ctr. for Photomedicine (United States) [7161C-307]

11:20 am: **Fiber-delivered CO₂ laser for airway surgery**, Swapna K. Chandran, Richard J. Schmidt M.D., Patrick Barth M.D., Udayan K. Shah M.D., Nemours/Alfred I. duPont Hospital for Children (United States) . . . [7161C-308]

11:40 am: **Spectrally encoded confocal microscopic endoscopy for in vivo imaging of pediatric vocal fold**, Priyanka A. Jillella, DongKyun Kang, Wellman Ctr. for Photomedicine (United States); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada); Shelby C. Leuin, Massachusetts Eye and Ear Infirmary (United States); Milen S. Shishkov, Brett E. Bouma, Wellman Ctr. for Photomedicine (United States); Christopher J. Hartnick, Massachusetts Eye and Ear Infirmary (United States); Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7161C-309]

Lunch/Exhibition Break 12:00 to 1:10 pm

SESSION 16

Room: Conv. Ctr. Room E Sat. 1:10 to 2:30 pm

In Vivo Imaging of the Larynx and Airways:

1:10 pm: **Anatomical optical coherence tomography of the lower airway: assessment of stenoses**, Robert A. McLaughlin, Univ. of Western Australia (Australia); Jonathan P. Williamson, Sir Charles Gairdner Hospital (Australia) and Univ. of Western Australia (Australia); Martin J. Phillips, Sir Charles Gairdner Hospital (Australia); Julian J. Armstrong, Sven Becker, The Univ. of Western Australia (Australia); David R. Hillman, Sir Charles Gairdner Hospital (Australia) and West Australian Sleep Disorders Research Institute (Australia); Peter R. Eastwood, Sir Charles Gairdner Hospital (Australia) and Univ. of Western Australia (Australia) and West Australian Sleep Disorders Research Institute (Australia); David D. Sampson, The Univ. of Western Australia (Australia) [7161C-310]

1:30 pm: **Optical coherence tomography using the Niris system in otolaryngology**, Marc Rubinstein, William B. Armstrong, Hamid R. Djallilian, Roger Crumley M.D., Brian Jet-Fei Wong M.D., Univ. of California, Irvine (United States) [7161C-313]

1:50 pm: **Endoscopic confocal microscopy: imaging characteristics and challenges**, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) [7161C-317]

2:10 pm: **In-vivo office-based dynamic imaging of vocal cords in awake patients with swept-source optical coherence tomography**, Lingfeng Yu, Gangjun Liu, Marc Rubinstein, Arya Saïdi, Beckman Laser Institute and Medical Clinic (United States); Shuguang Guo, Univ. of Florida, Gainesville (United States); Brian J. Wong M.D., Zhongping Chen, Beckman Laser Institute and Medical Clinic (United States) [7161C-318]

SESSION 17

Room: Conv. Ctr. Room E Sat. 2:30 to 4:40 pm

Tissue Reshaping, Case Studies, and Miscellaneous Topics

2:30 pm: **Laser induced fragmentation of salivary stones: an in vitro comparison of two different, clinically approved laser systems**, Ronald Sroka, Vanessa Siedek, Christian S. Betz, Pamela Zengel, Volkmar Hecht, Andreas Leunig, Ludwig-Maximilians-Univ. München (Germany) [7161C-311]

2:50 pm: **Electromechanical reshaping of rabbit septal cartilage: a six needle electrode geometric configuration**, Edward C. Wu, Adam Khan, Dimitry E. Protsenko, Sterling Dubin, Mohammad Shaikh, Michael Li, Beckman Laser Institute and Clinic (United States); Brian Jet-Fei Wong M.D., Univ. of California, Irvine (United States) [7161C-315]

3:10 pm: **Mechanical evaluation of auricular tissue following laser ear reshaping in the rabbit in-vivo model using the Candela Smoothbeam laser system**, D. E. Protsenko, C. A. Chlebicki, P. K. Holden, B. J. Wong, Beckman Laser Institute and Medical Clinic (United States) [7161C-316]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Track record and transparency: How to avoid criminal prosecution in corporate-provider relationships**, Douglas Johnston, Thomas Jefferson Univ. (United States); Udayan K. Shah M.D., Swapna K. Chandran, Nemours/Alfred I. duPont Hospital for Children (United States); Gina M. Smith, JD, Ballard-Spahr (United States); James S. Reilly M.D., Nemours/Alfred I. duPont Hospital for Children (United States); Barbara E. Ziv M.D., Cigna Behavioral Health (United States) [7161C-312]

4:20 pm: **Diode laser for myringotomy**, Udayan K. Shah M.D., Swapna K. Chandran, Nemours/Alfred I. duPont Hospital for Children (United States) [7161C-302]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Diagnostic and Therapeutic Applications of Light in Cardiology

Conference Chairs: **Kenton W. Gregory**, Oregon Medical Laser Ctr.; **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine, Massachusetts General Hospital; **Laura Marcu**, Univ. of California, Davis

Saturday 24 January

SESSION 18

Room: Conv. Ctr. Room A1 Sat. 8:50 to 9:50 am

Optical Coherence Tomography

Session Chair: **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine, Massachusetts General Hospital

8:50 am: **Atherosclerotic plaque composition from intravascular OCT optical attenuation**, Gijs van Soest, Thadé Goderie, Senada Koljenovic, Arno van Leenders, Evelyn Regar, Sander van Noorden, Patrick W. Serruys, Anton F. W. van der Steen, Univ. Medisch Ctr. Rotterdam (Netherlands). . . . [7161D-401]

9:10 am: **Intracoronary optical frequency domain imaging test retest clinical study**, Evelyn Regar, Univ. Medisch Ctr. Rotterdam (Netherlands); Guillermo J. Tearney, Milen Shiskov, Benjamin J. Vakoc, Melissa J. Suter, Massachusetts General Hospital (United States); Gijs van Soest, Patrick W. Serruys, Univ. Medisch Ctr. Rotterdam (Netherlands); Brett E. Bouma, Massachusetts General Hospital (United States). . . . [7161D-403]

9:30 am: **Durable coronary artery phantoms for optical coherence tomography**, Charles-Etienne Bisailon, National Research Council Canada (Canada); Rafik Bourezak, Ecole Polytechnique de Montréal (Canada) and Industrial Materials Institute (Canada); Marie-Michèle Lanthier, National Research Council Canada (Canada) and Ecole Polytechnique de Montréal (Canada); Marc L. Dufour, National Research Council Canada (Canada); Guy Lamouche, National Research Council Canada (Canada) and Ecole Polytechnique de Montréal (Canada) [7161D-404]

Coffee Break9:50 to 10:20 am

SESSION 19

Room: Conv. Ctr. Room A1 Sat. 10:20 am to 11:40 pm

Spectroscopy

Session Chair: **Laura Marcu**, Univ. of California, Davis

10:20 am: **Biochemical imaging of atherosclerosis by fluorescence lifetime imaging (FLIM)**, Javier A. Jo, Chintan Trivedi, Cen Huang, Fred Clubb, Texas A&M Univ. (United States). . . . [7161D-405]

10:40 am: **Fluorescence lifetime imaging microscopy (FLIM) for the characterization of human atherosclerotic plaques**, Jennifer E. Phipps, Yinghua H. Sun, Univ. of California, Davis (United States); Ramez Saroufeem, Univ. of California, Davis Health System (United States); Laura Marcu, Univ. of California, Davis (United States) [7161D-406]

11:00 am: **Advances in intravascular time resolved fluorescence spectroscopy for diagnosis of atherosclerotic cardiovascular disease**, Laura Marcu, Douglas N. Stephens, Jesung Park, Jennifer E. Phipps, Yang Sun, Yinghua H. Sun, Univ. of California, Davis (United States) [7161D-407]

11:20 am: **Raman Monte Carlo simulations for the development of an intracoronary Raman catheter**, Alexandra H. Chau, Massachusetts General Hospital (United States) and Massachusetts Institute of Technology (United States); Joseph A. Gardecki, Massachusetts Institute of Technology (United States); Jason T. Motz, Massachusetts General Hospital (United States); Brett E. Bouma, Guillermo J. Tearney, Massachusetts General Hospital (United States) and Harvard-MIT Division of Health Sciences and Technology (United States) and Harvard Medical School (United States) [7161D-410]

Lunch/Exhibition Break11:40 am to 1:40 pm

SESSION 20

Room: Conv. Ctr. Room A1 Sat. 1:40 to 3:00 pm

Myocardium

Session Chair: **Kenton W. Gregory**, Oregon Medical Laser Ctr.

1:40 pm: **Non-invasive measurements of hemoglobin + myoglobin, their oxygenation and NIR light pathlength in heart in vivo by diffuse reflectance spectroscopy**, Eugene Gussakovskiy, Olga Jilkina, National Research Council Canada (Canada); Yanmin Yang, Univ. of Manitoba (Canada); Valery V. Kupriyanov, National Research Council Canada (Canada). . . . [7161D-411]

2:00 pm: **In vitro analysis of cardiac radiofrequency ablation lesions and over treatment using OCT**, Christine P. Fleming, Lee M. Barwick, Hui Wang, Yinsheng Pan, Zhilin Hu, Kara J. Quan, Andrew M. Rollins, Case Western Reserve Univ. (United States) [7161D-412]

2:20 pm: **Cardiac ischemia evaluation by near infrared spectroscopic imaging during optical coherence tomography catheterization**, Mark D. Hewko, Marc L. Dufour, Guy Lamouche, Michael S. D. Smith, Bo Xiang, Lori Gregorash, Christian Padioleau, Christian De Grandpre, National Research Council Canada (Canada); Farrukh Hussain M.D., St. Boniface General Hospital (Canada) and Univ. of Manitoba (Canada); Michael G. Sowa, National Research Council Canada (Canada) [7161D-413]

2:40 pm: **Second harmonic generation images of collagen matrix in atrium for arrhythmia diagnosis**, Ming-Rung Tsai, National Taiwan Univ. (Taiwan); Yu-We Chioui, Far Eastern Memorial Hospital (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) [7161D-414]

Coffee Break3:00 to 3:30 pm

SESSION 21

Room: Conv. Ctr. Room A1 Sat. 3:30 to 5:10 pm

Biomechanics and Therapy

Session Chair: **Seemantini K. Nadkarni**, Harvard Medical School

3:30 pm: **Intravascular catheter for laser speckle imaging**, Seemantini K. Nadkarni, Harvard Medical School (United States) and Massachusetts General Hospital (United States); Brett E. Bouma, Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7161D-415]

3:50 pm: **Quantitative validation study on micro-bio-strain estimator by optical coherence strainography**, Yoshitaro Sakata, Souichi Saeki, Yu Nakamichi, Takashi Saito, Takafumi Hiro, Masunori Matsuzaki M.D., Yamaguchi Univ. (Japan) [7161D-416]

4:10 pm: **Measurement of thermoelastic expansion in tissue phantoms and rabbit arteries containing nanoroses using swept source phase sensitive OCT**, Amit S. Paranjape, Li Ma, The Univ. of Texas at Austin (United States); Roman Kuranov, Volcano Corp. (United States); Stepan Baranov, The Univ. of Texas at Austin (United States); Joseph W. Villard, Marc D. Feldman M.D., The Univ. of Texas Health Science Ctr. at San Antonio (United States); Keith P. Johnston, Thomas E. Milner, The Univ. of Texas at Austin (United States). . . . [7161D-417]

4:30 pm: **Laser phototherapy in cardiovascular disease**, David W. Rindge, Ctr. for Cooperative Medicine, Inc. (United States) [7161D-418]

4:50 pm: **Selective removal of cholesterol ester in atherosclerotic plaque by nanosecond pulsed laser at 5.75 µm for less-invasive laser angioplasty**, Katsunori Ishii, Hideki Tsukimoto, Hisanao Hazama, Kunio Awazu, Osaka Univ. (Japan). . . . [7161D-419]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Monday 26 January

POSTERS-MONDAY

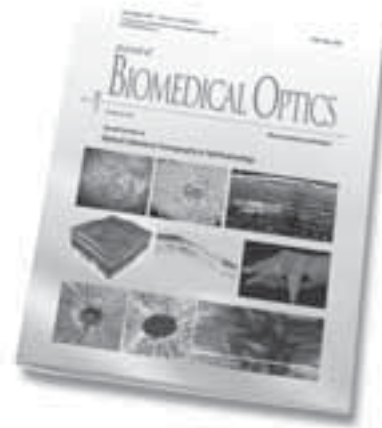
Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Artery classification based on OCT images of arterial laminar structure, In Chul Choi, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) [7161D-402]

An improvement algorithm to reduce side lobe level in ultrasound phased array, Ashraf Talaat-Ibrahim, Alexandria Univ. (Egypt) [7161D-420]



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Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Conference Chairs: **Henry Hirschberg**, Univ. of California, Irvine; **Steen J. Madsen**, Univ. of Nevada, Las Vegas

Saturday 24 January

INTRODUCTION

Room: Conv. Ctr. Room A4 Sat. 8:20 to 8:30 am
Henry Hirschberg, Univ. of California/Irvine

SESSION 22

Room: Conv. Ctr. Room A4 Sat. 8:30 to 9:50 am

Multi-modality Neuroimaging

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas

8:30 am: **Relationship between vascular and neuronal signals measured using time-resolved near-infrared spectroscopy and broadband magnetoencephalography**, Heidrun Wabnitz, Tilmann H. Sander, Physikalisch-Technische Bundesanstalt (Germany); Stefanie Leistner, Michaela Wachs, Frederik Geisler, Charité Universitätsmedizin Berlin (Germany); Alexander Jelzow, Frank Peters, Martin Burghoff, Physikalisch-Technische Bundesanstalt (Germany); Gabriel Curio, Charité Universitätsmedizin Berlin (Germany); Bruno-Marcel Mackert, Charité Universitätsmedizin Berlin (Germany) and Vivantes Auguste-Viktoria-Klinikum (Germany); Lutz Trahms, Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany) [7161E-501]

8:50 am: **Validation of diffuse correlation spectroscopy for measurement of cerebral blood flow across spatial scales and against multiple modalities**, Turgut Durduran, Meeri N. Kim, Erin M. Buckley, Regine Choe, Chao Zhou, Guoqiang Yu, Arjun G. Yodh, Univ. of Pennsylvania (United States) [7161E-503]

9:10 am: **Optimal gadolinium dose level for magnetic resonance imaging (MRI) contrast enhancement of U87-derived tumors in athymic nude rats for the assessment of photodynamic therapy**, Nathan M. Cross, Davood Varghai, Christopher A. Flask, Denise K. Feyes, Nancy L. Oleinick, David Dean, Case Western Reserve Univ. (United States) [7161E-504]

9:30 am: **Improvement on brain tumor segmentation with assistance from estimation of lateral ventricles deformation**, Kai Xiao, Sooi Hock Ho, Andrzej Bargiela, The Univ. of Nottingham Malaysia Campus (Malaysia) [7161E-505]

Coffee Break 9:50 to 10:40 am

SESSION 23

Room: Conv. Ctr. Room A4 Sat. 10:40 am to 12:00 pm

Therapy and Intraoperative Monitoring I

Session Chair: **Henry Hirschberg**, Univ. of California, Irvine

10:40 am: **Nanoparticle-assisted photothermal ablation of brain tumor in an orthotopic canine model**, Jon A. Schwartz, Nanospectra Biosciences, Inc. (United States); Anil M. Shetty, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Roger E. Price, Baylor College of Medicine (United States); Roger J. Stafford, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); James C. Wang, Nanospectra Biosciences, Inc. (United States); Rajesh K. Uthamantil, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Kevin Pham, Roger J. McNichols, BioTex, Inc. (United States); Christopher L. Coleman M.D., J. Donald Payne, Nanospectra Biosciences, Inc. (United States) [7161E-506]

11:00 am: **Photobleaching behavior of 5-aminolevulinic acid induced protoporphyrin IX in intraoperative gliomablastoma detection**, Neda Haj-Hosseini, Johan Richter, Linköping Univ. (Sweden); Stefan Andersson-Engels, Lund Univ. (Sweden); Karin Wårdell, Linköping Univ. (Sweden) [7161E-507]

11:20 am: **Photochemical internalization enhances the efficacy of bleomycin in malignant glioma cells**, Steen J. Madsen, Van Vo, Univ. of Nevada, Las Vegas (United States); Even Angell-Petersen, The Norwegian Radium Hospital (Norway); Joseph Blickenstaff, Univ. of Nevada, Las Vegas (United States); Henry Hirschberg M.D., Univ. of California, Irvine (United States) [7161E-508]

11:40 am: **Quantification of optical properties of tissue and its application to study of pain mechanism in rats**, Vikrant Sharma, International Techlink Group Corp. (United States); Jiwei He, Univ. of Texas at Arlington (United States); Sweta Narvenkar, Univ. of Texas at Arlington (United States); Dheerendra R. Kashyap, Yuan B. Peng, The Univ. of Texas at Arlington (United States); Hanli Liu, The Univ. of Texas at Arlington (United States) and International Techlink Group Corp. (United States) [7161E-509]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 24

Room: Conv. Ctr. Room A4 Sat. 1:30 to 3:10 pm

Therapy and Intraoperative Monitoring II

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas

1:30 pm: **Intraoperative functional brain imaging using laser Doppler imaging**, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Dimitri van de Ville, Univ. Hospital of Geneva (Switzerland); Erica J. Martin-Williams, Antonio Lopez, Rainer A. Leitgeb, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Christoph G. Hauger, Carl Zeiss AG (Germany); Andrea Szelenyi, Elke Hattingen, Ruediger Gerlach, Andreas Raabe, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany) [7161E-510]

1:50 pm: **Intraoperative optical measurement of function in the human brain**, Paul R. Hoy, Harvey N. Rutt, Univ. of Southampton (United Kingdom); William P. Gray, Diederik O. Bulter, Southampton General Hospital (United Kingdom) [7161E-511]

2:10 pm: **Targeted opening of the blood brain barrier by photochemical internalization**, Henry Hirschberg M.D., Univ. of California, Irvine (United States); Michelle J. Zhang, Univ. of Nevada, Las Vegas (United States); H. Michael Gach, Nevada Cancer Institute (United States); David Chighvinadze, Univ. of Nevada, Las Vegas (United States); Francisco A. Uzal, Univ. of California, Davis (United States); Steen J. Madsen, Univ. of Nevada, Las Vegas (United States) [7161E-513]

2:30 pm: **Visualization of the arterial wall cutting mechanism during the excimer laser assisted non-occlusive anastomosis (ELANA) technique**, Rudolf M. Verdaasdonk, Jochem Bremmer, Bon Verweij, Rik Mansvelt Beck, Cees Tulleken, Univ. Medisch Ctr. Utrecht (Netherlands) [7161E-512]

2:50 pm: **Imaging cerebral blood flow during neurosurgery operation**, Hongyan Zhang, Nengyun Feng, Pengcheng Li, Weihua Luo, Jianjun Qiu, Qingming Luo, Britton Chance Ctr. for Biomedical Photonics (China) [7161E-514]

Coffee Break 3:10 to 3:40 pm

SESSION 25

Room: Conv. Ctr. Room A4 Sat. 3:40 to 5:20 pm

Neuroimaging I

Session Chair: **Henry Hirschberg**, Univ. of California, Irvine

3:40 pm: **Monitoring of cerebral blood volume and oxygenation with time-domain near-infrared spectroscopy in traumatic and ischemic brain injury patients**, Nicusor V. Iftimia, Mircea Mujat, Daniel X. Hammer, Vu Danthu, Physical Sciences Inc. (United States); Juliette J. Selb, David A. Boas, Massachusetts General Hospital (United States) [7161E-515]

4:00 pm: **Brain activation and connectivity of social cognition using diffuse optical imaging**, Banghe Zhu, Anuradha Godavarty, Florida International Univ. (United States) [7161E-516]

4:20 pm: **Brain functional imaging at small source-detector distances based on fast-gated single-photon avalanche diodes**, Lorenzo Spinelli, Davide Contini, Rinaldo Cubeddu, Antonio Pifferi, Alessandro Torricelli, Politecnico di Milano (Italy); Fabrizio Martelli, Giovanni Zaccanti, Univ. degli Studi di Firenze (Italy); Alberto Tosi, Alberto Dalla Mora, Franco Zappa, Sergio D. Cova, Politecnico di Milano (Italy) [7161E-517]

4:40 pm: **Bilateral responses of prefrontal and motor cortices to repetitive transcranial magnetic stimulation as measured by functional near infrared spectroscopy**, Fenghua Tian, The Univ. of Texas at Arlington (United States); Frank A. Kozel, Shawn M. McClintock, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Sameer Dhamne, The Univ. of Texas at Arlington (United States); Paul Croarkin, Kimberly Mapes, Mustafa M. Husain, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Hanli Liu, The Univ. of Texas at Arlington (United States) [7161E-518]

5:00 pm: **Simultaneous functional near-infrared brain imaging and event-related potential studies of Stroop effect**, Jiahuan Jai, Ting Li, Britton Chance Ctr. for Biomedical Photonics (China) and Wuhan National Lab. for Optoelectronics (China) and Huazhong Univ. of Science and Technology (China); Zhongxing Zhang, Hui Gong, Britton Chance Ctr. for Biomedical Photonics (China) [7161E-519]

BIOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

Introduction

Room: Conv. Ctr. Room A4 Sat. 8:20 to 8:30 am

Henry Hirschberg, Univ. of California/Irvine

SESSION 26

Room: Conv. Ctr. Room A4, Marriott Hotel,
Willow Glen Room. Sun. 8:30 to 10:10 am

Joint Session on Neurobiology with
Conference 7180 Photons and Neurons

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas

8:30 am: **Optical detection of action potential propagation using phase-sensitive interferometry**, Boris H. Park, Massachusetts General Hospital (United States); Christopher L. Passaglia, Boston Univ. (United States); Johannes F. de Boer, Massachusetts General Hospital (United States) [7161E-520]

8:50 am: **Action potential detection by non linear microscopy**, Leonardo Sacconi, Jacopo Lotti, Univ. of Florence (Italy); Rodney P. O'Connor, Janelia Farm Research Campus (United States) and Univ. of Florence (Italy); Jonathan Mapelli, Daniela Gandolfi, Egidio D'Angelo, Univ. of Pavia (Italy); Francesco S. Pavone, Univ. of Florence (Italy) [7161E-521]

9:10 am: **Quantitative in vivo optical assessment of nerve myelination**, Boris H. Park, Frank P. Henry, Mark A. Randolph, Johannes F. de Boer, Massachusetts General Hospital (United States) [7161E-522]

9:30 am: **Neurobiological use of a micro-optrode using UV excitation light and signal-to-noise ratio optimization**, Suzie Dufour, Univ. Laval (Canada); Florin Amzica, Univ. de Montréal (Canada); Réal Vallée, Univ. Laval (Canada) [7161E-523]

9:50 am: **Reflected light imaging of ON and OFF responses in frog retina**, Xin-Cheng Yao, Chris Gorga, The Univ. of Alabama at Birmingham (United States) [7161E-524]

Coffee Break 10:10 to 10:40 am

SESSION 27

Room: Conv. Ctr. Room A4, Marriott Hotel,
Willow Glen Room. Sun. 10:40 am to 12:00 pm

Joint Session on Neuroimaging II with
Conference 7180 Photons and Neurons

Session Chair: **Henry Hirschberg**, Univ. of California, Irvine

10:40 am: **Investigation of the prefrontal cortex in response to duration-flexible anagram tasks using functional near infrared spectroscopy**, Fenghua Tian, The Univ. of Texas at Arlington (United States); Britton Chance, Univ. of Pennsylvania (United States); Hanli Liu, The Univ. of Texas at Arlington (United States) [7161E-525]

11:00 am: **Noninvasive optical micro-angiography for structural and functional in vivo imaging of cerebro-vascular blood perfusion**, Yali Jia, Ruikang Wang, Oregon Health & Science Univ. (United States) [7161E-526]

11:20 am: **Characterization of the newborn visual activation response using high density diffuse optical imaging (HD-DOI)**, Steve M. Liao, Nicholas M. Gregg, Brian R. White, Terrie E. Inder, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7161E-527]

11:40 am: **A simultaneous NIRS&EEG study during seizure in the mouse brain**, Seungduk Lee, Dalkwon Koh, Beop-Min Kim, Yonsei Univ. (Korea, Republic of); Mina Lee, Jee Hyun Choi, Korea Institute of Science and Technology (Korea, Republic of) [7161E-528]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION JT3

Room: Conv. Ctr. Room A4, Marriott Hotel,
Willow Glen Room. Sun. 1:30 to 3:10 pm

Joint Session on Detecting Neural Activity with
Conference 7180 Photons and Neurons

Session Chair: **E. Duco Jansen**, Vanderbilt Univ.

1:30 pm: **Theoretical study on the origin of fast intrinsic optical responses**, Jonghwan Lee, Sung June Kim, Seoul National Univ. (Korea, Republic of) [7180-01]

1:50 pm: **Mitochondrial function and cerebral blood flow responses under unilateral carotid occlusion in rats**, Amir Livnat, Efrat Barbiro-Michaely, Avraham Mayevsky, Bar-Ilan Univ. (Israel) [7180-02]

2:10 pm: **Relation between the neuronal and hemodynamic response in the rat spinal cord following peripheral nerve stimulation**, Dubeau Simon, Frédéric Lesage, Ecole Polytechnique de Montréal (Canada); Éric Beaumont, Hôpital Sacre Coeur de Montréal (Canada) [7180-03]

2:30 pm: **Translation of near infrared brain imaging to assess children with cerebral palsy**, George Alexandrakis, Khosrow Behbehani, Nayan Asanani, Bilal Khan, Fenghua Tian, The Univ. of Texas at Arlington (United States); Mauricio Delgado M.D., Texas Scottish Rite Hospital for Children (United States); Hanli Liu, The Univ. of Texas at Arlington (United States) [7180-04]

2:50 pm: **Limits to non-fluorescent voltage sensitivity using surface and particle plasmons**, Mark C. Pitter, John D. Paul, Jing Zhang, Mike G. Somekh, The Univ. of Nottingham (United Kingdom) [7180-05]

Coffee Break 3:10 to 3:40 pm

Conference 7161E

SESSION JT4

**Room: Conv. Ctr. Room A4, Marriott Hotel,
Willow Glen Room. Sun. 3:40 to 5:30 pm**

Joint Session on Detecting Neural Activity II with
Conference 7180 Photons and Neurons

Session Chair: Edward S. Boyden,
Massachusetts Institute of Technology

3:50 pm: **Depth-encoded spectral domain phase microscopy for simultaneous multi-site nanoscale optical measurements of nerve activation**, Bradley A. Bower, Duke Univ. (United States); Neal Shepherd, Duke Univ. Medical Ctr. (United States); Alex S. Reinstein, Yuankai K. Tao, Joseph A. Izatt, Duke Univ. (United States) [7180-06]

4:10 pm: **Depth localization of neural action potentials using voltage sensitive dyes in optical coherence tomography**, Taner Akkin, Univ. of Minnesota (United States); David Landowne, Univ. of Miami (United States); Aarthi Sivaprakasam, Univ. of Minnesota (United States). [7180-07]

4:30 pm: **Optical probing of photoreceptor function: theoretical model and experimental verification in an in-vivo rat model**, Kostadinka K. Bizheva, Zhao Ren, Univ. of Waterloo (Canada); Aphrodite Dracopoulos, St. Michael's Hospital (Canada); Alireza Akhlagh Moayed, Sepideh Hariri, Univ. of Waterloo (Canada); Timothy W. Kraft, The Univ. of Alabama at Birmingham (United States); Bruce Doran, Diagnosys, LLC (United States); Shelley Boyd, St. Michael's Hospital (Canada) [7180-08]

4:50 pm: **Flavoprotein imaging in the cerebellar cortex in vivo: cellular and metabolic basis and insights into cerebellar function**, Wangcai Gao, Gang Chen, Timothy J. Ebner, Univ. of Minnesota (United States) [7180-09]

5:10 pm: **Flavoprotein imaging reveals low frequency oscillations in the cerebellar cortex of the tottering mouse**, Gang Chen, Wangcai Gao, Timothy J. Ebner, Univ. of Minnesota (United States) [7180-10]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Frontal brain activation during a working memory task: a time-domain fNIRS study, Erika Molteni, Matteo Caffini, Giuseppe Baselli, Anna Maria Bianchi, Davide Contini, Lorenzo Spinelli, Alessandro Torricelli, Sergio Cerutti, Rinaldo Cubeddu, Politecnico di Milano (Italy) [7161E-529]

Optical recording of electrical stimulation induced afterdischarge and spontaneous seizures from human cortex, Hongtao Ma, Mingrui Zhao, Theodore H. Schwartz, Weill-Cornell Medical College (United States). [7161E-530]

Lasers in Dentistry XV

Conference Chairs: **Peter Rechmann**, Univ. of California, San Francisco; **Daniel Fried**, Univ. of California, San Francisco

Program Committee: **Gregory B. Altshuler**, Palomar Medical Technologies, Inc.; **Tatjana Dostálová**, Charles Univ. in Prague (Czech Republic); **John D. Featherstone**, Univ. of California/San Francisco; **David M. Harris**, Bio-Medical Consultants, Inc.; **Harvey A. Wigdor**, Advocate Illinois Masonic Medical Ctr.

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room B3 Sat. 8:10 to 11:20 am

Lasers in Dental Hard Tissue

Session Chair: **Peter Rechmann**, Univ. of California, San Francisco

8:10 am: **Comparison between laser-induced photoemissions of hard tissues using fibre-coupled Nd:YAG and Er³⁺ doped fibre lasers operating at 1.064 micro-meter and 2.96 micro-meter, respectively**, Ashraf F. El-Sherif, Military Technical College (Egypt) [7162-06]

8:30 am: **Terahertz imaging of caries lesions: an in vitro study (Invited Paper)**, David R. Churchley, GlaxoSmithKline UK Ltd. (United Kingdom) [7162-01]

9:00 am: **Understanding the thermal adaptation of dental hard tissues using Moiré interferometry**, Annie Shrestha, National Univ. of Singapore (Singapore); Harold H. Messer, Univ. of Melbourne (Australia); Anand K. Asundi, Nanyang Technological Univ. (Singapore); Anil Kishen, National Univ. of Singapore (Singapore) [7162-02]

9:20 am: **Early detection of tooth wear by en face optical coherence tomography**, Meda Negrutiu M.D., Corina Marcauteanu, Cosmin G. H. Sinescu M.D., Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Eniko Demjan, Univ. de Medicina si Farmacie Victor Babes Timisoara (Romania); Mike Hughes, CIDTEC (United States); Adrian Bradu, George M. Dobre, Adrian Podoleanu, Univ. of Kent (United Kingdom) [7162-03]

9:40 am: **Ex-vivo imaging of early dental caries within the interproximal space**, Lin-P'ing Choo-Smith, Mark D. Hewko, Marc L. Dufour, National Research Council Canada (Canada); Cecilia Dong, Univ. of Manitoba (Canada); Blaine M. Cleghorn, Dalhousie Univ. (Canada); Bruno Gauthier, Christian Padiouleau, Michael G. Sowa, National Research Council Canada (Canada) [7162-04]

Coffee Break 10:00 to 10:20 am

10:20 am: **Osteoconductive bone substitute investigation by particles analyzer, numerical simulation and optical coherence tomography**, Cosmin Sinescu M.D., Meda Negrutiu M.D., Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Ana Terteleac, Ankersmid (Romania); Radu Negru, Mihai Hluscu, Politehnica Univ. Timisoara (Romania); Mihai Rominu, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Liviu Marsavina, Politehnica Univ. Timisoara (Romania); George M. Dobre, Univ. of Kent (United Kingdom); Corina Marcauteanu, Eniko Demjan, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Adrian Podoleanu, Univ. of Kent (United Kingdom) [7162-05]

10:40 am: **24 mm depth range discretely swept optical frequency domain imaging in dentistry**, Hideo Kakuma, Yoshida Dental Mfg. Co., Ltd. (Japan); DongHak Choi, Hiroyuki Furukawa, Hideaki Hiro-Oka, Kohji Ohbayashi, Kitasato Univ. (Japan) [7162-07]

11:00 am: **Time-course diffusion of hydrogen peroxide using modern technologies**, Fernando L. E. Florez D.D.S., Univ. Estadual Paulista (Brazil) and Univ. de São Paulo (Brazil); José D. Vollet II, Univ. de São Paulo (Brazil); Osmir B. Oliveira D.D.S., Univ. Estadual Paulista (Brazil); Vanderlei S. Bagnato, Univ. de São Paulo (Brazil) [7162-08]

POSTER POPS-SESSION A

Room: Conv. Ctr. Room B3 Sat. 11:20 to 12:00pm

Authors of the following posters will give a 2-3 minute overview of their posters using a maximum of 2 vu-graphs. Posters will be on display in the hallway near the meeting room. Posters will be viewed at the conclusion of this session from 11:20-12:00.

Poster authors: please put up your poster before the conference or during the morning coffee break. Posters must be removed from the boards immediately following the conference. Any posters left on the boards following the session will be considered unwanted and will be discarded.

Effect of different power parameters of Er,Cr:YSGG laser on dentin ablation ability and substrate morphology, Zhenlin Zhan, Xianzeng Zhang, Shusen Xie, Lili Yu, Fujian Normal Univ. (China) [7162-09]

Tooth whitening and temperature rise with two bleaching activation methods, Dalia A. Elmagd, Iman I. El-Sayad, Latifa Abdel Gawad, Cairo Univ. (Egypt) [7162-10]

Investigation of light distribution in teeth for dental bleaching, Fernando L. E. Florez D.D.S., Univ. Estadual Paulista Júlio de Mesquita Filho (Brazil); Augusto C. Figueiredo D.D.S., Univ. Federal de Goias (Brazil); Lilian T. Moriyama, Vanderlei S. Bagnato, Univ. de São Paulo (Brazil); Osmir B. Oliveira D.D.S., Univ. Estadual Paulista Júlio de Mesquita Filho (Brazil) [7162-11]

Oral pathology follow-up by means of micro-Raman spectroscopy on tissue and blood serum samples: an application of wavelet and multivariate data analysis, Carlo Camerlingo, Consiglio Nazionale delle Ricerche (Italy); Ines Delfino, Univ. degli Studi della Tuscia (Italy); Flora Zenone, Univ. degli Studi di Napoli Federico II (Italy); Giuseppe Perna, Vito Capozzi, Univ. di Foggia (Italy); Nicola Cirillo, Elizabeth De Mol, Giovanni M. Gaeta, Maria Lepore, Seconda Univ. degli Studi di Napoli (Italy) [7162-12]

Two-photon fluorescence microscopy on oral tissues: preliminary results, Daniele De Luca, Univ. degli Studi di Napoli Federico II (Italy); Michele Papa, Giovanni M. Gaeta, Maria Lepore, Seconda Univ. degli Studi di Napoli (Italy) [7162-13]

Optical coherence tomography combined with confocal microscopy for material defects detection in ceramic fixed partial dentures, Cosmin Sinescu M.D., Meda Negrutiu M.D., Mihai Rominu, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Adrian Bradu, Univ. of Kent (United Kingdom); Iulian Antoniac, Politehnica Univ. Timisoara (Romania); George M. Dobre, Univ. of Kent (United Kingdom); Radu Negru, Liviu Marsavina, Mihai Hluscu, Politehnica Univ. Timisoara (Romania); Corina Marcauteanu, Eniko Demjan, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Adrian Podoleanu, Univ. of Kent (United Kingdom) [7162-14]

Quality assessment of laser welding in dental technology, Meda Negrutiu M.D., Cosmin G. H. Sinescu M.D., Daniela Maria Pop, Mihai Rominu M.D., Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Radu Negru, Mihai Hluscu, Politehnica Univ. Timisoara (Romania); Dalibor Cozarov, Dal's Dentech (Romania); Corina Marcauteanu, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Eniko Demjan, Univ. de Medicina si Farmacie Victor Babes Timisoara (Romania) [7162-15]

Errors occurred in analogical and laser scanning procedure for selective laser sintering/selective laser melting technologies, Cosmin Sinescu M.D., Meda Negrutiu M.D., Mihai Rominu, Bogdan Bildea, Sergiu Antonie, Corina Marcauteanu, Eniko Demjan, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania) [7162-16]

Conference 7162 · Room: Conv. Ctr. Room B3

Selective laser sintering/selective laser melting versus casting procedures in the technology of dental prostheses, Meda Negrutiu M.D., Cosmin G. H. Sinescu M.D., Mihai Rominu M.D., Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); Radu Negru, Mihai Hluscu, Politehnica Univ. Timisoara (Romania); Eniko Demjan, Univ de Medicina si Farmacie Victor Babes Timisoara (Romania); Corina Marcautuanu, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania)[7162-17]

Lunch/Exhibition Break12:00 to 2:00 pm

SESSION 2

Room: Conv. Ctr. Room B3Sat. 2:00 to 5:10 pm

Lasers in Endodontics, Orthodontics, Periodontology, Bleaching, and Caries Prevention

Session Chair: Daniel Fried, Univ. of California, San Francisco

2:00 pm: **Quest for optimal and safe settings for root canal preparation with Er lasers**, Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands); Jan W. Blanken, ACTA School of Dentistry (Netherlands); Tjeerd de Boorder, Univ. Medisch Ctr. Utrecht (Netherlands)[7162-18]

2:20 pm: **Morphological changes of the root surface and fracture resistance after treatment of root fracture by CO₂ laser and glass ionomer or mineral trioxide aggregates (MTA)**, Yehia A. H. Badr, Latifa Abdel Gawad, Mostafa E. Ghaith, Cairo Univ. (Egypt)[7162-19]

2:40 pm: **Laser brackets debonding: Tm:YAP, Nd:YAG, and two diode lasers evaluation**, Tatjana Dostálová M.D., Charles Univ. in Prague (Czech Republic); Helena Jelinkova, Petr Koranda, Jan Sulc D.D.S., Michal Nemeč, Czech Technical Univ. in Prague (Czech Republic); Mitsunobu Miyagi, Katsumasa Iwai, Sendai National College of Technology (Japan)[7162-20]

3:00 pm: **Absorption of laser energy by P gingivalis**, David M. Harris, Univ. of Washington (United States); Steven L. Jacques, Oregon Health & Science Univ. (United States); Richard Darveau, Univ. of Washington (United States)[7162-21]

3:20 pm: **Laser ablation of dental calculus around 400 nm using a Ti-Sapphire laser**, Joshua Schoenly, Univ. of Rochester (United States) and The Institute of Optics, Univ. of Rochester (United States); Wolf Seka, Univ. of Rochester (United States); Peter Rechmann D.D.S., Univ. of California, San Francisco (United States)[7162-22]

Coffee Break3:40 to 4:10 pm

4:10 pm: **Adhesion of composite to dentin surfaces ablated with a CO₂ laser operating at high repetition rates**, Saba Hedayatollahnajafi, Michal Staninec, Chulsung Lee, Saman Manesh, Larry Watanabe, Daniel Fried, Univ. of California, San Francisco (United States)[7162-23]

4:30 pm: **Comparative assessment of the organization of the colors of the Vita Classical color pallet by digital images and visual analysis for dental bleaching**, Osmir B. Oliveira Junior D.D.S., São Paulo State Univ. (Brazil); Fernando L. E. Florez D.D.S., Univ. de São Paulo (Brazil); Mariana S. Cioffi D.D.S., São Paulo State Univ. (Brazil); Vanderlei S. Bagnato, Univ de São Paulo (Brazil); Diego R. Corrêa-dos-Santos, Fabio P. Fornazari, Faculdade Logatt Araraquara (Brazil)[7162-24]

4:50 pm: **Inhibition of enamel remineralization with blue LED: an in vitro study**, Ilka T. Kato D.D.S., Instituto de Pesquisas Energéticas e Nucleares (Brazil); Fausto M. Mendes D.D.S., Univ. de São Paulo (Brazil); Denise M. Zzell, Niklaus U. Wetter, Instituto de Pesquisas Energéticas e Nucleares (Brazil)[7162-25]

POSTER POPS-SESSION B

Room: Conv. Ctr. Room B3Sat. 5:10 to 5:50 pm

Authors of the following posters will give a 2-3 minute overview of their posters using a maximum of 2 vu-graphs. Posters will be on display in the hallway near the meeting room. Posters will be viewed at the conclusion of this session from 5:10-5:50.

Poster authors: please put up your poster before the conference or during the morning coffee break. Posters must be removed from the boards immediately following the conference. Any posters left on the boards following the session will be considered unwanted and will be discarded.

The effect of high intensity argon laser irradiation on the acid resistance of human enamel, Charles Q. Le, Daniel Fried, John D. Featherstone, Univ. of California, San Francisco (United States)[7162-28]

Study on calcifying treatments of hydroxyapatite (HAp) using calcification promotion solution, Moriaki Wakaki, Syungo Yazaki, Tokai Univ. (Japan); Yoshikazu Sunada, Oji Paper Co., Ltd. (Japan)[7162-29]

An automated digital microradiography system for assessing tooth demineralization, Cynthia L. Darling, Charles Q. Le, John D. Featherstone, Daniel Fried, Univ. of California, San Francisco (United States)[7162-30]

Methods for calculating the severity of demineralization on tooth surfaces from PS-OCT scans, Michael H. Le, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (United States)[7162-31]

Nondestructive measurement of the demineralization on root surfaces with PS-OCT, Chulsung Lee, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (United States)[7162-32]

Assessment of dentin remineralization with polarization sensitive optical coherence tomography, Saman Manesh, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (United States)[7162-33]

Near-IR multi-modal imaging of natural occlusal caries, Dustin Lee, Daniel Fried, Cynthia L. Darling, Univ. of California, San Francisco (United States)[7162-34]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Ophthalmic Technologies XIX

Conference Chairs: **Fabrice Manns**, Univ. of Miami; **Per G. Söderberg**, Uppsala Univ. (Sweden); **Arthur Ho**, Institute for Eye Research Ltd. (Australia)

Program Committee: **Rafat R. Ansari**, The Univ. of Texas School of Health Information Sciences at Houston; **Michael Belkin**, Tel Aviv Univ. (Israel); **Ralf Brinkmann**, Univ. zu Lübeck (Germany); **Wolfgang Drexler**, Cardiff Univ. (United Kingdom); **Daniel X. Hammer**, Physical Sciences Inc.; **Karen Margaret Joos**, Vanderbilt Univ.; **Katsuhiko Kobayashi**, Topcon Corp. (Japan); **Kirill V. Larin**, Univ. of Houston; **Ezra I. Maguen**, Cedars-Sinai Medical Ctr.; **Donald T. Miller**, Indiana Univ.; **Peter J. Milne**, National Science Foundation; **Michael C. Mrochen**, ETH Zürich (Switzerland); **Daniel V. Palanker**, Stanford Univ. Medical Ctr.; **Jean-Marie A. Parel**, Univ. of Miami Medical School; **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Luigi L. Rovati**, Univ. degli Studi di Modena (Italy); **Georg Schuele**, OptiMedica Corp.; **Jerry Sebag**, Univ. of Southern California; **Peter Soliz**, VisionQuest Biomedical; **William B. Telfair**, IRIDEX Corp.; **Valery V. Tuchin**, Saratov State Univ. (Russia)

SPIE and the organizers gratefully acknowledge the following sponsor of the Pascal Rol Award featured as part of the Ophthalmic Technologies Conference:



Topcon Advanced Biomedical Imaging Laboratory,
through the Pascal Rol Foundation

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Rooms A7/A8 Sat. 8:15 to 9:30 am

Models of Ocular Disease

Session Chairs: **Wolfgang Drexler**, Cardiff Univ. (United Kingdom); **Daniel X. Hammer**, Physical Sciences Inc.

8:15 am: **Retinal tumor imaging and volume quantification in transgenic mouse**, Marco Ruggeri, Gavriil Tsechpenakis, Shuliang Jiao, Maria Elena Jockovich, Colleen Cebulla, Timothy G. Murray, Philip J. Rosenfeld, Carmen A. Puliafito, Univ. of Miami Miller School of Medicine (United States) . . . [7163-01]

8:30 am: **Glaucoma development in an animal model monitored by ultrahigh resolution optical coherence tomography ex vivo**, Alisha Charlton, Boris Pova_ay, Marilyn Puah, Farah Nashir, Bernd Hofer, Paulina Samsel, James E. Morgan, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7163-02]

8:45 am: **Laser speckle imaging of rat retinal blood flow with hybrid temporal and spatial analysis method**, Haiying Cheng, Yumei Yan, Ruoyu Luo, Timothy Q. Duong, Emory Univ. (United States) [7163-03]

9:00 am: **High speed, high resolution, in-vivo imaging of healthy and pathological rat retinas with FD-OCT operating at 1060nm**, Zhao Ren, Prabakar Puvanathan, Univ. of Waterloo (Canada); Aphrodite Dracopoulos, Univ. of Toronto (Canada); Sepideh Hariri, Alireza Akhlagh Moayed, Univ. of Waterloo (Canada); Shelley Boyd, Univ. of Toronto (Canada); Kostadinka K. Bizheva, Univ. of Waterloo (Canada) [7163-04]

9:15 am: **A combined ERG and UHR OCT system for simultaneous recordings from the rat retina in-vivo**, Kostadinka K. Bizheva, Zhao Ren, Univ. of Waterloo (Canada); Aphrodite Dracopoulos, St. Michael's Hospital (Canada); Sepideh Hariri, Univ. of Waterloo (Canada); Timothy W. Kraft, The Univ. of Alabama at Birmingham (United States); Bruce Doran, Diagnosys, LLC (United States); Shelley Boyd, St. Michael's Hospital (Canada) [7163-05]

SESSION 2

Room: Conv. Ctr. Rooms A7/A8 Sat. 9:30 to 10:15 am

Ophthalmic Imaging Technology I

Session Chairs: **Donald T. Miller**, Indiana Univ.; **Michael Belkin**, Tel Aviv Univ. (Israel)

9:30 am: **Ultrahigh speed spectral/Fourier domain ophthalmic OCT imaging**, Benjamin M. Potsaid, Massachusetts Institute of Technology (United States); Iwona M. Gorczynska, Massachusetts Institute of Technology (United States) and New England Eye Center and Tufts Medical Ctr. (United States); Vivek J. Srinivasan, Yueli Chen, Jonathan J. Liu, Massachusetts Institute of Technology (United States); James Jiang, Alex Cable, Thorlabs, Inc. (United States); Jay S. Duker M.D., New England Eye Ctr. (United States) and Tufts Univ. School of Medicine (United States); James G. Fujimoto, Massachusetts Institute of Technology (United States) [7163-06]

9:45 am: **Swept source OCT imaging of human anterior segment at 200 kHz**, Karol M. Karnowski, Michalina Gora, Univ. Mikolaja Kopernika (Poland); Bartlomiej J. Kaluzny, Collegium Medikum UMK (Poland); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany); Maciej Szkulmowski, Andrzej Kowalczyk, Maciej Wojtkowski, Univ. Mikolaja Kopernika (Poland) [7163-07]

10:00 am: **In vivo three-dimensional 'snapshot' OCT of the human retina with up to 630 frames/s**, Boris Pova_ay, Bernd Hofer, Cristiano Torti, Vedran Kajic, Angelika Unterhuber, Boris M. Hermann, Alexandre R. Tumlinson, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7163-08]

Coffee Break 10:15 to 10:45 am

SESSION 3

Room: Conv. Ctr. Rooms A7/A8 Sat. 10:30 am to 12:00 pm

Ophthalmic Imaging Technology II

Session Chairs: **Donald T. Miller**, Indiana Univ.; **Michael Belkin**, Tel Aviv Univ. (Israel)

10:30 am: **Wide field visualization of retinal and choroidal microstructure in vivo using frequency domain OCT at 1060 nm with up to 47000 lines/s**, Boris Hermann, Boris Povazay, Bernd Hofer, Vedran Kajic, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7163-09]

10:45 am: **Wavelength scanning digital interference holography for high-resolution ophthalmic imaging**, Mariana C. Potcoava, Myung K. Kim, Christine N. Kay, Univ. of South Florida (United States) [7163-10]

11:00 am: **High-resolution imaging using structured illumination line-scanning laser ophthalmoscopy**, Yuankai K. Tao, Woo Jhon Choi, Kristen M. Kennedy, Joseph A. Izatt, Duke Univ. (United States) [7163-11]

11:15 am: **Technology needs for tomorrow's treatment and diagnosis of glaucoma**, Manfred Tetz, Berlin Eye Research Institute (Germany) . . . [7163-12]

Lunch/Exhibition Break 12:00 to 1:30 pm

Conference 7163

SESSION 4

Room: Conv. Ctr. Rooms A7/A8 Sat. 1:30 to 3:00 pm

Adaptive and Isotropic Ophthalmic Imaging

Session Chairs: **Katsuhiko Kobayashi**, Topcon Corp. (Japan);
Daniel V. Palanker, Stanford Univ. Medical Ctr.

1:30 pm: **Comparison of adaptive optics spectral-domain optical coherence tomography systems with four commercially-available sources**, Barry Cense, Jeffrey M. Brown, Weihua Gao, Ravi S. Jonnal, Erik Koperda, Omer Kocaoglu, Donald T. Miller, Indiana Univ. (United States) [7163-13]

1:45 pm: **Retinal imaging with combined adaptive optics, optical coherence tomography and adaptive optics, scanning laser ophthalmoscopy**, Robert J. Zawadzki, Univ. of California, Davis Medical Ctr. (United States); Steven M. Jones, Diana C. Chen, Lawrence Livermore National Lab. (United States); Stacey S. Choi, Univ. of California, Davis Medical Ctr. (United States); Julia W. Evans, Scot S. Olivier, Lawrence Livermore National Lab. (United States); John S. Werner, Univ. of California, Davis Medical Ctr. (United States) [7163-14]

2:00 pm: **Adding the third dimension on adaptive optics retina imager thanks to full-field optical coherence tomography**, Marie Blavier, Ctr. Hospitalier National d'Ophthalmologie des Quinze-Vingts (France) and Observatoire de Paris à Meudon (France); Marie Glanc, Leonardo Blanco, Observatoire de Paris à Meudon (France) and Univ. Paris Diderot (France); Florence Pouplard, Sarah Tick, Ctr. Hospitalier National d'Ophthalmologie des Quinze-Vingts (France); Ivan Maksimovic, Ctr. Hospitalier National d'Ophthalmologie des Quinze-Vingts (France) and Univ. Paris Diderot (France); Laurent M. Mugnier, ONERA (France) and Univ. Paris Diderot (France); Gérard Rousset, Observatoire de Paris à Meudon (France) and Univ. Paris Diderot (France) [7163-15]

2:15 pm: **In vivo genotype-phenotype correlation using ultra-high speed and resolution retinal OCT with pancorrection**, Cristiano Torti, Boris Povazay, Bernd Hofer, Boris M. Hermann, Vedran Kajic, Angelika Unterhuber, Cardiff Univ. (United Kingdom); Enrique J. Fernández, Univ. de Murcia (Spain); Joseph Carroll, Medical College of Wisconsin (United States); Peter K. Ahnelt, Medical Univ. of Vienna (Austria); Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7163-16]

2:30 pm: **1 μ m wavelength adaptive optics scanning laser ophthalmoscope**, Kazuhiro Kurokawa, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [7163-17]

2:45 pm: **Compact adaptive optics line scanning laser ophthalmoscope**, Daniel X. Hammer, Mircea Mujat, Nicusor V. Ifimia, Robert D. Ferguson, Physical Sciences Inc. (United States) [7163-18]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: Conv. Ctr. Rooms A7/A8 Sat. 3:30 to 4:45 pm

Ophthalmic Polarization Imaging

Session Chairs: **Karen Margaret Joos**, Vanderbilt Univ.;
Kirill V. Larin, Univ. of Houston

3:30 pm: **Modeling human corneal polarization properties and comparison with PS-OCT measurements**, Félix Fanjul-Vélez, Univ. of Cantabria (Spain); Michael Pircher, Bernhard Baumann, Erich Götzinger, Medical Univ. of Vienna (Austria); José Luis Arce-Diego, Univ. of Cantabria (Spain); Christoph K. Hitzenberger, Medical Univ. of Vienna (Austria) [7163-19]

3:45 pm: **Fundus depolarization imaging with GDx VCC scanning laser polarimeter and depolarization characteristics of normal eyes**, Qienyuan Zhou, Carl Zeiss Meditec, Inc. (United States); Henry A. Leder M.D., Duke Ctr. for Macular Diseases (United States); Barrick P. W. Lo, Gerard C. Reed, Carl Zeiss Meditec, Inc. (United States); Robert W. Knighton, Bascom Palmer Eye Institute (United States); Scott W. Cousins M.D., Duke Ctr. for Macular Diseases (United States) [7163-20]

4:00 pm: **Simultaneous birefringence and Doppler flow imaging of the anterior eye segment using multi-functional swept-source optical coherence tomography**, Masahiro Yamanari, Shuichi Makita, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan); Masahiro Miura, Tokyo Medical Univ. Kasumigaura Hospital (Japan) and Computational Optics Group in the Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan) [7163-21]

4:15 pm: **Imaging the human retina in vivo with combined spectral-domain polarization-sensitive optical coherence tomography and scanning laser ophthalmoscopy**, Bernhard Baumann, Michael Pircher, Erich Götzinger, Harald Sattmann, Medizinische Univ. Wien (Austria); Martin Wurm, David Stifter, Upper Austrian Research GmbH (Austria); Christopher Schütze, Christian Ahlers, Wolfgang Geitznauer, Ursula Schmidt-Erfurth, General Hospital and Medical Univ. of Vienna (Austria); Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [7163-22]

4:30 pm: **Investigation of anterior chamber angle by swept-source polarization sensitive optical coherence tomography**, Yoshiaki Yasuno, Masahiro Yamanari, Keisuke Kawana, Univ. of Tsukuba (Japan); Masahiro Miura, Tokyo Medical Univ. Kasumigaura Hospital (Japan); Shuichi Makita, Tetsuro Oshika, Univ. of Tsukuba (Japan) [7163-23]

SESSION 6

Room: Conv. Ctr. Rooms A7/A8 Sat. 4:45 to 5:45 pm

Functional Ophthalmic Imaging I

Session Chair: **Rafat R. Ansari**, The Univ. of Texas School of Health Information Sciences at Houston

4:45 pm: **A new imaging technique for retinal vessel oximetry: principles and first clinical results in patients with retinal arterial occlusion and diabetic retinopathy**, Martin Hammer, Friedrich-Schiller-Univ. Jena (Germany); Thomas Riemer, Walhard Vilser, Imedos GmbH (Germany); Simone Gehlert, Dietrich Schweitzer, Friedrich-Schiller-Univ. Jena (Germany) [7163-24]

5:00 pm: **Three-dimensional retinal blood flow analysis using joint spectral and time domain optical coherence tomography**, Anna Szkulmowska, Maciej Szkulmowski, Daniel Szlag, Danuta Bukowska, Szymon Tamborski, Andrzej Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) [7163-25]

5:15 pm: **In vivo volumetric imaging of vascular perfusion within human retina and choroids with optical micro-angiography**, Lin An, Ruikang Wang, Oregon Health & Science Univ. (United States) [7163-26]

5:30 pm: **A simple model of oxygen diffusion out of the retinal artery**, Bahram Khoobehi, Louisiana State Univ. (United States) [7163-27]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 7

Room: Conv. Ctr. Rooms A7/A8 Sun. 8:00 to 9:00 am

Ophthalmic Laser Tissue Interactions I

Session Chairs: **Ralf Brinkmann**, Medizinisches Laserzentrum Lübeck GmbH (Germany); **William B. Telfair**, IRIDEX Corp.

8:00 am: **Computational model of retinal photocoagulation and rupture**, Christopher Sramek, Yannis M. Paulus, Hiroyuki Nomoto, Phil Huie, Daniel V. Palanker, Stanford Univ. (United States) [7163-28]

8:15 am: **Monitoring intracellular cavitation during selective targeting of the retinal pigment epithelium with a laser scanner in vivo**, Clemens Alt, Mehron Puoris'haag M.D., Wellman Ctr. for Photomedicine (United States); Ho Lee, Kyungpook National Univ. (Korea, Republic of); Costas M. Pitsillides, Charles P. Lin, Wellman Ctr. for Photomedicine (United States) [7163-29]

8:30 am: **Dynamics of laser induced transient micro bubble clusters**, Andreas Fritz, Lars Ptaszynski, Hardo Stoehr, Ralf Brinkmann, Medizinisches Laserzentrum Lübeck GmbH (Germany) [7163-30]

8:45 am: **Optic interferometric realtime dosimetry for selective retina therapy (SRT)**, Ralf Brinkmann, Univ. zu Lübeck (Germany); Andreas Fritz, Lars Ptaszynski, Medical Laser Ctr. Lübeck (Germany); Hardo Stoehr, Univ. zu Lübeck (Germany); Mark Saeger, Johann Roeder, Univ. Eye Hospital (Germany); Reginald Birngruber, Univ. zu Lübeck (Germany) [7163-31]

SESSION 8

Room: Conv. Ctr. Rooms A7/A8 Sun. 9:00 to 10:15 am

Ophthalmic Laser Tissue Interactions II

*Session Chairs: Ezra I. Maguen, American Eye Institute;
Georg Schuele, OptiMedica Corp.*

- 9:00 am: **Intraocular tissue ablation using an optical fibre to deliver the 5th harmonic of a Nd:YAG**, Joe Miller, Xiaobo Yu, Paula K. Yu, Stephen J. Cringle, Dao-Yi Yu, The Univ. of Western Australia (Australia) [7163-32]
- 9:15 am: **Investigation on fibrous collagen modifications during corneal laser welding by second harmonic generation microscopy**, Paolo Matteini, Fulvio Ratto, Francesca Rossi, Istituto di Fisica Applicata Nello Carrara (Italy); Riccardo Cicchi, Chiara Stringari, Dimitrios Kapsokalyvas, Francesco S. Pavone, Univ. degli Studi di Firenze (Italy); Luca Menabuoni, Azienda USL 4 (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) [7163-33]
- 9:30 am: **Further progress in the development of the femtosecond-lentotomy treatment**, Silvia Schumacher, Michael Fromm, Laser Zentrum Hannover e.V. (Germany); Uwe Oberheide, Laserforum Köln (Germany); Patricia Bock, Ilka Imbschweiler, Univ. of Veterinary Medicine Hannover (Germany); Heike Hoffmann, Laser Zentrum Hannover e.V. (Germany); Georg Gerten, Laserforum Köln (Germany); Andreas Beineke, Univ. of Veterinary Medicine Hannover (Germany); Alfred R. Wegener, Univ. of Bonn (Germany); Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany) [7163-34]
- 9:45 am: **Patterned laser trabeculoplasty**, Daniel V. Palanker, Hiroyuki Nomoto, Stanford Univ. (United States); Georg Schuele, Dan E. Andersen, George R. Marcellino, OptiMedica Inc. (United States); Christopher J. Engelman, Santa Clara Valley Medical Ctr. (United States) [7163-35]
- 10:00 am: **Photochemical effects in the lens from near infrared radiation?**, Per G. Söderberg, Uppsala Univ. (Sweden) [7163-36]
- Coffee Break 10:15 to 10:45 am

SESSION 9

Room: Conv. Ctr. Rooms A7/A8 Sun. 10:45 to 11:45 am

Ophthalmic Image Correction, Analysis, and Visualization

*Session Chairs: Arthur Ho, Institute for Eye Research Ltd. (Australia);
Wolfgang Drexler, Cardiff Univ. (United Kingdom)*

- 10:45 am: **Comparison of real-time visualization of volumetric OCT data sets by CPU-enabled slicing and GPU-supported ray casting**, Alfred R. Fuller, Robert J. Zawadzki, Bernd Hamann, John S. Werner, Univ. of California, Davis (United States) [7163-37]
- 11:00 am: **Automated analysis of OCT images of the crystalline lens**, Eon Kim, Institute for Eye Research Ltd. (Australia) and Vision CRC (Australia); Klaus Ehrmann, Institute for Eye Research Ltd. (Australia) and Vision CRC (Australia) and School of Optometry and Vision Science, Univ. of New South Wales (Australia); Stephen R. Uhlhorn, David Borja, Jean-Marie A. Parel, Bascom Palmer Eye Institute (United States) [7163-38]
- 11:15 am: **Three-dimensional refraction correction and Zernike polynomial aberration decomposition for high-speed corneal spectral domain OCT**, Mingtao Zhao, Joseph A. Izatt, Duke Univ. (United States) [7163-39]
- 11:30 am: **Fully automated corneal endothelial morphometry of images captured by clinical specular microscopy**, Curry P. Bucht, Per G. Söderberg, Uppsala Univ. (Sweden) [7163-40]

PANEL DISCUSSION

Room: Conv. Ctr. Rooms A7/A8 Sun. 11:45 am to 12:30 pm

Ophthalmic Express: The Glaucoma Debate

Panel Moderator: Arthur Ho, Institute for Eye Research Ltd. (Australia)

Lunch/Exhibition Break 12:30 to 1:45 pm

SESSION 11

Room: Conv. Ctr. Rooms A7/A8 Sun. 1:45 to 3:00 pm

Optics of the Eye and Vision Correction

*Session Chairs: Per G. Söderberg, Uppsala Univ. (Sweden);
Donald T. Miller, Indiana Univ.*

- 1:45 pm: **Working sketch of an anatomically and optically equivalent physical model eye**, Ravi Chandra Bakaraju, Klaus Ehrmann, Eric B. Papas, Arthur Ho, Institute for Eye Research Ltd. (Australia) [7163-41]
- 2:00 pm: **Effect of the refractive index gradient on the paraxial ray path in the crystalline lens**, Fabrice Manns, David Borja, Univ. of Miami (United States); Arthur Ho, Institute for Eye Research Ltd. (Australia); Jean-Marie A. Parel, Univ. of Miami (United States) [7163-42]
- 2:15 pm: **Peripheral refraction and field curvature of the human eye with accommodation**, Arthur Ho, Frederik Zimmermann, Institute for Eye Research Ltd. (Australia); Andrew Whatham, Univ. of New South Wales (Australia); Aldo Martinez, Percy Lazon de la Jara, Padmaja Sankaridurg, Institute for Eye Research Ltd. (Australia) [7163-43]
- 2:30 pm: **A theoretical design of gradient index multifocal contact lens for correcting presbyopia and an attempt to elicit its performance using ray tracing**, Ravi Chandra Bakaraju, Klaus Ehrmann, Eric B. Papas, Arthur Ho, Institute for Eye Research Ltd. (Australia) [7163-45]
- 2:45 pm: **Measuring directionality of the retinal reflection with a Shack-Hartmann wavefront sensor**, Weihua Gao, Ravi S. Jonnal, Barry Cense, Donald T. Miller, Indiana Univ. (United States) [7163-46]
- Coffee Break 3:00 to 3:30 pm

SESSION 12

Room: Conv. Ctr. Rooms A7/A8 Sun. 3:30 to 4:45 pm

Ophthalmic Devices and Instruments

*Session Chairs: Jean-Marie A. Parel, Univ. of Miami Medical School;
Jerry Sebag, Univ. of Southern California*

- 3:30 pm: **High resolution photovoltaic retinal prosthesis**, Jim Loudin, Rostam Dinyari, Phil Huie, Alex Butterwick, Peter Peumans, Daniel V. Palanker, Stanford Univ. (United States) [7163-47]
- 3:45 pm: **Multimodal scanning laser ophthalmology for image guided treatment of age-related macular degeneration**, Daniel X. Hammer, Robert D. Ferguson, Ankit Patel, Mircea Mujat, Nicusor V. Iftimia, Physical Sciences Inc. (United States); Deeba Husain, Boston Medical Ctr. (United States) . . . [7163-48]
- 4:00 pm: **OCT-imaging of the retina and the anterior section of the eye with one instrument: the SpectralRadar slit-lamp**, Gereon Hüttmann, Univ. zu Lübeck (Germany); Cyriak Schulz-Wackerbarth, Univ. Schleswig-Holstein (Germany); Eva Lankenau, Heike H. Müller, Univ. zu Lübeck (Germany); Maya Müller, Philipp Steven, Univ. Schleswig-Holstein (Germany) [7163-49]
- 4:15 pm: **Optical power mapping using paraxial laser scanning**, Klaus Ehrmann, Institute for Eye Research Ltd. (Australia) and Vision CRC (Australia) and School of Optometry and Vision Science (Australia); Darrin Falk, Institute for Eye Research Ltd. (Australia) and Vision CRC (Australia) [7163-50]
- 4:30 pm: **Laser eye protection in a contact lens using plasmon resonant nanoparticles**, Glenn P. Goodrich, J. Donald Payne, James C. Wang, Joseph B. Jackson, Nanospectra Biosciences, Inc. (United States) [7163-51]

SESSION 13

Room: Conv. Ctr. Rooms A7/A8 Sun. 4:45 to 5:45 pm

Functional Ophthalmic Imaging II

*Session Chairs: Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy);
William B. Telfair, IRIDEX Corp.*

- 4:45 pm: **Evaluation of hypoxic swelling of human cornea with high speed, ultrahigh resolution optical coherence tomography**, Nazila Yavari, Trefford Simpson, Natalie Hutchings, Univ. of Waterloo (Canada); Zhao Ren, Univ. of Waterloo (Canada) and Univ. of Waterloo, Electrical and Computer Engineering (Canada); Kostadinka K. Bizheva, Univ. of Waterloo (Canada); Prabakar Puvanathan, Univ. of Waterloo (Canada) and Univ. of Waterloo, Systems Design Engineering (Canada) [7163-52]
- 5:00 pm: **Optical coherence tomography in estimating molecular diffusion of drugs and analytes in ocular tissues**, Mohamad G. Ghosn, Univ. of Houston (United States); Valery V. Tuchin, Saratov State Univ. (Russian Federation); Kirill V. Larin, Univ. of Houston (United States) [7163-53]

Conference 7163

5:15 pm: **In vitro detection of neuronal programmed cell death by ultrahigh resolution optical coherence tomography**, Debbie Tudor, James E. Morgan, Boris Povazay, Bernd Hofer, Vedran Kajic, Marcela Votruba, Mike Wride, Angelika Unterhuber, Boris M. Hermann, Wolfgang Drexler, Cardiff Univ. (United Kingdom)[7163-54]


5:30 pm: **Functional retinal optical coherence tomography fOCT**, Rainer A. Leitgeb, Tilman Schmolli, Medical Univ. of Vienna (Austria)[7163-55]

PASCAL ROL AWARD ANNOUNCEMENT
Room: Conv. Ctr. Rooms A7/A8 Sun. 5:45 to 6:00 pm

Session Chair: Fabrice Manns, Univ. of Miami

The Pascal Rol Award will be given to the Best Paper in Ophthalmic Technologies.

Award Sponsor:


Topcon Advanced Biomedical Imaging Laboratory,
through the Pascal Rol Foundation

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Surgical device for supporting corneal suturing, Liliane Ventura, Jean-Jacques De Groote, Sidney J. Faria e Sousa, Homero Schiabel, Univ. de São Paulo (Brazil)[7163-56]

UVA system for human cornea irradiation, Liliane Ventura, Fernando R. A. Pereira, Univ. de São Paulo (Brazil); Mario A. Stefani, José A. Otoboni, Eduardo H. Richter, Giuliano Rossi, Alessandro D. Mota, Opto Eletrônica S.A. (Brazil)[7163-57]

Omni-focal refractive focus correction technology as a substitute for bi/multi-focal IOL, contact lenses and spectacles, Shai Ben Yaish, Alex Zlotnik, Ido Raveh, Xceed Imaging Ltd. (Israel); Oren Yehezkel, Michael Belkin M.D., Tel Aviv Univ. (Israel); Karen Lahav, Xceed Imaging Ltd. (Israel); Zeev Zalevsky, Bar-Ilan Univ. (Israel)[7163-58]

Automated spectroscopic imaging of oxygen saturation in human retinal vessels, Daisuke Nakamura, Satoshi Sueda, Noboru Matsuoka, Yukiyasu Yoshinaga, Kyushu Univ. (Japan); Hiroshi Enaida, Kyushu Medical Ctr. (Japan); Tatsuro Ishibashi, Kyushu Univ. (Japan)[7163-59]

Characterization of the vitreous body of the human eye using a cyanine dye as a spectral and fluorescent probe, Ina G. Panova, Koltsov Institute of Developmental Biology (Russian Federation); Alexander S. Tatikolov, Emanuel Institute of Biochemical Physics (Russian Federation)[7163-60]

High brightness application of orange fiber laser for photocoagulator, Jun Nakanishi, Jun Suzuki, Koichi Ito, Kazunobu Kojima, Muneyuki Adachi, Tsuyoshi Yamada, Tokio Ueno, Ken-ichi Hayashi, NIDEK Co., Ltd. (Japan)[7163-61]

Low-temperature corneal laser welding investigated by atomic force microscopy, Paolo Matteini, Istituto di Fisica Applicata Nello Carrara (Italy); Francesca Sbrana, Univ. degli Studi di Firenze (Italy); Bruno Tiribilli, Istituto dei Sistemi Complessi-CNR (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy)[7163-62]

Optical clearing of human eye sclera, Alexey N. Bashkatov, Elina A. Genina, Vyacheslav I. Kochubey, Tatyana G. Kamenskikh, Valery V. Tuchin, Saratov State Univ. (Russian Federation)[7163-63]

Drug delivery in eye sclera in vitro, Elina A. Genina, Alexey N. Bashkatov, Valery V. Tuchin, Tatiana G. Kamenskikh, Saratov State Univ. (Russian Federation)[7163-64]

Scheimpflug camera system for cross-sectional imaging of the ex vivo crystalline lens during simulated accommodation, David Borja, Stephen R. Uhlhorn, Noël M. Ziebarth, Derek Nakivil, Esdras Arrieta-Quintero, Bascom Palmer Eye Institute (United States); Klaus Ehrmann, Arthur Ho, Institute for Eye Research Ltd. (Australia); Fabrice Manns, Univ. of Miami (United States); Jean-Marie Parel, Bascom Palmer Eye Institute (United States)[7163-65]

Non-invasive OCT assessment of structural changes of banked cornea tissues in different preservation solutions, Yicong Wu, Univ. of Washington (United States); Dominic Clarke, Biolife Solutions, Inc. (United States); Xingde Li, Univ. of Washington (United States)[7163-66]

Femtosecond laser surgery on the anterior segment of the eye: laser parameters and tissue optics, Karsten Plamann, Valeria Nuzzo, Florent Deloison, Donald A. Peyrot, Florent Aptel, Caroline Crotti, Ecole Nationale Supérieure de Techniques Avancées (France); Laurent Arnaud, Benoît C. Forget, René Descartes Univ. (France); Michèle Savoldelli, Jean-Marc Legeais, Hôpital Hôtel Dieu (France)[7163-67]

IOPTima's laser-based non-penetrating deep sclerectomy: initial clinical trial results, Y. Ton, Meir Hospital (Israel); F. Gil Carrasco, M. Turati, Hospital Dr. Luis Sanchez Bulnes (Mexico); R. Thomas, S. Naveen, Siloam Eye Ctr. (India); M. Zalish, Kaplan Hospital (Israel); Michael Belkin M.D., Tel Aviv Univ. (Israel); E. Asia, Meir Hospital (Israel)[7163-68]

Evaluation of retinal image quality of the avian eye in peripheral vision, Yaiza Garcia-Sanchez, Cristiano Torti, Jonathan T. Erichsen, Wolfgang Drexler, Cardiff Univ. (United Kingdom)[7163-69]

Post acquisition analysis of RNFL in SD-OCT (3DOCT-1000 of Topcon) acquired volumes, Roy de Kinkelder, Academic Medical Ctr. (Netherlands) and Topcon Europe Medical b.v. (Netherlands); Jeroen Kalkman, Pauline Kok, Frank D. Verbraak, Ton G. van Leeuwen, Academic Medical Ctr. (Netherlands)[7163-70]

In-vivo high resolution imaging of chicken retina with adaptive optics scanning laser ophthalmoscope, Yuhua Zhang, Christine F. Wildsoet, Austin Roorda, Univ. of California, Berkeley (United States)[7163-71]

Oxygen saturation mapping of the optic nerve head by hyperspectral image analysis: effects of raising IOP, Bahram Khoobehi, J. Ning, J. M. Beach, D. A. Rice, H. W. Thompson, C. Burgoyne, Louisiana State Univ. (United States)[7163-72]

Bottlenose dolphin iris asymmetries enhance aerial and underwater vision, Lorenzo A. Rivamonte, US Army TMDE Activity (United States)[7163-73]

Refractive index distribution of the crystalline lens measured with optical coherence tomography, Stephen R. Uhlhorn, David Borja, Fabrice Manns, Jean-Marie A. Parel, Univ. of Miami (United States)[7163-74]

Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XVIII

Conference Chair: **David H. Kessel**, Wayne State Univ.

Conference Co-Chair: **Tayyaba Hasan**, Wellman Ctr. for Photomedicine, Massachusetts General Hospital

Program Committee: **Thomas H. Foster**, Univ. of Rochester; **Charles J. Gomer**, Childrens Hospital Los Angeles; **Nancy L. Oleinick**, Case Western Reserve Univ.; **Brian W. Pogue**, Dartmouth College; **Kevin M. Smith**, Louisiana State Univ.; **Kenneth K. Wang**, Mayo Clinic

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room C1 Sat. 9:00 am to 12:00 pm

Preclinical I

Session Chair: **David H. Kessel**, Wayne State Univ.

9:00 am: **Determinants of PDT efficacy** (*Invited Paper*), David H. Kessel, Michael Price, Wayne State Univ. (United States) [7164-01]

9:30 am: **Autophagy in response to photodynamic therapy: cell survival vs. cell death** (*Invited Paper*), Nancy L. Oleinick, Liang-yan Xue, Song-mao Chiu, Sheeba Joseph, Case Western Reserve Univ. (United States) [7164-02]

10:00 am: **Optimization of combinatorial therapy using EGFR inhibition and photodynamic therapy in novel ovarian cancer models** (*Invited Paper*), Adnan O. Abu-Yousif, Imran Rizvi, Humra Athar, Jon Celli, Tayyaba Hasan, Massachusetts General Hospital (United States) [7164-03]

Coffee Break 10:30 to 11:00 am

11:00 am: **Preclinical experience with intratumor administration of Pc 4** (*Invited Paper*), Benjamin R. Giesselman, Univ. of Rochester Medical Ctr. (United States); Tammy K. Lee, Timothy M. Baran, Univ. of Rochester (United States); Barbara J. Stwertka, Soumya Mitra, Thomas H. Foster, Univ. of Rochester Medical Ctr. (United States) [7164-04]

11:30 am: **Comparison between single and combined modality approaches involving photodynamic therapy** (*Invited Paper*), Charles J. Gomer, Children's Hospital Los Angeles (United States) [7164-05]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 2

Room: Conv. Ctr. Room C1 Sat. 1:30 to 3:10 pm

Preclinical II

Session Chairs: **Thomas H. Foster**, Univ. of Rochester Medical Ctr.; **Nancy L. Oleinick**, Case Western Reserve Univ.

1:30 pm: **Optimal combination strategy for photodynamic therapy (PDT) and anti-angiogenic therapy: a mechanistic study**, Sung K. Chang, Zhiming Mai, Arshi Malik, Tayyaba Hasan, Massachusetts General Hospital (United States) [7164-06]

1:50 pm: **Optical monitoring of oxygen in photodynamic therapy using magnetic field effects on photosensitizer luminescence**, Ozzy Mermut, Jean-François Cormier, Pascal Gallant, Nicolas Hô, Sébastien Leclair, Isabelle Noiseux, Marcia L. Vernon, INO (Canada); Jean-François Morin, Univ. Laval (Canada); Kevin R. Diamond, Juravinski Cancer Ctr. (Canada); Mike S. Patterson, McMaster Univ. (Canada) [7164-07]

2:10 pm: **Detection and monitoring of tumors during PDT with fluorescence tomography**, Daniel P. Muffoletto, Roswell Park Cancer Institute (United States) and SUNY at Buffalo (United States); Christopher J. Mahrer, Roswell Park Cancer Institute (United States) and North Dakota State Univ. (United States); Gretchen Bauer, Roswell Park Cancer Institute (United States) and Univ. of Rochester (United States); Nadine S. James, Ravindra K. Pandey, Ulas Sunar, Roswell Park Cancer Institute (United States) [7164-08]

2:30 pm: **In vivo light dosimetry for pleural photodynamic therapy**, Andreea Dimofte, Timothy C. Zhu, Jarod C. Finlay, Melissa Culligan, Joseph S. Friedberg, Keith A. Cengel, Stephen M. Hahn, Univ. of Pennsylvania (United States) [7164-09]

2:50 pm: **A heterogeneous optimization algorithm for light fluence rate optimization for prostate PDT**, Timothy C. Zhu, Martin D. Altschuler, Jarod C. Finlay, Andreea Dimofte, Ken Wang, Keith A. Cengel, S. Bruce Malkowicz, Stephen M. Hahn, Univ. of Pennsylvania (United States) [7164-10]

Coffee Break 3:10 to 3:40 pm

Room: Conv. Ctr. Room C1 Sat. 3:10 to 3:40 pm

Posters-Saturday

Posters will be placed on display from Saturday morning. Authors will be present to discuss their posters during the Saturday afternoon coffee break.

Poster authors: Please put up your posters before the conference or during the Saturday morning coffee break.

Photophysical and photochemical properties of α -(8-quinolinoxy) zinc phthalocyanine for photodynamic therapy, Buhong Li, Shusen Xie, Huiyun Lin, Jinping Xue, Fujian Normal Univ. (China) [7164-31]

Interaction of dye-enhanced photothermotherapy and chemotherapy in the treatment of cancer: an in vitro study, Yuan Tang, Anthony J. McGoron, Florida International Univ. (United States) [7164-32]

PDT driven by energy-converting materials: a theoretical analysis, Jarod C. Finlay, Univ. of Pennsylvania (United States) [7164-33]

The current methods of laser therapy in oncology, Alexander Mikov, Vyacheslav Svirin, M.F. Stelmakh Polyus Research and Development Institute (Russian Federation) [7164-34]

Spectroscopic, cyto-, and photo-toxicity studies of substituted piperidones: potential sensitizers for two-photon photodynamic therapy, Kurt W. Short, Tiffany L. Kinnibrough, David M. Sammeth, Tatiana V. Timofeeva, New Mexico Highlands Univ. (United States) [7164-36]

The mechanism of PDT-induced electrical blockade: The dependence of time-lapse localization of talaporfin sodium on the cell death phenotypes in rat cardiac myocytes, Arisa Ito, Hiroki Matsuo, Tsukasa Suenari, Shunichiro Miyoshi, Seiji Takatsuki, Satoshi Ogawa, Tsunenori Arai, Keio Univ. (Japan) [7164-37]

SESSION 3

Room: Conv. Ctr. Room C1 Sat. 3:40 to 5:00 pm

Preclinical III

Session Chairs: **Tayyaba Hasan**, Wellman Ctr. for Photomedicine, Massachusetts General Hospital; **Sung K. Chang**, Massachusetts General Hospital

3:40 pm: **In vivo pharmacokinetics of pegylated liposome-encapsulated m-THPC sensitizer using fluorescence tomography**, Pontus Svenmarker, Johan Axelsson, Haiyan Xie, Katarina Svanberg M.D., Nils Bendsoe, Lund Univ. (Sweden); Susanna Gräfe, biolitec AG (Germany); Stefan Andersson-Engels, Lund Univ. (Sweden) [7164-11]

4:00 pm: **Image-guided treatment planning and monitoring of pancreas tumor photodynamic therapy with Verteporfin**, Kimberley S. Samkoe, Alina Chen, Dartmouth College (United States); Imran Rizvi, Wellman Ctr. for Photomedicine (United States) and Dartmouth College (United States); Julia A. O'Hara, Dartmouth College (United States); P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States); Tayyaba Hasan, Wellman Ctr. for Photomedicine (United States); Brian W. Pogue, Dartmouth College (United States) [7164-12]

Conference 7164

4:20 pm: **In vivo optical detection of singlet oxygen for photodynamic therapy (PDT) dosimetry: a clinical study**, Sung K. Chang, Hans Laubach, Massachusetts General Hospital (United States); Seonkyung Lee, Physical Sciences Inc. (United States); Imran Rizvi, Massachusetts General Hospital (United States); David Zurakowski, Children's Hospital Boston (United States); Steven J. Davis, Physical Sciences Inc. (United States); Charles R. Taylor, Tayyaba Hasan, Massachusetts General Hospital (United States). . . . [7164-13]

4:40 pm: **Dose limited fluorescence microscopy of 5-aminolevulinic acid induced protoporphyrin IX in living cells**, Herbert Schneckenburger, Sarah Schickinger, Thomas Bruns, Michael Wagner, Petra Weber, Hochschule Aalen (Germany); Wolfgang S. L. Strauss, Univ. Ulm (Germany) [7164-14]

BiOS Hot Topics Sat. 7:00 to 9:30 pm
See p. 20 for details.

Sunday 25 January

SESSION 4

Room: Conv. Ctr. Room C1 Sun. 8:30 to 11:30 am

Clinical and Preclinical I

Session Chairs: **Kenneth K. Wang**, Mayo Clinic;
Merrill A. Biel, Univ. of Minnesota

8:30 am: **Clonal diversity and response to photodynamic therapy** (*Invited Paper*), Kenneth K. Wang M.D., Mayo Clinic (United States). [7164-15]

9:00 am: **Photodynamic therapy and treatment of head and neck malignancies** (*Invited Paper*), Merrill A. Biel, Univ. of Minnesota (United States) and Virginia Piper Cancer Institute, Abbott Northwestern Hospital (United States). [7164-16]

9:30 am: **Improving the therapeutic index of PDT with targeted therapies** (*Invited Paper*), Stephen M. Hahn, Univ. of Pennsylvania (United States). [7164-17]

Coffee Break 10:00 to 10:30 am

10:30 am: **Photodynamic therapy for pancreatic and biliary tract carcinoma**, Stephen Pereira, Univ. College London (United Kingdom) [7164-18]

10:50 am: **Enhancement and optimization of PpIX-based photodynamic therapy of skin cancer: translational studies from the bench to the clinic**, Edward V. Maytin M.D., Sanjay Anand, Christine Baran, Golar Honari M.D., Sara Schultz M.D., Cleveland Clinic Lerner Research Institute (United States); Allison Vidimos M.D., Philip Bailin M.D., The Cleveland Clinic Foundation (United States). [7164-19]

11:10 am: **Patterns of recurrence following resection and intraoperative photodynamic therapy for malignant mesothelioma**, Kevin L. Du, Melissa Culligan, Debbie Smith, Stephen M. Hahn, Joseph S. Friedberg, Keith A. Cengel, Univ. of Pennsylvania (United States) [7164-20]

Lunch/Exhibition Break 11:30 am to 1:00 pm

SESSION 5

Room: Conv. Ctr. Room C1 Sun. 1:00 to 2:40 pm

Clinical and Preclinical II

Session Chairs: **Theresa Busch**, The Univ. of Pennsylvania Health System; **Timothy C. Zhu**, Univ. of Pennsylvania

1:00 pm: **Glioma resection guided by fluorescence imaging: initial results**, Frederic Leblond, Kathryn Fontaine, Dartmouth College (United States); Pablo A. Valdes, Dartmouth College (United States) and Dartmouth Medical School (United States); Brian W. Pogue, Dartmouth College (United States); Alexander Hartov, Keith D. Paulsen, Dartmouth College (United States) and Norris Cotton Cancer Ctr. (United States); Songbai Ji, Dartmouth College (United States); David W. Roberts, Dartmouth Hitchcock Medical Ctr. (United States). [7164-21]

1:20 pm: **High-frequency ultrasound-guided sub-surface PPIX fluorescence tomography**, Josiah D. Gruber, Venkataraman Krishnaswamy, Dartmouth College (United States); Edward V. Maytin M.D., Cleveland Clinic Lerner Research Institute (United States); Tayyaba Hasan, Wellman Ctr. for Photomedicine (United States); Brian W. Pogue, Dartmouth College (United States). [7164-22]

1:40 pm: **Optimization of photophysical parameters for macroscopic modeling of reacted singlet oxygen concentration in an in-vivo model**, Ken Wang, Timothy C. Zhu, Univ. of Pennsylvania (United States) [7164-23]

2:00 pm: **Reconstruction of optical properties using an adjoint model for interstitial diffuse optical tomography**, Ken Wang, Jarod C. Finlay, Timothy C. Zhu, Univ. of Pennsylvania (United States) [7164-24]

2:20 pm: **Diffuse reflectance spectra measured in vivo in human tissues during Photofrin-mediated pleural photodynamic therapy: updated results**, Jarod C. Finlay, Andreea Dimofte, Timothy C. Zhu, Joseph S. Friedberg, Keith A. Cengel, Stephen M. Hahn, Univ. of Pennsylvania (United States) . . . [7164-25]

Coffee Break 3:00 to 3:30 pm

SESSION 6

Room: Conv. Ctr. Room C1 Sun. 3:30 to 5:10 pm

Clinical and Preclinical III

Session Chairs: **Brian W. Pogue**, Dartmouth College;
Soumya Mitra, Univ. of Rochester Medical Ctr.

3:30 pm: **Periwave demonstrates bactericidal activity against periopathogens and leads to improved clinical outcomes in the treatment of adult periodontitis**, Cale N. Street, Roger Andersen, Nicolas G. Loebel, Ondine Research Labs., Inc. (United States) [7164-26]

3:50 pm: **Fluence rate effects in Motexafin lutetium-mediated photodynamic therapy**, Theresa Busch, Arjun G. Yodh, Guoqiang Yu, Xiaoman Xing, E. Paul Wileyto, Shirron Carter, Elizabeth A. Rickter, Min Yuan, Kevin Jenkins, Univ. of Pennsylvania (United States) [7164-27]

4:10 pm: **Pattern of intratumor heterogeneity in vascular response during photodynamic therapy**, Xiaoman Xing, Univ. of Pennsylvania (United States); Guoqiang Yu, Univ. of Kentucky (United States); Turgut Durduran, Elizabeth A. Rickter, Arjun G. Yodh, Theresa Busch, Univ. of Pennsylvania (United States). [7164-28]

4:30 pm: **Monitoring blood flow and photobleaching during topical ALA PDT treatment**, Theresa L. Sands, Ulas Sunar, Roswell Park Cancer Institute (United States); Thomas H. Foster, Univ. of Rochester Medical Ctr. (United States); Allan R. Oseroff M.D., Roswell Park Cancer Institute (United States) [7164-29]

4:50 pm: **The effect of topically-applied Pc 4 on treatment light penetration in human CTCL lesions**, Tammy K. Lee, Univ. of Rochester (United States); Minh C. Lam, Myriam E. Rodriguez, Elma D. Baron, Case Western Reserve Univ. (United States); Thomas H. Foster, Univ. of Rochester Medical Ctr. (United States). [7164-30]

Mechanisms for Low-Light Therapy IV

Conference Chairs: Michael R. Hamblin, Massachusetts General Hospital; Ronald W. Waynant, U.S. Food and Drug Administration; Juanita Anders, Uniformed Services Univ. of the Health Sciences

Program Committee: James D. Carroll, THOR Photomedicine Ltd. (United Kingdom); Luis H. De Taboada, PhotoThera, Inc.; Mary Dyson, Dyderm Ltd. (United Kingdom)

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room A3 Sat. 8:00 to 10:00 am

Session Chair: Michael R. Hamblin, Massachusetts General Hospital

8:00 am: **The role of reactive oxygen species in low level light therapy** (*Invited Paper*), Michael R. Hamblin, Massachusetts General Hospital (United States) [7165-01]

8:30 am: **Harnessing the cell's own ability to repair and prevent** (*Invited Paper*), Harry T. Whelan M.D., Medical College of Wisconsin (United States); Kristina Desmet, Univ. of Wisconsin, Milwaukee (United States); Ellen Buchmann, Michele Henry, Margaret Wong-Riley, Medical College of Wisconsin (United States); Janis Eells, Univ. of Wisconsin, Milwaukee (United States); Jim VerHoeve, Univ. of Wisconsin, Madison (United States) [7165-02]

9:00 am: **Amplification of the effects of photon absorption on wound healing** (*Invited Paper*), Mary Dyson, King's College London (United Kingdom) [7165-03]

9:30 am: **Light therapy: a new treatment for Parkinson's disease** (*Invited Paper*), Patricia Trimmer, Emily Cronin-Furman, Kathleen Schwartz, M. Kathleen Borland, Univ. of Virginia (United States); Uri Oron, Tel Aviv Univ. (Israel); Jackson Streeter, PhotoThera, Inc. (United States) [7165-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room A3 Sat. 10:30 am to 12:20 pm

Session Chair: Juanita Anders, Uniformed Services Univ. of the Health Sciences

10:30 am: **Low level laser/photobiomodulation dosimetry: what are the thresholds and what are the limits?** (*Invited Paper*), James D. Carroll, THOR Photomedicine Ltd. (United Kingdom) [7165-05]

11:00 am: **The importance of coherence in phototherapy**, Tomas L. M. Hode, Irradia USA (United States) and Portland State Univ. (United States) [7165-06]

11:20 am: **A comparative study on non-confluent and confluent human malignant brain cancer metabolic response to He-Ne laser exposures: evidence for laser enhanced cellular production of H2O2 and laser induced "Bystander" effect**, Darrell B. Tata, Ronald W. Waynant, U.S. Food and Drug Administration (United States) [7165-07]

11:40 am: **The effect of 648nm diode laser irradiation on second messengers in senescent human keratinocytes**, Denise H. Hawkins Evans, Heidi Abrahamse, Univ. of Johannesburg (South Africa) [7165-08]

12:00 pm: **Effects of a polarized light source (400-2000nm) on Hep.2 and L929 cell lines: a spectroscopic in vitro study**, Juliana S. D. C. Monteiro, Jean N. d. Santos, Univ. Federal da Bahia (Brazil); Katia V. M. d. Moura, Cibelle B. Lopes, Cristina P. Soares, Univ. do Vale do Paraiba (Brazil); Antonio L. Barbosa Pinheiro, Univ. Federal da Bahia (Brazil) [7165-09]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room A3 Sat. 1:30 to 3:10 pm

Session Chair: Ronald W. Waynant, U.S. Food and Drug Administration

1:30 pm: **Low level light therapy activates NF-κB via generation of reactive oxygen species in mouse embryonic fibroblasts**, Chih-Hao Chen, Praveen R. Arany, Elizabeth Tompkinson, Michael R. Hamblin, Massachusetts General Hospital (United States) [7165-10]

1:50 pm: **Role of ROS-mediated TGF beta activation in laser photobiomodulation**, Praveen R. Arany, Harvard Univ. (United States); Chih-Hao Chen, Massachusetts General Hospital (United States); Tristan Hunt, David J. Mooney, Harvard Univ. (United States); Michael R. Hamblin, Massachusetts General Hospital (United States) [7165-11]

2:10 pm: **Influence of laser phototherapy on severe chemo-induced epithelial dysplasia on the hamster cheek pouch mode**, Juliana S. D. C. Monteiro, Gilberth T. d. S. Aciole, Jean N. d. Santos, Maria Cristina T. Cangussu, Antonio L. Barbosa Pinheiro, Univ. Federal da Bahia (Brazil) [7165-12]

2:30 pm: **DNA damage in wounded, hypoxic and acidotic human skin fibroblast cell cultures after low level laser irradiation**, Alwin Mbene, Innocent Zungu, Nicolette Houreld, Denise H. Hawkins Evans, Heidi Abrahamse, Univ. of Johannesburg (South Africa) [7165-13]

2:50 pm: **The effect of 808 nm light on cellular ATP levels in rat neural cells in vitro following oxygen-glucose deprivation with reperfusion**, Tara B. Romanczyk, Luis H. De Taboada, PhotoThera, Inc. (United States); Robert K. Naviaux M.D., Univ. of California, San Diego (United States) [7165-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room A3 Sat. 3:40 to 5:10 pm

Session Chair: James D. Carroll, THOR Photomedicine Ltd. (United Kingdom)

3:40 pm: **Laser modulation of inflammatory reaction**, Grigory E. Brill, Saratov State Medical Univ. (Russian Federation); Levon V. Gasparyan, EMRED Oy (Finland); Anu Makela M.D., Acupuncture and Bioenergy Research Institute (Finland) [7165-15]

3:55 pm: **Photodynamic therapy can kill Cryptococcus neoformans**, Renato A. Prates, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Eriques G. da Silva, Univ. de São Paulo (Brazil); Priscila F. Chaves, Antônio José S. Santos, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Claudete R. Paula, Univ. de São Paulo (Brazil); Martha S. Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [7165-17]

4:10 pm: **Low-intensity LED (625 and 405 nm) and laser (805 nm) killing of Propionibacterium acnes and Staphylococcus epidermidis**, Elena Tuchina, Valery V. Tuchin, Saratov State Univ. (Russian Federation) [7165-18]

4:25 pm: **Preventive and therapeutic effects of low level laser therapy on gentamicin vestibulotoxicity in rat utricle**, Chung-Ku Rhee M.D., Dankook Univ. (Korea, Republic of); Yang Hee Oh M.D., Jin-Chul Ahn, Min-Sang Jung, Yong-Sik Kim, Dankook Univ. Hospital (Korea, Republic of) [7165-19]

4:40 pm: **Sperm motility enhancement with low level laser and LED light**, Philip Gabel, Access Physiotherapy Ctr. (Australia); Keith L. Harrison, Deborah A. Sherrin, Queensland Fertility Group (Australia); James D. Carroll, THOR Photomedicine Ltd. (United Kingdom) [7165-20]

4:55 pm: **Aculaser therapy for cerebral palsy treatment**, Shahzad Anwar, Anwar Shah's First C.P. and Paralysis Clinic and Research Ctr. (Pakistan) [7165-21]

BiOS Hot Topics Sat. 7:00 to 9:30 pm
See p. 20 for details.

Optics in Bone Biology and Diagnostics

Conference Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

Program Committee: **Robert R. Alfano**, City College/CUNY; **Angela Cheung**, Univ. Health Network/Mount Sinai Hospital (Canada); **Peter Fratzl**, Max Planck Institute, Potsdam (Germany); **Huabei Jiang**, Univ. of Florida; **Stephen J. Matcher**, The Kroto Institute, The Univ. of Sheffield (United Kingdom); **Michael D. Morris**, Univ. of Michigan; **Eleftherios P. Paschalis**, Ludwig Boltzmann Institute of Osteology, Vienna (Austria); **George Sandor**, Hospital for Sick Children, Toronto (Canada)

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room C4 Sat. 8:00 to 9:30 am

Bone Spectroscopy and Optical Processes I

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

8:00 am: **Microspectroscopy in biomedical science** (*Invited Paper*), Ruth Zoehrer, Sonja Gamsjaeger, Paul Roschger, Ludwig Boltzmann Institute of Osteology (Austria); Peter Fratzl, Max Planck Institute for Colloids and Interfaces (Germany); Klaus Klaushofer, Eleftherios P. Paschalis, Ludwig Boltzmann Institute of Osteology (Austria) [7166-01]

8:30 am: **Evolution of cortical bone orientation and composition as a function of age in a mouse animal model as studied by Raman microspectroscopy**, Sonja Gamsjaeger, Ruth Zoehrer, Paul Roschger, Klaus Klaushofer, Eleftherios P. Paschalis, Ludwig Boltzmann Institute of Osteology (Austria); Peter Fratzl, Max Planck Institute for Colloids and Interfaces (Germany) [7166-02]

8:50 am: **Monte Carlo modeling of photon transport in buried bone tissue layer for quantitative Raman spectroscopy**, Robert H. Wilson, Kathryn A. Dooley, Michael D. Morris, Mary-Ann Mycek, Univ. of Michigan (United States) [7166-03]

9:10 am: **Automated Raman spectral preprocessing of bone and other musculoskeletal tissues**, Francis W. Esmonde-White, Matthew V. Schulmerich, Karen A. Esmonde-White, Michael D. Morris, Univ. of Michigan (United States) [7166-04]

SESSION 2

Room: Conv. Ctr. Room C4 Sat. 9:30 to 10:30 am

Bone Spectroscopy and Optical Processes II

Session Chair: **Huabei Jiang**, Univ. of Florida

9:30 am: **Raman analysis of yield in cortical bone**, Ozan Akkus, Purdue Univ. (United States); Vinay Korlepara, Mako Surgical Corp. (United States) [7166-05]

9:50 am: **Raman spectroscopy of murine bone in response to simulated spaceflight conditions**, Gurjit S. Mandair, Univ. of Michigan (United States); Erica Anderson, Steven E. Ellis, Ted A. Bateman, Clemson Univ. (United States); Michael D. Morris, Univ. of Michigan (United States) [7166-06]

10:10 am: **Polarization sensitive optical coherence tomography in equine bone**, James W. Jacobs, Stephen J. Matcher, Univ. of Sheffield (United Kingdom) [7166-07]

Coffee Break 10:30 to 11:00 am

SESSION 3

Room: Conv. Ctr. Room C4 Sat. 11:00 to 11:50 am

Photonic Processes in Bone and Dental Tissues I

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

11:00 am: **Optimization of the detection of porphyrins in dental tooth tissue cavities using fluorescence at excitation at 405 nm** (*Invited Paper*), Elbert de Josselin de Jong, Inspektor Research Systems BV (Netherlands) [7166-09]

11:30 am: **Dynamic photophysical processes in laser irradiated human cortical skull bone**, Andreas Mandelis, Chi-Hang Kwan, Anna Matvienko, Univ. of Toronto (Canada) [7166-10]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 4

Room: Conv. Ctr. Room C4 Sat. 1:30 to 3:10 pm

Photonic Processes in Bone and Dental Tissues II

Session Chair: **Michael D. Morris**, Univ. of Michigan

1:30 pm: **Raman spectroscopy for assessment of bone quality in MMP-2 knockout mice**, Jeffrey S. Nyman, Chetan A. Patil, Philip Masui, Conor C. Lynch, Anita Mahadevan-Jansen, Vanderbilt Univ. (United States) [7166-11]

1:50 pm: **Quantitative analysis of incipient mineral loss in hard tissues**, Anna Matvienko, Andreas Mandelis, Adam Hellen, Raymond J. Jeon, Univ. of Toronto (Canada) and Quantum Dental Technologies (Canada); Stephen H. Abrams, Quantum Dental Technologies (Canada); Bennett T. Amaechi, Univ. of Texas Health Science Ctr. at San Antonio (United States) [7166-12]

2:10 pm: **Detection of hard tissue demineralization with photothermal radiometry and**, Raymond J. Jeon, Adam Hellen, Anna Matvienko, Andreas Mandelis, Univ. of Toronto (Canada) and Quantum Dental Technologies (Canada); Stephen H. Abrams, Quantum Dental Technologies (Canada); Bennett T. Amaechi, Univ. of Texas Health Science Ctr. at San Antonio (United States) [7166-13]

2:30 pm: **Caries assessment: establishing mathematical link of clinical and benchtop method**, Bennett T. Amaechi, Univ. of Texas Health Science Ctr. at San Antonio (United States) [7166-14]

2:50 pm: **Quantum dots as mineral- and matrix-specific strain gages for bone biomechanical studies**, Peizhi Zhu, Jiadi Xu, Michael D. Morris, Nadder D. Sahar, David H. Kohn, Ayyalusamy Ramamoorthy, Univ. of Michigan (United States) [7166-16]

Coffee Break 3:10 to 4:00 pm

SESSION 5

Room: Conv. Ctr. Room C4 Sat. 4:00 to 5:50 pm

Imaging Diagnostics of Bones and Teeth

Session Chair: **Stephen J. Matcher**, The Univ. of Sheffield (United Kingdom)

4:00 pm: **Tomographic x-ray guided three-dimensional diffuse optical tomography of osteoarthritis in the finger joints** (*Invited Paper*), Zhen Yuan, Qizhi Zhang, Eric S. Sobel, Huabei Jiang, Univ. of Florida (United States) [7166-17]

4:30 pm: **Photothermal and infrared thermography characterizations of thermal diffusion in hidroxyapatite materials**, J. Bante-Guerra, Ctr. de Investigación y de Estudios Avanzados del Insituto Politecnico Nacional (Mexico); M. Alcocer-Avila, B. Cruz-Jimenez, Univ. Autonoma de Yucatan (Mexico); S. Trujillo, P. Martinez-Torres, M. Conde-Contreras, P. Quintana, J. J. Alvarado-Gil, Ctr. de Investigación y de Estudios Avanzados del Insituto Politecnico Nacional (Mexico) [7166-18]

4:50 pm: **Characterizing light propagation in bone for photodynamic therapy of osteosarcoma**, Vincent M. Rossi, Oregon State Univ. (United States); Scott B. Gustafson, VCA Raleigh Hills Animal Hospital (United States); Steven L. Jacques, Oregon Health & Science Univ. (United States) . . . [7166-19]

5:10 pm: **Osteoarthritis screening using Raman spectroscopy of dried human synovial fluid drops**, Karen A. Esmonde-White, Gurjit S. Mandair, Francis W. Esmonde-White, Univ. of Michigan (United States); Farhang Raaii, Blake J. Roessler, Univ. of Michigan Medical School (United States); Michael D. Morris, Univ. of Michigan (United States) [7166-20]

5:30 pm: **Three-dimensional diffuse optical tomography of osteoarthritis: a study of 38 finger joints**, Qizhi Zhang, Zhen Yuan, Eric S. Sobel, Huabei Jiang, Univ. of Florida (United States) [7166-21]

BIOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Assessment of a new biomimic scaffold and its effects on bone formation by OCT, Ying Yang, Keele Univ. (United Kingdom); Halil Aydin, Hacettepe Univ. and Biyomedtek (Turkey).[7166-08]

Frontiers in Pathogen Detection: From Nanosensors to Systems

Conference Chair: **Philippe M. Fauchet**, Univ. of Rochester

Conference Co-Chairs: **Frances S. Ligler**, Naval Research Lab.; **Benjamin L. Miller**, Univ. of Rochester

Program Committee: **Carl A. Batt**, Cornell Univ.; **Jeffrey L. Coffey**, Texas Christian Univ.; **Harold Craighead**, Cornell Univ.; **Jiri Homola**, Czech Academy of Sciences (Czech Republic); **Hongrui Jiang**, Univ. of Wisconsin/Madison; **Laura Maria Lechuga**, Ctr. Nacional de Microelectrónica (Spain); **Deborah Leckband**, Univ. of Illinois at Urbana-Champaign; **Sonia E. Letant**, Lawrence Livermore National Lab.; **Daniel V. Lim**, Univ. of South Florida; **Christopher Myatt**, Precision Photonics Corp.; **Michael J. Sailor**, Univ. of California/San Diego; **Jerry Schultz**, Univ. of California at Riverside; **Christopher C. Striemer**, Pathologics; **Christopher M. Strohsahl**, Lighthouse Biosciences, LLC; **Sharon M. Weiss**, Vanderbilt Univ.

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room A6 Sat. 8:30 to 10:00 am

Systems

Session Chair: **Philippe M. Fauchet**, Univ. of Rochester

8:30 am: **Meeting current public health needs: optical biosensors for pathogen detection and analysis** (*Invited Paper*), Avraham Rasooly, National Institutes of Health (United States) and FDA (United States) [7167-01]

9:00 am: **Low-cost, multiplexed biosensor for disease diagnosis** (*Invited Paper*), Christopher Myatt, Marie Delaney, Kathryn Todorof, James Heil, Monique Givens, Precision Photonics Corp. (United States); Robert Schooley M.D., Univ. of California, San Diego (United States); Michael Lochhead, Precision Photonics Corp. (United States) [7167-02]

9:30 am: **BioHawk portable pathogen detector** (*Invited Paper*), Elric W. Saaski, Research International, Inc. (United States) [7167-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room A6 Sat. 10:30 am to 12:00 pm

SPR and SERS

Session Chair: **Frances S. Ligler**, Naval Research Lab.

10:30 am: **Surface plasmon resonance biosensors for detection of foodborne pathogens and toxins** (*Invited Paper*), Jiri Homola, Institute of Photonics and Electronics (Czech Republic) [7167-04]

11:00 am: **A microfluidic-based hybrid SPR/molecular imaging biosensor for the multiplexed detection of food-borne pathogens**, Michael D. Zordan, Meggie Grafton, Ghanashyam Acharya, Arthur I. Aronson, Lisa M. Reece, Kinam Park, James F. Leary, Purdue Univ. (United States) [7167-05]

11:15 am: **Detection of staphylococci aureus pathogen with ultra-high sensitivity plasmonic nanoprobe**, Li-Lin Tay, Jamshid Tanha, National Research Council Canada (Canada) [7167-06]

11:30 am: **Enhancing the sensitivity of pathogen-detecting platforms via novel (nano)-photonic strategies** (*Invited Paper*), Brian McGrath, Dublin City Univ. (Ireland) [7167-07]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room A6 Sat. 1:30 to 3:00 pm

Mostly Waveguides

Session Chair: **Michael J. Sailor**, Univ. of California, San Diego

1:30 pm: **Biofunctional subwavelength optical fibers for biomolecular diagnostics**, Donald J. Sirbully, Lawrence Livermore National Lab. (United States) [7167-08]

1:45 pm: **Multiplex detection of B.anthraxis lethal toxin components on a single mode planar optical waveguide**, Harshini Mukundan, Aaron S. Anderson, Hongzhi Xie, W. Kevin Grace, Basil I. Swanson, Los Alamos National Lab. (United States) [7167-09]

2:00 pm: **Portable nanobiosensor platforms for ultrasensitive multidetection of pathogens** (*Invited Paper*), Laura Maria Lechuga, Ctr. d'Investigació en Nanociència i Nanotecnologia (Spain) [7167-10]

2:30 pm: **Porous silicon waveguide with integrated grating coupler for DNA sensing**, Xing Wei, Christopher Kang, Vanderbilt Univ. (United States); Marco Liscidini, Univ. of Toronto (Canada); Guoguang Rong, Vanderbilt Univ. (United States); Scott T. Retterer, Oak Ridge National Lab. (United States); Maddalena Patrini, Univ. degli Studi di Pavia (Italy); John E. Sipe, Univ. of Toronto (Canada); Sharon M. Weiss, Vanderbilt Univ. (United States) [7167-11]

2:45 pm: **Multi-channel biodetection via resonant microcavities coupled to photonic crystal waveguides**, Elisa Guillermain, Philippe M. Fauchet, Univ. of Rochester (United States) [7167-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room A6 Sat. 3:30 to 5:00 pm

Porous and Planar Silicon

Session Chair: **Sharon M. Weiss**, Vanderbilt Univ.

3:30 pm: **Sensing small molecules, proteins, and bacteria with porous silicon photonic crystals** (*Invited Paper*), Michael J. Sailor, Univ. of California, San Diego (United States) [7167-13]

4:00 pm: **Composite bioactive hydrogel with integrated porous silicon sensor for diagnostic testing**, Lisa Bonanno, Lisa A. DeLouise, Univ. of Rochester (United States) [7167-14]

4:15 pm: **Arrayed imaging reflectometry for inexpensive and label-free protein arrays** (*Invited Paper*), Christopher C. Striemer, Adarza Biosystems, Inc. (United States); Charles R. Mace, Univ. of Rochester (United States); Jared A. Carter, Sourabh D. Mehta, Adarza Biosystems, Inc. (United States); Benjamin L. Miller, Univ. of Rochester (United States) [7167-15]

4:45 pm: **Tracking serum antibody response to viral antigens with arrayed imaging reflectometry**, Benjamin L. Miller, Charles R. Mace, Univ. of Rochester (United States) [7167-16]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 5

Room: Conv. Ctr. Room A6 Sun. 8:30 to 10:00 am

Mostly Fluidics I

Session Chair: **Benjamin L. Miller**, Univ. of Rochester

8:30 am: **A universal label-free biosensing platform based on opto-fluidic ring resonators** (*Invited Paper*), Hongying Zhu, Ian M. White, Jonathan D. Suter, Xudong Fan, Univ. of Missouri, Columbia (United States) [7167-17]

9:00 am: **Detection of E. coli O157:H7 in complex matrices under varying flow parameters with a robotic fluorometric assay system**, Stephanie D. Leskinen, Sarah M. Schlemmer, Elizabeth A. Kearns, Daniel V. Lim, Univ. of South Florida (United States) [7167-18]

9:15 am: **Controlled microfluidic interfaces for microsensors** (*Invited Paper*), Hongrui Jiang, Univ. of Wisconsin, Madison (United States) [7167-19]

9:45 am: **Enhancing lab-on-a-chip performance via tunable parallel liquid microlens arrays**, Ye Liu, Xuefeng Zeng, Hongrui Jiang, Univ. of Wisconsin, Madison (United States) [7167-20]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: Conv. Ctr. Room A6 Sun. 10:30 am to 12:00 pm

Mostly Fluidics II

Session Chair: Laura Maria Lechuga, Ctr. d'Investigació en Nanociència i Nanotecnologia (Spain)

10:30 am: **Pathogen detection using printed photonics** (*Invited Paper*), Max Sonnleitner, BIOIDENT Technologies Inc. (United States) and NANOIDENT Technologies AG (Austria); Roland Pieler, Erwin Fueeder, Martin Schamesberger, Christian Wechselberger, BIOIDENT Technologies Inc. (Austria) [7167-21]

11:00 am: **Microflow cytometer**, Frances S. Ligler, Jeffrey S. Erickson, Peter J. Howell, Jr., Joel P. Golden, Lisa C. Shriver-Lake, Abel L. Thangawng, Naval Research Lab. (United States); Lisa Hilliard, National Oceanic and Atmospheric Administration (United States); George P. Anderson, Naval Research Lab. (United States) [7167-22]

11:15 am: **Sample preparation and assay refinements for pathogen detection platforms** (*Invited Paper*), Daniel V. Lim, Elizabeth A. Kearns, Stephaney D. Leskinen, Sonia Magana, Joyce M. Simpson-Stroot, Dawn M. Hunter, Sarah M. Schlemmer, Univ. of South Florida (United States) . . [7167-23]

11:45 am: **Nanomembranes for purification and preconcentration**, Philippe M. Fauchet, James L. McGrath, Univ. of Rochester (United States); Christopher C. Striemer, Thomas Gaborski, SIMPore (United States); David Fang, Maryna Kavalenka, Henry Chung, Mike Hoffman, Jessica Snyder, Univ. of Rochester (United States) [7167-24]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Room A6 Sun. 1:30 to 3:00 pm

Films and Substrates

Session Chair: Xudong Fan, Univ. of Missouri, Columbia

1:30 pm: **Robust sensing films for biothreat detection and medical diagnostics**, Aaron S. Anderson, Andrew M. Dattelbaum, Jurgen G. Schmidt, Harshini Mukundan, Dominique N. Price, Victoria L. Hansen, Jesse M. Resnick, W. Kevin Grace, Basil I. Swanson, Los Alamos National Lab. (United States) [7167-25]

1:45 pm: **DNA oligonucleotide synthesis in mesoporous silicon for biosensing applications**, Jenifer L. Lawrie, Zhou Xu, Paul E. Laibinis, Sharon M. Weiss, Vanderbilt Univ. (United States) [7167-26]

2:00 pm: **Detection of methicillin-resistant Staphylococcus aureus (MRSA) using the NanoLantern™ Biosensor** (*Invited Paper*), Christopher M. Strohsahl, Lighthouse Biosciences, LLC (United States); Benjamin L. Miller, Todd D. Krauss, Univ. of Rochester (United States) [7167-27]

2:30 pm: **Label-free DNA detection on nanostructured Ag surfaces**, Hsin-I Peng, Univ. of Rochester (United States); Christopher M. Strohsahl, Lighthouse Biosciences, LLC (United States); Kathryn E. Leach, Todd D. Krauss, Benjamin L. Miller, Univ. of Rochester (United States) [7167-28]

2:45 pm: **CRP immunoassay with a miniaturised PMMA optical biochip**, Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy); Luca Bolzoni, Datamed S.r.L. (Italy); Ambra Giannetti, Istituto di Fisica Applicata Nello Carrara (Italy); Giampiero Porro, Datamed S.r.L. (Italy); Folco Senesi, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara (Italy) [7167-29]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: Conv. Ctr. Room A6 Sun. 3:30 to 4:45 pm

Platforms and Applications

Session Chair: Max Sonnleitner, NANOIDENT Technologies AG (Austria)

3:30 pm: **Attomolar detection in complex matrices with cBASSI: How basic science guides system development** (*Invited Paper*), Shawn P. Mulvaney, Naval Research Lab. (United States) [7167-30]

4:00 pm: **Digital magnetic tagging platform technology**, Thanos Mitrelas, Thomas J. Hayward, Theodossis Trypiniotis, Bingyan Hong, Kunal Vyas, Justin J. Palfreyman, Crispin H. Barnes, Univ. of Cambridge (United Kingdom) . [7167-31]

4:15 pm: **Energy transfer-based biosensing of Botulinum neurotoxin A activity measured using an electroluminescent platform**, Kim E. Sapsford, U.S. Food and Drug Administration (United States); Steven Sun, Jesse Francis, Yordan V. Kostov, Univ. of Maryland, Baltimore County (United States); Avraham Rasooly, National Cancer Institute (United States); Dorothy Farrell, Hedi Mattoussi, Igor L. Medintz, Naval Research Lab. (United States) [7167-32]

4:30 pm: **Verifying of endocrine disruptor chemical affect to the mouse testes: Can Raman spectroscopy support immunohistochemistry and ultrastructural study?**, Bibin B. Andriana, Yusuke Oshima, Sota Takanezawa, Toshiaki Suzuki, Yuko S. Yamamoto, Hiroki Mitsuoka, The Institute of Physical and Chemical Research (RIKEN) (Japan); Tat W. Tay, Mohammad S. Alam, Xiao B. Zhu, Linda S. Soeratman, Naoki Tsunekawa, Yoshiakira Kanai, Masamichi Kurohmaru, The Univ. of Tokyo (Japan); Hidetoshi Sato, The Institute of Physical and Chemical Research (RIKEN) (Japan) [7167-33]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Label-free optical detection of bacteria on a 1-D photonic crystal of porous silicon, Chia-Chen Wu, Sara D. Alvarez, Lin Chao, Michael J. Sailor, Univ. of California, San Diego (United States) [7167-34]

Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIII

Conference Chairs: **James G. Fujimoto**, Massachusetts Institute of Technology; **Joseph A. Izatt**, Duke Univ.; **Valery V. Tuchin**, Saratov State Univ. (Russia)

Program Committee: **Peter Eskil Andersen**, Danmarks Tekniske Univ. (Denmark); **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Zhongping Chen**, Univ. of California/Irvine; **Johannes F. de Boer**, Vrije Univ. (Netherlands); **Wolfgang Drexler**, Cardiff Univ. (United Kingdom); **Christoph K. Hitzenberger**, Medizinische Univ. Wien (Austria); **Rainer A. Leitgeb**, Medical Univ. of Vienna (Austria); **Xingde Li**, Univ. of Washington; **Adrian G. P. Podoleanu**, Univ. of Kent (United Kingdom); **Andrew M. Rollins**, Case Western Reserve Univ.; **Natalia M. Shakhova**, Institute of Applied Physics (Russia); **Guillermo J. Tearney**, Massachusetts General Hospital; **Ruikang Wang**, Oregon Health & Science Univ.; **Maciej Wojtkowski**, Univ. Mikolaja Kopernika (Poland); **Yoshiaki Yasuno**, Univ. of Tsukuba (Japan)

Monday 26 January

SESSION 1

Room: Conv. Ctr. Rooms A7/A8 Mon. 8:30 to 10:00 am

Ophthalmic OCT: New Technology

Session Chair: **James G. Fujimoto**, Massachusetts Institute of Technology

8:30 am: **In vivo frequency domain optical coherence tomography of the human retina at 800 nm with up to 312,000 lines/s**, Boris Povazay, Bernd Hofer, Cristiano Torti, Vedran Kajic, Angelika Unterhuber, Boris Hermann, Alexandre R. Tumlinson, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7168-01]

8:45 am: **Ultrahigh speed swept source optical coherence tomography**, Yueli Chen, Massachusetts Institute of Technology (United States) and Tufts Univ. (United States); Vivek J. Srinivasan, Desmond C. Adler, Jay S. Duker M.D., Massachusetts Institute of Technology (United States); Joel S. Schuman M.D., Univ. of Pittsburgh Medical Ctr. (United States); James G. Fujimoto, Massachusetts Institute of Technology (United States) [7168-02]

9:00 am: **Quadruple depth range spectral domain optical coherence tomography for imaging of the anterior eye segment**, Erich Götzinger, Michael Pircher, Rainer A. Leitgeb, Bernhard Baumann, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [7168-03]

9:15 am: **Analysis of structure and dynamics of anterior segment using 100 kHz UHR spectral OCT and 200 kHz swept source OCT**, Michalina Gora, Ireneusz Grulkowski, Karol M. Karnowski, Iwona M. Gorczynska, Maciej Szkulmowski, Andrzej Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) [7168-04]

9:30 am: **Active axial eye motion tracking by extended range, closed loop OPD-locked white light interferometer for combined confocal/ en face optical coherence tomography imaging of the human eye fundus in vivo**, Radu G. Cucu, Univ. of Kent (United Kingdom); Mark W. Hathaway, Ophthalmic Technologies Inc. (Canada); Adrian G. P. Podoleanu, Univ. of Kent (United Kingdom); Richard B. Rosen M.D., The New York Eye and Ear Infirmary (United States) [7168-05]

9:45 am: **The broadest spectral bandwidth suitable for in-vivo UHROCT imaging of human and animal retina at 1060nm**, Sepideh Hariri, Zhao Ren, Alireza Akhlagh Moayed, Kostadinka K. Bizheva, Univ. of Waterloo (Canada) [7168-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Rooms A7/A8 Mon. 10:30 am to 12:00 pm

Ophthalmic/Doppler

Session Chair: **Joseph A. Izatt**, Duke Univ.

10:30 am: **Blood flow imaging at deep posterior human eye using 1 µm spectral-domain optical coherence tomography**, Shuichi Makita, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan); Tapio Fabritius, Univ. of Tsukuba (Japan) and Univ. of Oulu (Finland); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [7168-07]

10:45 am: **Velocity-resolved single-pass volumetric retinal flow imaging spectral domain optical coherence tomography**, Yuankai K. Tao, Kristen M. Kennedy, Joseph A. Izatt, Duke Univ. (United States) [7168-08]

11:00 am: **Cyclic reconstruction of 4D retinal blood flow with pulse synchronization**, Tilman Schmoll, Rainer A. Leitgeb, Medical Univ. of Vienna (Austria); Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7168-09]

11:15 am: **Investigation of retinal blood flow in normal and glaucoma subjects by Doppler Fourier-domain optical coherence tomography**, Yimin Wang, Ou Tan, David Huang M.D., Doheny Eye Institute (United States) [7168-10]

11:30 am: **Segmentation of flowing particles using joint spectral and time domain optical coherence tomography**, Ireneusz Grulkowski, Anna Szkulmowska, Maciej Szkulmowski, Michalina Gora, Daniel Szlag, Andrzej Kowalczyk, Maciej Wojtkowski, Univ. Mikolaja Kopernika (Poland) [7168-11]

11:45 am: **Optical micro-angiography images blood perfusion within human retina and choroids**, Ruikang Wang, Lin An, Oregon Health & Science Univ. (United States) [7168-12]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Rooms A7/A8 Mon. 1:30 to 3:00 pm

Cellular and Small Animal Imaging

Session Chair: **Wolfgang Drexler**, Cardiff Univ. (United Kingdom)

1:30 pm: **Imaging of cardiovascular dynamics in early mouse embryos with swept source optical coherence tomography**, Irina V. Larina, Baylor College of Medicine (United States); Michael Liebling, Univ. of California (United States); Mary E. Dickinson, Baylor College of Medicine (United States); Kirill V. Larin, Univ. of Houston (United States) [7168-13]

1:45 pm: **Revealing cellular structure in the living human retina using ultrahigh speed and resolution OCT with pancorrection**, Cristiano Torti, Boris Povazay, Bernd Hofer, Boris M. Hermann, Vedran Kajic, Angelika Unterhuber, Cardiff Univ. (United Kingdom); Enrique J. Fernández, Univ. de Murcia (Spain); Joseph Carroll, Medical College of Wisconsin (United States); Peter K. Ahnelt, Medical Univ. of Vienna (Austria); Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7168-14]

2:00 pm: **Sequential en-face optical coherence tomography imaging and monitoring of Drosophila Melanogaster larval heart**, Adrian Bradu, Lisha Ma, Jim W. Bloor, Adrian G. P. Podoleanu, Univ. of Kent (United Kingdom) [7168-15]

2:15 pm: **Modelling the optical response of human retinal photoreceptors to plane wave illumination with the finite difference time domain method**, Alireza Akhlagh Moayed, Shannon Dang, Omar M. Ramahi, Kostadinka K. Bizheva, Univ. of Waterloo (Canada) [7168-16]

2:30 pm: **Measuring apoptosis in human RPE cells using optical coherence tomography**, Daniel Martijn M. de Bruin, Mans Broekgaarden, Theo Gorgels, Ton G. C. van Leeuwen, Dirk J. Faber, Academic Medical Ctr. (Netherlands) [7168-17]

2:45 pm: **Simultaneous probing of retinal physiology in-vivo in a rat model with electrical and optical recordings at 1060nm**, Zhao Ren, Sepideh Hariri, Univ. of Waterloo (Canada); Aphrodite Dracopoulos, Shelley Boyd, St. Michael's Hospital (Canada); Kostadinka K. Bizheva, Univ. of Waterloo (Canada) [7168-18]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Rooms A7/A8 Mon. 3:30 to 5:30 pm

Clinical Applications

Session Chair: Xingde Li, Univ. of Washington

3:30 pm: **Visualization of coronary artery microstructure with intracoronary optical frequency domain imaging: a first in human study**, Guillermo J. Tearney, Massachusetts General Hospital (United States); Sergio Waxman M.D., Lahey Clinic Medical Ctr. (United States); Milen Shiskov, Benjamin J. Vakoc, Melissa J. Suter, Massachusetts General Hospital (United States); Mark I. Freilich, Lahey Clinic Medical Ctr. (United States); Adrien E. Desjardins, William W. Oh, Lisa A. Bartlett, Mireille Rosenberg, Brett E. Bouma, Massachusetts General Hospital (United States).....[7168-19]

3:45 pm: **Three-dimensional endomicroscopy of the human colon using optical coherence tomography**, Desmond C. Adler, Chao Zhou, Massachusetts Institute of Technology (United States); Hiroshi Mashimo, VA Boston Healthcare System (United States); Tsung-Han Tsai, Massachusetts Institute of Technology (United States); Yu Chen, Univ. of Maryland, College Park (United States); Horst C. Weber M.D., Marisa Figuerido, VA Boston Healthcare System (United States); Joseph M. Schmitt, LightLab Imaging Inc. (United States); James G. Fujimoto, Massachusetts Institute of Technology (United States).....[7168-20]

4:00 pm: **Characterization of cardiac radiofrequency ablation using OCT**, Christine P. Fleming, Lee M. Barwick, Hui Wang, Yinsheng Pan, Zhilin Hu, Case Western Reserve Univ. (United States); Kara J. Quan, MetroHealth Medical Ctr. (United States); Andrew M. Rollins, Case Western Reserve Univ. (United States).....[7168-21]

4:15 pm: **Ex vivo imaging of human pathologies with integrated optical coherence tomography (OCT) and optical coherence microscopy (OCM)**, Chao Zhou, Massachusetts Institute of Technology (United States); Aaron D. Aguirre, Massachusetts Institute of Technology (United States) and Harvard Medical School (United States); Yihong Wang, Bradley Bryan, Beth Israel Deaconess Medical Ctr. (United States); Tsung-Han Tsai, Massachusetts Institute of Technology (United States); James L. Connolly, Beth Israel Deaconess Medical Ctr. (United States); James G. Fujimoto, Massachusetts Institute of Technology (United States).....[7168-22]

4:30 pm: **SSOCT/laser therapy system for pancreatic cancer diagnosis and guided therapy**, Nicusor V. Iftimia, Daniel X. Hammer, Mircea Mujat, R. Daniel Ferguson, Physical Sciences Inc. (United States); Sevdenur Cizginer, Vikram Desphande, William Brugge, Massachusetts General Hospital (United States); Ustun Teoman, Physical Sciences Inc. (United States).....[7168-23]

4:45 pm: **Effective indicators in using optical coherence tomography for oral cancer diagnosis**, Meng-Tsan Tsai, Hsiang-Chieh Lee, Cheng-Kuang Lee, Chuan-Hang Yu, Hsin-Ming Chen, Chun-Ping Chiang, Yih-Ming Wang, Chih-Chung Yang, National Taiwan Univ. (Taiwan).....[7168-24]

5:00 pm: **Optical coherence tomography of human breast lymph nodes: microstructures and metastasis**, Robert A. McLaughlin, Loretta Scolaro, Blake R. Klyen, The Univ. of Western Australia (Australia); Saud Hamza, Sir Charles Gairdner Hospital (Australia); Peter Robbins, PathWest Lab. Medicine WA (Australia); Christobel Saunders, The Univ. of Western Australia (Australia) and Sir Charles Gairdner Hospital (Australia); David D. Sampson, The Univ. of Western Australia (Australia).....[7168-25]

5:15 pm: **Tracking the regression of oral cancer after photodynamic**, Hsiang-Chieh Lee, Meng-Tsan Tsai, Cheng-Kuang Lee, Chuan-Hang Yu, Hsin-Ming Chen, Chun-Ping Chiang, Yih-Ming Wang, Chih-Chung Yang, National Taiwan Univ. (Taiwan).....[7168-26]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

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View Poster Setup Instructions on p. 311.

Automated retinal pigment epithelium identification from optical coherence tomography images, Tapio Fabritius, Univ. of Oulu (Finland); Shuichi Makita, Univ. of Tsukuba (Japan); Risto A. Myllylä, Univ. of Oulu (Finland); Yoshiaki Yasuno, Univ. of Tsukuba (Japan).....[7168-78]

Screening retinal transplants with Fourier-domain OCT, Bin Rao, Lingfeng Yu, Univ. of California, Irvine (United States); Robert B. Aramant, Univ. of California, Irvine (United States) and Univ. of Louisville (United States); Sylvia Pham, Hans K. Keirstead, Zhongping Chen, Magdalene J. Seiler, Univ. of California, Irvine (United States).....[7168-79]

Depolarization properties of the normal human fovea, Wai Sze Tiffany Lam, Karen Twietmeyer, College of Optical Sciences/The Univ. of Arizona (United States); Kurt R. Denninghoff, The Univ. of Arizona (United States); Ann E. Elsner, Stephen A. Burns, Yanming Zhou, Indiana Univ. (United States); Russell A. Chipman, College of Optical Sciences/The Univ. of Arizona (United States).....[7168-80]

Office-based laryngeal imaging in awake patients with swept-source optical coherence tomography, Lingfeng Yu, Gangjun Liu, Univ. of California, Irvine (United States); Shuguang Guo, Univ. of Florida (United States); Brian J. Wong M.D., Zhongping Chen, Univ. of California, Irvine (United States).....[7168-81]

Feasibility study of high-resolution retinal imaging by full-field optical coherence tomography, Masahiro Akiba, Zhenguo Wang, Charles Reisman, Yasufumi Fukuma, KinPui Chan, Topcon Medical Systems, Inc. (United States).....[7168-82]

Enhanced OCT imaging of embryonic tissue with optical clearing, Irina V. Larina, Baylor College of Medicine (United States); Esteban F. Carbajal, Univ. of Houston (United States); Valery V. Tuchin, Saratov State Univ. (Russian Federation); Mary E. Dickinson, Baylor College of Medicine (United States); Kirill V. Larin, Univ. of Houston (United States).....[7168-83]

Maximum-intensity-projection imaging for dynamic analysis of mental sweating by optical coherence tomography, Hiroyuki Saigusa, Yoshihiro Ueda, Masato Ohmi, Makoto Ohnishi, Mitsuo Kuwabara, Masamitsu Haruna, Osaka Univ. (Japan).....[7168-84]

Comparisons of statistical features in histology and optical coherence tomography images for oral cancer diagnosis, Cheng-Kuang Lee, Meng-Tsan Tsai, Hsiang-Chieh Lee, Chuan-Hang Yu, Hsin-Ming Chen, Chun-Ping Chiang, Yih-Ming Wang, Chih-Chung Yang, National Taiwan Univ. (Taiwan).....[7168-85]

Imaging of dental implant osseointegration using optical coherent tomography, Iulian G. Ionita, Univ. of Bucharest (Romania); Paul Reisen, Thorlabs, Inc. (United States).....[7168-86]

A liquid-based skin and blood flow model for Doppler optical coherence tomography imaging, Graham Dinsdale, Nicolas Bensaid, Andrea K. Murray, Mark R. Dickinson, The Univ. of Manchester (United Kingdom).....[7168-87]

In vivo depth-resolved tissue contrast by local birefringence and differential optic axis orientation using polarization-sensitive swept-source optical coherence tomography, Shuichi Makita, Masahiro Yamanari, Yoshiaki Yasuno, Univ. of Tsukuba (Japan).....[7168-88]

Single-body lensed fiber probe actuated by magnetic force for spectral domain optical coherence tomography, Eun Jung Min, Jihoon Na, Seon Young Ryu, Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of).....[7168-89]

Signal-to-noise ratio and phase stability analysis in spectral domain phase microscopy, Al-Hafeez Z. Dhalla, Joseph A. Izatt, Duke Univ. (United States).....[7168-90]

Evaluation of the signal noise ratio enhancement of SS-OCT versus TD-OCT using a full field set-up, Jingyu Wang, Univ. of Kent (United Kingdom); Mark W. Hathaway, Ophthalmic Technologies Inc. (United Kingdom); Vladimir R. Shidlovski, Superlum Diodes Ltd. (Russian Federation); Christopher J. Dainty, National Univ. of Ireland, Galway (Ireland); Adrian G. P. Podoleanu, Univ. of Kent (United Kingdom).....[7168-91]

Axial resolution and depth range of high-resolution spectral domain optical coherence tomography at 1.3 μ m, Sang-Won Lee, Yonsei Univ. (Korea, Republic of) and Institute of Advanced Biomedical Engineering (Korea, Republic of); Hyun-Woo Jeong, Yonsei Univ. (Korea, Republic of); Yeh-Chan Ahn, Woonggyu Jung, Zhongping Chen, Univ. of California, Irvine (United States); Beop-Min Kim, Yonsei Univ. (Korea, Republic of).....[7168-92]

Artifact removal in FD-OCT with a B-M mode scanning technique: condition on the transverse step, Sebastien Vergnole, Guy Lamouche, National Research Council Canada (Canada).....[7168-93]

Speckle reduction during all-fiber common-path optical coherence tomography of the prostate nerves, Shahab Chitchian, Michael A. Fiddy, Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (United States).....[7168-94]

The potential of optical coherence tomography in meniscal tear characterization, Hang Yin Ling, Shuguang Guo, Kelley M. Thieman, Brent B. Wise, Antonio Pozzi, Huikai Xie, MaryBeth Horodyski, Univ. of Florida (United States).....[7168-95]

Coherent fibre bundles in full-field swept-source OCT, Helen D. Ford, Ralph P. Tatam, Cranfield Univ. (United Kingdom).....[7168-96]

Tuesday 27 January

SESSION 5

Room: Conv. Ctr. Rooms A7/A8 Tues. 8:30 to 10:00 am

Novel Contrast Mechanisms

Session Chair: Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign

8:30 am: **Photothermal optical coherence tomography of epidermal growth factor receptor in live cells using immunotargeted gold nanospheres**, Melissa C. Skala, Matthew J. Crow, Adam P. Wax, Joseph A. Izatt, Duke Univ. (United States).....[7168-27]

8:45 am: **Validation of nonlinear interferometric vibrational imaging as a molecular OCT technique by the use of Raman microscopy**, Wladimir A. Benalcazar, Beckman Institute for Advanced Science and Technology (United States) and Univ. of Illinois at Urbana-Champaign (United States); Zhi Jiang, Daniel L. Marks, Joseph B. Geddes III, Beckman Institute for Advanced Science and Technology (United States); Stephen A. Boppart M.D., Beckman Institute for Advanced Science and Technology (United States) and Univ. of Illinois at Urbana-Champaign (United States).....[7168-28]

9:00 am: **Mechanical resonance detection for elastography of small biosamples using magnetomotive optical coherence tomography**, Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (United States); Vasilica Crecea, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (United States).....[7168-29]

9:15 am: **Optical coherence elastography of tissue at audio frequencies**, Brendan F. Kennedy, Steven G. Adie, Sergey A. Alexandrov, Julian J. Armstrong, David D. Sampson, The Univ. of Western Australia (Australia).....[7168-30]

9:30 am: **Dual Gaussian window method for spectroscopic optical coherence tomography with high spectral and temporal resolution**, Francisco E. Robles, Robert N. Graf, Adam P. Wax, Duke Univ. (United States).....[7168-31]

9:45 am: **Quantitative assessment of absorption in scattering media by low coherence spectroscopy**, Nienke Bosschaart, Dirk J. Faber, Jelmer Weda, Ton G. C. van Leeuwen, Maurice C. Aalders, Jr., Univ. van Amsterdam (Netherlands).....[7168-32]

Coffee Break10:00 to 10:30 am

SESSION 6

Room: Conv. Ctr. Rooms A7/A8 Tues. 10:30 am to 12:00 pm

Endoscopic/Catheter Technology

Session Chair: Zhongping Chen, Univ. of California, Irvine

10:30 am: **Real-time swept source optical coherence tomography imaging of the human airway using a microelectromechanical system endoscope and digital signal processor**, Jianping Su, Univ. of California, Irvine (United States).....[7168-33]

10:45 am: **Improved optics design for high-resolution OCT balloon imaging catheter**, Jiefeng Xi, Michael J. Cobb, Li Huo, Univ. of Washington (United States); Kevin Hsu, Micron Optics, Inc. (United States); Joo Ha Hwang, Xingde Li, Univ. of Washington (United States).....[7168-34]

11:00 am: **Manually scannable optical coherence tomography (OCT) endoscope based on optical tracking**, Jian Ren, Jigang Wu, Emily J. McDowell, Guoan Zheng, Xiquan Cui, Changhui Yang, California Institute of Technology (United States).....[7168-35]

11:15 am: **Robust high-resolution fine OCT needle**, Yicong Wu, Jiefeng Xi, Jason Padvorac, Li Huo, Joo Ha Hwang, Xingde Li, Univ. of Washington (United States).....[7168-36]

11:30 am: **3D in vivo swept source endoscopic OCT based on rigid GRIN lens rod probe**, Gangjun Liu, Tuqiang Xie, Jun Zhang, George M. Peavy D.V.M., Matthew Brenner, Zhongping Chen, Univ. of California, Irvine (United States).....[7168-37]

11:45 am: **Cross-polarization endoscopic optical coherence tomography in urology**, Elena V. Zagaynova, Natalia D. Gladkova M.D., Nizhny Novgorod State Medical Academy (Russian Federation); Valentin M. Gelikonov, Institute of Applied Physics (Russian Federation); Olga S. Streltsova, Denis Ledayev, Elena Kiseleva, Ludmila B. Snopova M.D., Nizhny Novgorod State Medical Academy (Russian Federation).....[7168-38]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Rooms A7/A8 Tues. 1:30 to 3:00 pm

Polarization Sensitive

Session Chair: Johannes F. de Boer, Vrije Univ. (Netherlands)

1:30 pm: **Quantitative measurement of the degree of polarization of light backscattered by retinal layers by polarization sensitive OCT**, Christoph K. Hitzengerber, Erich Göttinger, Michael Pircher, Bernhard Baumann, Christian Ahlers, Wolfgang Geitzbauer, Christopher Schütze, Ursula Schmidt-Erfurth, Medizinische Univ. Wien (Austria).....[7168-39]

1:45 pm: **Non-destructive in vivo optical assessment of peripheral nerve myelination using PS-OCT**, Boris H. Park, Frank P. Henry, Mark A. Randolph, Johannes F. de Boer, Massachusetts General Hospital (United States).....[7168-40]

2:00 pm: **Discrimination of conjunctiva and sclera using texture analysis of polarization sensitive optical coherence tomography images**, Arata Miyazawa, Masahiro Yamanari, Yoshiaki Yasuno, Univ. of Tsukuba (Japan).....[7168-41]

2:15 pm: **Polarization-sensitive swept-source optical coherence tomography at 1 μ m for birefringence imaging of the posterior eye segment**, Masahiro Yamanari, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) and Computational Optics and Ophthalmology Group (Japan).....[7168-42]

2:30 pm: **Polarization and the depth resolution of optical fiber based optical coherence tomograph**, Shuliang Jiao, Marco Ruggeri, Univ. of Miami School of Medicine (United States).....[7168-43]

2:45 pm: **Polarization-maintaining fiber based optical coherence tomography for polarization-sensitive measurements**, Muhammad K. Al-Kaisi, Taner Akkin, Univ. of Minnesota (United States).....[7168-44]

Coffee Break3:00 to 3:30 pm

SESSION 8

Room: Conv. Ctr. Rooms A7/A8 Tues. 3:30 to 5:30 pm

Full Field/Parallel/Phase Contrast Methods

Session Chair: Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria)

- 3:30 pm: **FFT-free en face Fourier-domain optical coherence tomography and spectral shaping in hardware**, Benjamin R. Biedermann, Wolfgang Wieser, Christoph M. Eigenwillig, Gesa Palte, Ludwig-Maximilians-Univ. München (Germany); Desmond C. Adler, Vivek J. Srinivasan, James G. Fujimoto, Massachusetts Institute of Technology (United States); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany) [7168-45]
- 3:45 pm: **Transverse scanning phase contrast coherence microscopy**, Michael Pircher, Bernhard Baumann, Erich Götzinger, Harald Sattmann, Christoph K. Hitzenberger, Medical Univ. of Vienna (Austria) [7168-46]
- 4:00 pm: **Synthetic wavelength-based phase unwrapping in Fourier domain optical coherence tomography**, Hansford C. Hendargo, Mingtao Zhao, Neal Shepherd, Joseph A. Izatt, Duke Univ. (United States) [7168-47]
- 4:15 pm: **Imaging the structure and growth of three-dimensional ovarian tumor models**, Conor L. Evans, Massachusetts General Hospital (United States); Imran Rizvi, Dartmouth College (United States) and Massachusetts General Hospital (United States); Jon Celli, Tayyaba Hasan, Massachusetts General Hospital (United States); Johannes F. de Boer, Vrije Univ. (Netherlands) [7168-48]
- 4:30 pm: **Swept-source parallel OCT**, Mircea Mujat, Nicusor V. Iftimia, R. Daniel Ferguson, Daniel X. Hammer, Physical Sciences Inc. (United States) [7168-49]
- 4:45 pm: **Phase contrast swept source optical coherence tomography at 1050 nm for mouse retinal and choroidal vasculature visualization in vivo**, Reza S. M. Motaghianezam, David Koos, California Institute of Technology (United States); Dan Schwartz, Univ. of California, San Francisco (United States); Scott E. Fraser, California Institute of Technology (United States) [7168-50]
- 5:00 pm: **High speed one shot extended length measurements with parallel Fourier domain optical coherence tomography**, Branislav Grajciar, Rainer A. Leitgeb, Adolf F. Fercher, Medical Univ. of Vienna (Austria) [7168-51]
- 5:15 pm: **Real-time single-shot full-field OCT based on dual-channel phase-stepper optics and 2D quaternionic analytic signal processing**, Molly S. Hrebesh, Manabu Sato, Yamagata Univ. (Japan) [7168-52]

Wednesday 28 January

SESSION 9

Room: Conv. Ctr. Rooms A7/A8 Wed. 8:30 to 10:00 am

Signal/Image Processing

Session Chair: Peter Eskil Andersen, Danmarks Tekniske Univ. (Denmark)

- 8:30 am: **Dispersion encoded full range frequency domain OCT**, Bernd Hofer, Cardiff Univ. (United Kingdom) and Technische Univ. Wien (Austria); Boris Povazay, Angelika Unterhuber, Cardiff Univ. (United Kingdom); Gerald Matz, Vienna Univ. of Technology (Austria); Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7168-53]
- 8:45 am: **Interferometric synthetic aperture microscopy with a portable intraoperative optical coherence tomography system**, Steven G. Adie, Daniel L. Marks, Freddy T. Nguyen, Tyler S. Ralston, Eric J. Chaney, Univ. of Illinois at Urbana-Champaign (United States); Jan G. Kotynek, John Brokenbrough, Uretz J. Oliphant, Frank J. Bellafiore M.D., Kendrith M. Rowland M.D., Patricia A. Johnson M.D., Carle Foundation Hospital (United States); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (United States) [7168-54]
- 9:00 am: **Simultaneous complex ambiguity removal and quantitative flow velocity estimation with joint spectral and time domain OCT**, Maciej Szkulmowski, Ireneusz Grulkowski, Daniel Szlag, Anna Szkulmowska, Andrzej Kowalczyk, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) [7168-55]
- 9:15 am: **From Talbot bands to no mirror terms in Fourier domain OCT, a quest on the fundamental origin of the sensitivity decay with depth**, Adrian G. P. Podoleanu, Daniel Woods, Michael Hughes, Univ. of Kent (United Kingdom) [7168-56]
- 9:30 am: **AM-FM analysis of optical coherence tomography signals**, Constantinos Pitris, Andreas Kartakoullis, Univ. of Cyprus (Cyprus) [7168-57]
- 9:45 am: **Image blending in multi-beam OCT**, Jon Holmes, Simon Hattersley, Michelson Diagnostics Ltd. (United Kingdom) [7168-58]
- Coffee Break 10:00 to 10:30 am

SESSION 10

Room: Conv. Ctr. Rooms A7/A8 Wed. 10:30 am to 12:00 pm

Doppler OCT

Session Chair: Yoshiaki Yasuno, Univ. of Tsukuba (Japan)

- 10:30 am: **Doppler optical frequency domain imaging of tumor angiogenesis**, Benjamin J. Vakoc, William W. Oh, Adrien E. Desjardins, Lisa A. Bartlett, Guillermo J. Tearney, Brett E. Bouma, Wellman Ctr. for Photomedicine (United States); Ryan M. Lanning, Timothy Padera, Dai Fukumura M.D., Rakesh K. Jain, Edwin L. Steele Lab. (United States) [7168-59]
- 10:45 am: **In vivo bi-directional Doppler Fourier-domain optical coherence tomography for the measurement of absolute flow velocities**, Rene Werkmeister, Nikolaus Dragostinoff, Michael Pircher, Erich Götzinger, Christoph K. Hitzenberger, Rainer A. Leitgeb, Leopold F. Schmetterer, Medical Univ. of Vienna (Austria) [7168-60]
- 11:00 am: **New model for space encoded Fourier domain optical Doppler tomography**, Edmund Koch, Julia Walther, Maximiliano Cuevas, Technische Univ. Dresden (Germany) [7168-61]
- 11:15 am: **Laser Doppler optical micro-angiography based on analysis of spatial frequency components on FDOCT interferograms**, Lin An, Ruikang Wang, Oregon Health & Science Univ. (United States) [7168-62]
- 11:30 am: **Flow measurement by using the signal decrease of moving scatterers in spatially encoded Fourier domain optical coherence tomography (FD OCT)**, Julia Walther, Edmund Koch, Technische Univ. Dresden (Germany) [7168-63]
- 11:45 am: **Spectral Doppler imaging of micro-vasculature response to laser irradiation**, Bin Rao, Univ. of California, Irvine (United States) [7168-64]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 11

Room: Conv. Ctr. Rooms A7/A8 Wed. 1:30 to 3:00 pm

Novel Technology

Session Chair: Andrew M. Rollins, Case Western Reserve Univ.

- 1:30 pm: **Subharmonic Fourier domain mode locking (shFDML)**, Christoph M. Eigenwillig, Benjamin R. Biedermann, Wolfgang Wieser, Gesa Palte, Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany) [7168-65]
- 1:45 pm: **Ultrahigh temporal resolution for assessing embryonic cardiac dynamics using signal-free retrospective gated OCT**, Michael W. Jenkins, Madhusudhana Gargasha, Case Western Reserve Univ. (United States); Barbara Garita, Univ. of South Florida (United States); Austin Bishop, Lee M. Barwick, Case Western Reserve Univ. (United States); Kersti Linask, Univ. of South Florida (United States); David L. Wilson, Andrew M. Rollins, Case Western Reserve Univ. (United States) [7168-66]
- 2:00 pm: **In vivo monitoring cerebral blood flow and vascular plasticity following traumatic brain injury by optical micro-angiography**, Yali Jia, Ruikang Wang, Oregon Health & Science Univ. (United States) [7168-67]
- 2:15 pm: **OCT speckle reduction with angular compounding by B-scan Doppler-shift encoding**, Hui Wang, Andrew M. Rollins, Case Western Reserve Univ. (United States) [7168-68]
- 2:30 pm: **Spatial refractive index estimation using multiangle OCT**, Peter H. Tomlins, Peter Woolliams, Andrew Beaumont, Christian J. Hart, Matthew Tedaldi, National Physical Lab. (United Kingdom) [7168-69]
- 2:45 pm: **High frequency translated SD-OCT system using multi-wavelength optical source**, Tae-Joong Eom, Bong-Ahn Yu, Sang-Yun Gee, Jongmin Lee, Gwangju Institute of Science and Technology (Korea, Republic of); Chang-Seok Kim, Eun Joo Jung, Jae Seok Park, Myung-Yung Jeong, Pusan National Univ. (Korea, Republic of) [7168-70]
- Coffee Break 3:00 to 3:30 pm

Conference 7168

SESSION 12

Room: Conv. Ctr. Rooms A7/A8Wed. 3:30 to 5:15 pm

Novel Light Sources

Session Chair: Valery V. Tuchin,
Saratov State Univ. (Russian Federation)

3:30 pm: **Ultra-miniature swept source for point of care optical frequency domain imaging**, Brian D. Goldberg, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States) and Harvard-MIT Division of Health Sciences and Technology (United States); Reza S. M. Motaghianezam, Priyanka A. Jillella, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); Brett E. Bouma, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States) and Harvard-MIT Division of Health Sciences and Technology (United States); Guillermo J. Tearney, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States).[7168-71]

3:45 pm: **Isolator-free 840-nm broadband SLEDs for high-resolution OCT**, Marcus Duellk, Valerio Laino, Paolo Navaretti, Raffaele Rezzonico, Christopher J. Armistead, Christian Vélez, Exalos AG (Switzerland)[7168-72]

4:00 pm: **High-power 1300 nm FDML swept laser using polygon-based narrowband optical scanning filter**, Youxin Mao, National Research Council Canada (Canada)[7168-73]

4:15 pm: **Novel wavelength-swept Raman laser for arbitrary gain band OCT**, Eun Joo Jung, Hyung Seok Lee, Jae Seok Park, Myung-Yung Jeong, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of)[7168-74]

4:30 pm: **Frequency-swept laser light source at 1050 nm with higher bandwidth due to multiple semiconductor optical amplifiers in series**, Sebastian Marschall, Lars Thrane, Peter E. Andersen, Christian Pedersen, Danmarks Tekniske Univ. (Denmark); Kevin Hsu, Micron Optics, Inc. (United States).[7168-75]

4:45 pm: **100 kHz axial scan rate swept-wavelength OCT using sampled grating distributed Bragg reflector lasers**, Dennis J. Derickson, Shane A. O'Connor, Michael Bernacil, Andrew J. DeKelaita, Ben Maher, California Polytechnic State Univ. (United States)[7168-76]

5:00 pm: **1.0 μm semiconductor light sources with wide bandwidth for optical coherence tomography**, Atsushi Mukai, Yoshikatsu Morishima, Tsuyoshi Ohgoh, Junya Yaguchi, Hideki Asano, FUJIFILM Advanced Research Labs. (Japan)[7168-77]

Advanced Biomedical and Clinical Diagnostic Systems VII

Conference Chairs: **Anita Mahadevan-Jansen**, Vanderbilt Univ.; **Tuan Vo-Dinh**, Duke Univ.; **Warren S. Grundfest**, Univ. of California, Los Angeles

Program Committee: **Maurice C. Aalders, Jr.**, Univ. van Amsterdam (Netherlands); **Jennifer K. Barton**, The Univ. of Arizona; **Stephen A. Boppert**, Univ. of Illinois at Urbana-Champaign; **Laura Marcu**, Univ. of California, Davis; **Mary-Ann Mycek**, Univ. of Michigan; **Jianan Y. Qu**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Urs Utzinger**, The Univ. of Arizona; **Georges A. Wagnieres**, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room B3 Sun. 8:00 to 10:00 am

Biosensing

Session Chair: **Maurice C. Aalders, Jr.**,
Univ. van Amsterdam (Netherlands)

8:00 am: **Integrated point of care testing system based on low cost polymer biochips**, Albrecht C. Brandenburg, Franzisca Curdt, Fraunhofer-Institut für Physik Messtechnik (Germany); Joerg Nestler, Technische Univ. Chemnitz (Germany); Thomas Otto, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Kai Wunderlich, Dirk Michel, Fraunhofer-Institut für Biomedizinische Technik (Germany) [7169-01]

8:20 am: **Antibody fragment recognition layers for surface plasmon resonance biosensing: a parametric study**, André R. Magalhães, Sandro Bordeira, Maria J. Costa, Joao G. da Fonseca, Biosurfit SA (Portugal) [7169-02]

8:40 am: **Label-free and dynamic measurement of biomolecular interactions for high-throughput diagnostics**, Emre Ozkumur, Ayca Yalcin, Boston Univ. (United States); Francesco Damin, National Research Council (Italy); Bennett B. Goldberg, Boston Univ. (United States); Marcella Chiari, National Research Council (Italy); M. Selim Unlu, Boston Univ. (United States) [7169-03]

9:00 am: **A sandwich assay for procalcitonin detection for POCT applications**, Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy); Luca Bolzoni, Datamed S.r.L. (Italy); Ambra Giannetti, Istituto di Fisica Applicata Nello Carrara (Italy); Melanie Kess, Petra Kraemer, Elisabeth Kremmer, Helmholtz Zentrum München, GmbH (Germany); Giampiero Porro, Datamed S.r.L. (Italy); Folco Senesi, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara (Italy) [7169-04]

9:20 am: **The involvement of nitric oxide in the hemodynamic and metabolic activities of the brain and the small intestine**, Michael Tolmasov, Efrat Barbiro-Michaely, Avraham Mayevsky, Bar-Ilan Univ. (Israel) [7169-05]

9:40 am: **Determination of free and protein-bound NADH in cell using time- and spectral-resolved fluorescence anisotropy in vivo**, Wei Zheng, Dong Li, Jianan Y. Qu, The Hong Kong Univ. of Science and Technology (Hong Kong, China) [7169-06]

Coffee Break 10:00 to 10:20 am

SESSION 2

Room: Conv. Ctr. Room B3 Sun. 10:20 am to 12:00 pm

Optical Spectroscopy

Session Chair: **Laura Marcu**, Univ. of California, Davis

10:20 am: **Clinical system model for monitoring the physiological status of jaundice by extracting bilirubin components from skin diffuse reflectance spectra**, Suresh K. Alla, Fred R. Beyette, Jr., Univ. of Cincinnati (United States) [7169-07]

10:40 am: **A non invasive simple spectroscopic method to detect blast lung injury**, Jae Gwan Kim, Jangwoen Lee, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (United States); Matthew Brenner, Univ. of California, Irvine (United States) and Beckman Laser Institute and Medical Clinic (United States) [7169-08]

11:00 am: **Epithelial cancer detection by oblique-incidence optical spectroscopy**, Alejandro Garcia-Urbe, Karthik C. Balareddy, Jun Zou, Texas A&M Univ. (United States); Kenneth K. Wang M.D., Mayo Clinic (United States); Madeleine Ducic, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States) [7169-09]

11:20 am: **Time-resolved fluorescence based optical biopsy of Barrett's Esophagus for early cancer screening**, Mowleswaran Krishnamoorthy, Frances Tse, Ji-Young Hwang, Ye Yuan, McMaster Univ. (Canada); Louis W. Liu, Toronto Western Hospital (Canada); M. Jamal Deen, McMaster Univ. (Canada); Warren S. Grundfest M.D., Univ. of California, Los Angeles (United States); Qi Yin Fang, McMaster Univ. (Canada) [7169-10]

11:40 am: **Support vector machine based classification of fast Fourier transform spectroscopy of proteins**, Aleksandar Lazarević, Dragoljub Pokrajac, Aristides Marcano, Nouredine Melikechi, Delaware State Univ. (United States) [7169-11]

Lunch/Exhibition Break 12:00 to 1:15 pm

SESSION 3

Room: Conv. Ctr. Room B3 Sun. 1:15 to 3:15 pm

Raman Spectroscopy

Session Chair: **Tuan Vo-Dinh**, Duke Univ.

1:15 pm: **Detecting cervical precancer with Raman spectroscopy**, Elizabeth Vargis, Elizabeth M. Kanter, Anita Mahadevan-Jansen, Vanderbilt Univ. (United States) [7169-12]

1:35 pm: **Raman endoscopy for in vivo gastric disease diagnosis**, Zhiwei Huang, Seng-Khoon Teh, Wei Zheng, Khek-Yu Ho, Khay-Guan Yeoh, National Univ. of Singapore (Singapore) [7169-13]

1:55 pm: **Depth-resolved measurements in breast tissues with spatially offset Raman spectroscopy**, Matthew D. Keller, Shovan K. Majumder, Vanderbilt Univ. (United States); Mark C. Kelley, Vanderbilt Univ. Medical Ctr. (United States); Anita Mahadevan-Jansen, Vanderbilt Univ. (United States) [7169-14]

2:15 pm: **Nonlinear Raman microspectroscopy: from research laboratory to clinical environment**, Vladislav V. Yakovlev, Univ. of Wisconsin, Milwaukee (United States) [7169-15]

2:35 pm: **Raman tissue imaging of fibrosis and microcirculation in the heart**, Mitsugu Ogawa, Yoshinori Harada, Yoshihisa Yamaoka, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan) [7169-16]

2:55 pm: **UTI diagnosis and antibiogram using Raman spectroscopy**, Evdokia Kastanos, Univ. of Nicosia (Cyprus); Alexandros Kyriakides, Katerina HadjiGeorgeiou, Constantinos Pitris, Univ. of Cyprus (Cyprus) [7169-17]

Coffee Break 3:15 to 3:35 pm

SESSION 4

Room: Conv. Ctr. Room B3 Sun. 3:35 to 5:55 pm

Multi-Modality

Session Chair: **Stephen A. Boppert**,
Univ. of Illinois at Urbana-Champaign

3:35 pm: **Clinical detection of oral neoplasia using fluorescence, reflectance and polarized optical imaging**, Darren M. Roblyer, Rice Univ. (United States); Cristina Kurachi, Adel K. El-Naggar, Michelle D. Williams, Ann M. Gillenwater, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Rebecca R. Richards-Kortum, Rice Univ. (United States) [7169-18]

3:55 pm: **Clinical diagnosis of breast lesions: multimodal spectroscopy**, Zoya I. Volynskaya, Massachusetts Institute of Technology (United States); Maryann Fitzmaurice, Case Western Reserve Univ. (United States); Luis H. Galindo, Obrad R. Scepanovic, Ramachandra R. Dasari, Michael S. Feld, Massachusetts Institute of Technology (United States) [7169-19]

4:15 pm: **Optical guidance of endocrine surgery**, Constantine Paras, Matthew D. Keller, Vanderbilt Univ. (United States); Lisa White, Vanderbilt Univ. Medical Ctr. (United States); John Phay, Vanderbilt Univ. Medical Ctr. (United States); Anita Mahadevan-Jansen, Vanderbilt Univ. (United States) [7169-59]

Conference 7169

4:35 pm: **An optical biopsy system with miniaturized Raman and spectral imaging probes: in vivo animal and ex vivo clinical application studies**, Hidetoshi Sato, Toshiaki Suzuki, Bibin B. Andriana, Shin-ichi Morita, Atsushi Maruyama, Hideyuki Shinzawa, The Institute of Physical and Chemical Research (RIKEN) (Japan); Yuichi Komachi, Gen-ichi Kanai, Machida Endoscope Co., Ltd. (Japan); Nobuo Ura, Soma Opto Co., Ltd. (Japan); Koji Masutani, Micro Science Co., Ltd. (Japan); Yuji Matsuura, Tohoku Univ. (Japan); Masakazu Toi, Kyoto Univ. (Japan); Toru Shimosegawa, Tohoku Univ. (Japan); Yukihiko Ozaki, Kwansai-Gakuin Univ. (Japan)[7169-21]

4:55 pm: **A MEMS based handheld confocal microscope with Raman spectroscopy for in-vivo skin cancer diagnosis**, Christopher L. Arrasmith, Montana State Univ., Bozeman (United States); Chetan A. Patil, Anita Mahadevan-Jansen, Vanderbilt Univ. (United States); David L. Dickensheets, Montana State Univ., Bozeman (United States)[7169-22]

5:15 pm: **Combining optical coherence tomography with fluorescence molecular imaging: toward simultaneous morphology and molecular imaging**, Shuai Yuan, Michael Lai, Univ. of Maryland, College Park (United States); James Jiang, Alex Cable, Thorlabs, Inc. (United States); Yu Chen, Univ. of Maryland, College Park (United States)[7169-23]

5:35 pm: **Measurement of the local muscular metabolism by time-domain near infrared spectroscopy during knee flex-extension induced by functional electrical stimulation**, Davide Contini, Lorenzo Spinelli, Alessandro Torricelli, Simona Ferrante, Alessandra Pedrocchi, Politecnico di Milano (Italy); Franco Molteni, Ospedale Valduce (Italy); Giancarlo Ferrigno, Rinaldo Cubeddu, Politecnico di Milano (Italy)[7169-24]

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room B3 Mon. 8:00 to 10:00 am

Imaging with Optical Coherence Tomography

Session Chair: Jennifer K. Barton, The Univ. of Arizona

8:00 am: **Automated contact lens measurement using optical coherence tomography**, Bryan R. Davidson, Jennifer K. Barton, The Univ. of Arizona (United States)[7169-25]

8:20 am: **Development of an integrated endoscopic device for multiplexed low coherence interferometry measurements of microbicide gel coating thickness**, Tyler K. Drake, Francisco E. Robles, Michael DeSoto, Marcus H. Henderson, David F. Katz, Adam P. Wax, Duke Univ. (United States)[7169-26]

8:40 am: **Laparoscopic optical coherence tomographic imaging of human ovarian cancer**, Lida P. Hariri, Garret T. Bonnema, Kathy Schmidt, Vrushali R. Korde, Amy M. Winkler, Kenneth Hatch M.D., Molly A. Brewer, Jennifer K. Barton, The Univ. of Arizona (United States)[7169-27]

9:00 am: **Large peak velocity Doppler Fourier domain optical coherence tomography**, Rui Wang, Hai Yao, Clemson Univ. (United States); Brad Neville D.D.S., Medical Univ. of South Carolina (United States); Xiang Peng, Shenzhen Univ. (China); Bruce Z. Gao, Clemson Univ. (United States)[7169-28]

9:20 am: **Three-dimensional intraoperative optical coherence tomography of human lymph nodes**, Steven G. Adie, Freddy T. Nguyen, Eric J. Chaney, Univ. of Illinois at Urbana-Champaign (United States); Jan G. Kotynek, John Brokenbrough, Uretz J. Oliphant, Frank J. Bellafiore M.D., Kendrith M. Rowland M.D., Patricia A. Johnson M.D., Carle Foundation Hospital (United States); Daniel L. Marks, Stephen A. Boppert M.D., Univ. of Illinois at Urbana-Champaign (United States)[7169-29]

9:40 am: **Full-field OCT: a pathologist tool in the operating room**, Samuel Labiau, Charles Brossollet, Olivier De Witte, LLTech (France); Brigitte Sigal-Zafrani, Institut Curie (France); Bertrand De Poly, LLTech (France); Claude Boccara, Ctr. National de la Recherche Scientifique (France)[7169-30]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: Conv. Ctr. Room B3 Mon. 10:30 am to 12:30 pm

Imaging and Microscopy

Session Chair: Jianan Y. Qu,

Hong Kong Univ. of Science and Technology (Hong Kong, China)

10:30 am: **Identification and classification of human neural stem cells by infrared spectroscopic imaging**, Gerald Steiner, Dresden Univ. of Technology (Germany)[7169-31]

10:50 am: **Toward automated detection of malignant melanoma**, Billy Huang, Massachusetts Institute of Technology (United States); Daniel S. Gareau, Oregon Health & Science Univ. (United States)[7169-32]

11:10 am: **Fluorescence confocal mosaicing microscopy of basal cell carcinomas ex vivo: demonstration of rapid surgical pathology with high sensitivity and specificity**, Daniel S. Gareau, Gary Peterson, Kishwer S. Nehal, Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (United States)[7169-33]

11:30 am: **Multimodal wide-field high-resolution imager for the automated detection of pathology**, Anna N. Yaroslavsky, Rongjing Zhang, Elena V. Salomatina, Victor Neel, Massachusetts General Hospital (United States)[7169-34]

11:50 am: **Integrating instrumentation, computation, and sampling for a high throughput approach to automated histology by mid-infrared microscopy**, Rohit Bhargava, Jason Ip, Univ. of Illinois at Urbana-Champaign (United States)[7169-35]

12:10 pm: **Detection of breast cancer genes using SERS molecular sentinels**, Hsin-Neng Wang, Tuan Vo-Dinh, Duke Univ. (United States)[7169-58]

Lunch Break 12:30 to 1:25 pm

SESSION 7

Room: Conv. Ctr. Room B3 Mon. 1:25 to 2:55 pm

Imaging and Diagnosis

Session Chair: Warren S. Grundfest, Univ. of California, Los Angeles

1:25 pm: **Narrow band imaging of tumors using gold nanoshells**, Priyaveena Puvanakrishnan, Jaesook Park, The Univ. of Texas at Austin (United States); Parameshwaran Diagaradjane, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Jon A. Schwartz, Chris L. Coleman, Kelly L. Gill-Sharp, Kristina L. Sang, J. Donald Payne, Nanospectra Biosciences, Inc. (United States); Sunil Krishnan, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); James W. Tunnell, The Univ. of Texas at Austin (United States)[7169-36]

1:45 pm: **Cervical dysplasia detection with quantitative spectroscopy imaging**, Condon Lau, Jelena Mirkovic, Massachusetts Institute of Technology (United States); Elizabeth Stier, Antonio de las Morenas, Victoria Feng, Boston Medical Ctr. (United States); Chung-Chieh Yu, Kamran Badizadegan, Ramachandra R. Dasari, Michael S. Feld, Massachusetts Institute of Technology (United States)[7169-37]

2:05 pm: **Real-time co-registered imaging using a novel hand-held optical imager**, Sarah J. L. Erickson, Steven Regalado, Jiajia Ge, Anuradha Godavarty, Florida International Univ. (United States)[7169-38]

2:35 pm: **Artificial intelligence based classification of rheumatoid arthritis in finger joints using frequency domain optical tomography**, Christian D. Klose, Hyun Keol, Alexander D. Klose, Columbia Univ. (United States); Uwe J. Netz, Juergen Beuthan, Charité Universitätsmedizin Berlin (Germany); Andreas H. Hielscher, Columbia Univ. (United States)[7169-39]

Coffee Break 2:55 to 3:20 pm

SESSION 8

Room: Conv. Ctr. Room B3 Mon. 3:20 to 4:40 pm

Imaging and Perfusion/Blood Vessels

Session Chair: Georges A. Wagnieres, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

3:20 pm: **Quantitative assessment of autonomic dysreflexia with combined spectroscopic and perfusion probes**, Afshin C. Nabili, Allison Pfeffer, The Catholic Univ. of America (United States); Joseph Hidler, National Rehabilitation Hospital (United States); Jessica C. Ramella-Roman, The Catholic Univ. of America (United States) [7169-40]

3:40 pm: **A new approach: opto-physiological tomography to measure blood perfusion in skin tissue**, Sijung Hu, Jia Zheng, Vicente Azorin-Peris, Angelos Echiadis, Loughborough Univ. (United Kingdom) [7169-41]

4:00 pm: **Validation of the performance of a practical blood vessel imaging system to facilitate vessel punctures**, Natascha Cuper, Rudolf M. Verdaasdonk, Rowland de Roode, Univ. Medisch Ctr. Utrecht (Netherlands) [7169-42]

4:20 pm: **Functional assessment of hand vasculature using infrared and laser speckle imaging**, Alexander M. Gorbach, National Institutes of Health (United States); Hengliang Wang, Naval Medical Research Ctr. (United States) [7169-43]

SESSION 9

Room: Conv. Ctr. Room B3 Mon. 4:40 to 6:00 pm

Imaging and Image Analysis

Session Chair: Mary-Ann Mycek, Univ. of Michigan

4:40 pm: **Analysis of the role of collagen in terahertz reflection from skin**, Priyamvada Tewari, Martin O. Culjat, Univ. of California, Los Angeles (United States); Zachary D. Taylor, Jonathan Y. Suen, Hua Lee, Elliott R. Brown, Univ. of California, Santa Barbara (United States); Warren S. Grundfest M.D., Univ. of California, Los Angeles (United States); Rahul S. Singh, Univ. of California, Santa Barbara (United States) [7169-44]

5:00 pm: **Illuminants as visualization tool for clinical diagnostics and surgery**, Maritoni Litorja, National Institute of Standards and Technology (United States) [7169-45]

5:20 pm: **Image analysis software for following progression of peripheral neuropathy**, Thomas J. Epplin-Zapf, Eduardo Hermesmeier, Jenny Macy, Lickenbrock Technologies, LLC (United States); Marco Pellegrini, Saverio Luccarelli, Giovanni Staurengi M.D., Univ. degli Studi di Milano (Italy); Timothy J. Holmes, Lickenbrock Technologies, LLC (United States) [7169-46]

5:40 pm: **Interactive 3D brain-shift compensation in neurosurgery using GPU based programming**, Herke Jan Noordmans, Sander van der Steen, Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands) [7169-47]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Visible and near infrared autofluorescence and hyperspectral imaging spectroscopy for the enhanced diagnosis of colorectal lesions, Kevin R. Koh, Tobias C. Wood, Vincent Sauvage, Karim Lekadir, Guang-Zhong Yang, Daniel S. Elson, Imperial College London (United Kingdom) [7169-20]

Spinning wave plate design for retinal birefringence scanning, Kristina Irsch, Johns Hopkins Medical Institutions (United States) and Ruprecht-Karls-Universität Heidelberg (Germany); Boris I. Gramatikov, Yi-Kai Wu, David L. Guyton, Johns Hopkins Medical Institutions (United States) [7169-48]

A fluorescence diagnostic system detecting cancer-specific enzymatic activities: preliminary results, Tobias J. Beck, Herbert G. Stepp, Ann Johansson, Richard Meier, Hilmar Schachenmayr, Ludwig-Maximilians-Universität München (Germany); Sigrun Henkenjohann, Markus Sauer, Univ. Bielefeld (Germany); Axel Duerkop, Univ. Regensburg (Germany); Rainer Wittig, Peter Schubert, R-Biopharm AG (Germany); Christian S. Betz, Ludwig-Maximilians-Universität München (Germany) [7169-49]

New design for an OCT micro-probe with distal interferometer, Gereon Hüttmann, Tim Bonin, Eva Lankenau, Lukas Ramrath, Univ. of Lübeck (Germany) [7169-50]

Protein profile study of clinical samples using laser induced fluorescence as the detection method: case of malignant and normal cervical tissues, Gopal R. Karemore, Univ. of Copenhagen (Denmark) and Nordic Bioscience A/S (Denmark); Sujatha N. Raja, Lavanya Rai, V. B. Kartha, Santhosh Chidangil, Manipal Univ. (India) [7169-51]

One- and two-photon time-resolved fluorescence of visible and near-infrared dyes in scattering media, Rosario Esposito, Carlo Altucci, Raffaele Velotta, Univ. degli Studi di Napoli Federico II (Italy); Maria Lepore, Seconda Univ. degli Studi di Napoli (Italy) [7169-52]

New diagnostic tools for noninvasive transcutaneous bilirubinometry in neonatal jaundice using laser diodes & LEDs, Mostafa Hamza, Mansoura Univ. (Egypt); Mohammad Hamza Sayed El-Ahl, Military Medical Academy (Egypt); Ahmed M. Hamza M.D., National Research Ctr. (Egypt); Mohammed Yahya Hamza, Aya M. Hamza, Tabarak Children's Hospital (Egypt) [7169-53]

Stroboscopic wide-field optical coherence gated imaging, Woo Jun Choi, Jihoon Na, Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [7169-54]

Antenna configurations for ultra wide band radar detection of breast cancer, Raquel C. Conceição, Martin O'Halloran, Martin Glavin, Edward Jones, National Univ. of Ireland, Galway (Ireland) and Bioelectronics Cluster, National Ctr. for Biomedical Engineering and Science, NUIG (Ireland) [7169-55]

An approach to the correspondence problem in the 1-D optical transducers tracking system, Qiuting Wen, Jian Wu, Tsinghua Univ. (China); Hai Tao, Univ. of California, Santa Cruz (United States); Guangzhi Wang, Datian Ye, Tsinghua Univ. (China) [7169-56]

Design and Quality for Biomedical Technologies II

Conference Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration; **Rongguang Liang**, Carestream Health, Inc.

Conference Co-Chair: **T. Joshua Pfefer**, U.S. Food and Drug Administration

Program Committee: **Anthony Joseph Durkin**, Beckman Laser Institute and Medical Clinic; **Kazuhiro Gono**, Olympus Corp. (Japan); **Jeeseong Hwang**, National Institute of Standards and Technology; **Steve P. Morgan**, The Univ. of Nottingham (United Kingdom); **Jannick P. Rolland**, College of Optics & Photonics/Univ. of Central Florida; **Rudolf M. Verdaasdonk**, Univ. Medisch Ctr. Utrecht (Netherlands)

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room C1 Mon. 8:00 to 10:00 am

Design of Biomedical Technologies

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration; **Jannick P. Rolland**, College of Optics & Photonics/Univ. of Central Florida

8:00 am: **Photodynamic agents and imaging: applications in therapy monitoring** (*Invited Paper*), Tayyaba Hasan, Wellman Ctr. for Photomedicine (United States) [7170-01]

8:30 am: **Land-contrast BioCD: self-referencing interferometric protein microarray**, Xuefeng Wang, Ming Zhao, David D. Nolte, Purdue Univ. (United States) [7170-02]

8:50 am: **An innovative device for glaucoma treatment: self-controlled CO₂ laser glaucoma surgery system**, Zhixiao Xue, Yingxin Li, Tianjin Medical Univ. (China) [7170-03]

9:10 am: **Development of a remote photoplethysmographic technique for human biometrics**, Sijung Hu, Ping Shi, Loughborough Univ. (United Kingdom); Yisheng Zhu, Shanghai Jiao Tong Univ. (China); Angelos Echiadis, Vicente Azorin-Peris, Loughborough Univ. (United Kingdom) [7170-04]

9:30 am: **Miniature microscopy for bio-medical applications** (*Invited Paper*), Tomasz S. Tkaczyk, Rice Univ. (United States) [7170-05]

Coffee Break 10:00 to 10:20 am

SESSION 2

Room: Conv. Ctr. Room C1 Mon. 10:20 am to 12:30 pm

Design of Imaging Systems

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration; **Rongguang Liang**, Carestream Health, Inc.

10:20 am: **A novel fast imaging modality for free radicals in vivo: continuous wave (CW) EPR imaging with direct detection and rapid field scan in the presence of rotating gradients** (**Keynote Presentation**), Sankaran Subramanian, Janusz W. Koscielniak, Nallathambay Devasahayam, Randall H. Pursley, Thomas J. Pohida, Murali C. Krishna, National Institutes of Health (United States) [7170-06]

10:50 am: **Quantification of resolution for a dynamic focusing OCM microscope**, Supraja Murali, Kye-Sung Lee, Panomsak Meemon, College of Optics & Photonics, Univ. of Central Florida (United States); William P. Kuhn, Opt-E Corp. (United States); Jannick P. Rolland, College of Optics & Photonics, Univ. of Central Florida (United States) [7170-30]

11:10 am: **Design of reflectance confocal microscopes for clinical applications** (*Invited Paper*), James M. Zavislan, Univ. of Rochester (United States) [7170-08]

11:40 am: **Integrated biophotonics in endoscopic oncology**, Naoki Muguruma, Univ. of Tokushima (Japan) [7170-09]

12:00 pm: **Hyperspectral imaging utilizing LCTF and DLP technology for surgical and clinical applications** (*Invited Paper*), Karel J. Zuzak, The Univ. of Texas at Arlington (United States) [7170-10]

Lunch Break 12:30 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room C1 Mon. 1:30 to 2:30 pm

Quality of Clinical Systems

Session Chair: **Jeeseong Hwang**, National Institute of Standards and Technology

1:30 pm: **Development of a 3D resolution test phantom for OCT system validation**, Peter Woolliams, Peter H. Tomlins, Christian J. Hart, National Physical Lab. (United Kingdom); Alex Grimwood, Univ. College London (United Kingdom) [7170-11]

1:50 pm: **Evaluation of the optical quality of rigid endoscopes in clinical practice**, Herke Jan Noordmans, Sander Veldhorst, Henk van den Brink, Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands) [7170-12]

2:10 pm: **Development and validation of a system based on spectral-photometry for measuring the fluid dynamics of multi-infusion conditions in the ICU**, Annemoon Timmerman, Brechtje Riphagen, John H. G. M. Klaessens, Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands) [7170-13]

SESSION 4

Room: Conv. Ctr. Room C1 Mon. 2:30 to 3:30 pm

Quality of Components

Session Chair: **Rudolf M. Verdaasdonk**, Univ. Medisch Ctr. Utrecht (Netherlands)

2:30 pm: **Calibrating fluorometers for in-vitro diagnostics**, Eric Heinz, Heinz Optical Engineering, LLC (United States) [7170-14]

2:50 pm: **Securing quality of camera-based biomedical optics**, Frank Guse, Axel Kasper, LINOS Photonics GmbH & Co. KG (Germany); Bob Zinter, Qioptiq Imaging Solutions (United States) [7170-15]

3:10 pm: **Comparison of methods for optical property determination in two-layer tissues**, Quanzeng Wang, Anant Agrawal, U.S. Food and Drug Administration (United States); Nam-Sun Wang, Univ. of Maryland, College Park (United States); T. Joshua Pfefer, U.S. Food and Drug Administration (United States) [7170-16]

Coffee Break 3:30 to 3:50 pm

SESSION 5

Room: Conv. Ctr. Room C1 Mon. 3:50 to 4:50 pm

Biomedical Technologies

Session Chair: **T. Joshua Pfefer**, U.S. Food and Drug Administration

3:50 pm: **Full field laser Doppler flowmetry with custom made CMOS sensors**, Steve P. Morgan, Diwei He, Barrie R. Hayes-Gill, John A. Crowe, Yiqun Zhu, Nguyen Hoang, The Univ. of Nottingham (United Kingdom) [7170-17]

4:10 pm: **Fast-gated single-photon avalanche diode for extremely wide dynamic-range applications**, Alberto Tosi, Alberto Dalla Mora, Franco Zappa, Sergio D. Cova, Davide Contini, Antonio Pifferi, Lorenzo Spinelli, Alessandro Torricelli, Rinaldo Cubeddu, Politecnico di Milano (Italy) [7170-18]

4:30 pm: **Pseudo-random single photon counting: the principle, simulation and experimental results**, Qiang Zhang, Nanguang Chen, National Univ. of Singapore (Singapore) [7170-19]

SESSION 6

Room: Conv. Ctr. Room C1 Mon. 4:50 to 5:50 pm

Components

Session Chair: **Anthony Joseph Durkin**, Univ. of California, Irvine

4:50 pm: **New lighting for the design of high quality biomedical devices**, Claudia B. Jaffe, Steven M. Jaffe, Arlie R. Conner, Lumencor, Inc. (United States) [7170-20]

5:10 pm: **Source stabilization for high quality time-domain diffuse optical tomography**, Weirong Mo, Nanguang Chen, National Univ. of Singapore (Singapore) [7170-21]

5:30 pm: **Tolerancing fluorometers for in-vitro diagnostics**, Eric Heinz, Heinz Optical Engineering, LLC (United States) [7170-22]

Monday 26 January

Posters-Monday

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Adaptive cross-correlation detector for signals optoelectronic reflective sensors, Oleksandr I. Bilyy, Roman Y. Yaremyk, Lviv National Univ. (Ukraine); Sergej O. Kostyukevych, Institute of Semiconductor Physics (Ukraine); Ihor Kotsiumbas, Halyna Kotsiumbas, State Scientific-Research Control Institute of Veterinary Preparations and Fodder Additives (Ukraine) [7170-24]

Comparative performance analysis of STFT and Wigner distribution method for real-time optical Doppler tomography applications, Changho Lee, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) . . . [7170-25]

High-speed spectroscopy system using a supercontinuum pulse source, Hoseong Song, Dug-Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) . . . [7170-26]

Rapid and facile immunodetection of multiple proteins with quantum dots as fluorescent labels, Sonia R. Gawande, National Ctr. for Cell Science (India); Anup A. Kale, National Chemical Lab. (India); Haribhau M. Gholap, Fergusson College (India) and National Chemical Lab. (India); Padma R. Shastry, National Ctr. for Cell Science (India); Satishchandra B. Ogale, National Chemical Lab. (India) . . . [7170-27]

Hardware and software facilities for enhancement of laser therapy efficiency of oncologic diseases, Alexander Mikov, Vyacheslav Svirin, M.F. Stelmakh Polyus Research and Development Institute (Russian Federation) . . . [7170-28]

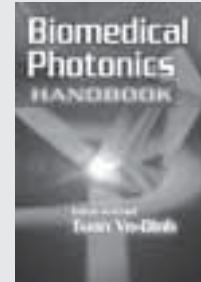
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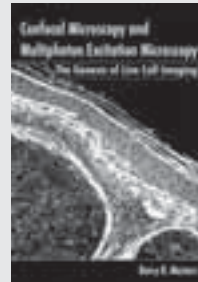
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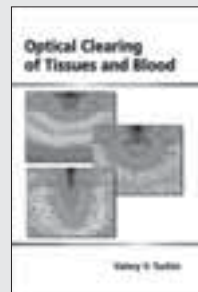
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Multimodal Biomedical Imaging IV

Conference Chairs: **Fred S. Azar**, Siemens Corporate Research; **Xavier Intes**, Rensselaer Polytechnic Institute

Program Committee: **Nicholas Ayache**, INRIA Sophia Antipolis (France); **David A. Boas**, Massachusetts General Hospital; **Britton Chance**, Univ. of Pennsylvania; **Sergio Fantini**, Tufts Univ.; **Keyvan Farahani**, National Institutes of Health; **Gultekin Gulsen**, Univ. of California, Irvine; **Mario Khayat**, ART Advanced Research Technologies Inc. (Canada); **Dimitris N. Metaxas**, Rutgers Univ.; **Nassir Navab**, Technische Univ. München (Germany); **Tim Nielsen**, Philips Research (Germany); **Vasilis Ntziachristos**, Helmholtz Zentrum München, GmbH (Germany); **Brian W. Pogue**, Dartmouth College; **Birsen Yazici**, Rensselaer Polytechnic Institute; **Arjun G. Yodh**, Univ. of Pennsylvania

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room D Sat. 8:00 to 9:50 am

Advances in Spectroscopic Imaging and Microscopy

Session Chairs: **Xavier Intes**, Rensselaer Polytechnic Institute; **Hamid Dehghani**, The Univ. of Exeter (United Kingdom)

8:00 am: **Hybrid x-ray CT/FMT approach for high-performance molecular imaging applications** (*Invited Paper*), Ralf B. Schulz, Angélique Ale, Athanasios Sarantopoulos, Damon Hyde, Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München, GmbH (Germany) [7171-01]

8:30 am: **Clinical results from 3-D MRI-NIR spectroscopy using boundary element method**, Subhadra Srinivasan, Brian W. Pogue, Colin M. Carpenter, Keith D. Paulsen, Dartmouth College (United States) [7171-02]

8:50 am: **Diffuse optical and bioluminescence tomography using spectral techniques**, Hamid Dehghani, Univ. of Exeter (United Kingdom); Scott C. Davis, Brian W. Pogue, Dartmouth College (United States) [7171-03]

9:10 am: **Examination of the synergy of near-infrared spectroscopy guided by advanced MR sequences in vivo**, Colin M. Carpenter, Brian W. Pogue, Subhadra Srinivasan, Keith D. Paulsen, Dartmouth College (United States) [7171-04]

9:30 am: **Imaging glioma mitochondrial activity in vivo with time-domain FMT/microCT**, Frederic Leblond, Dax S. Kepshire, Brian W. Pogue, Julia A. O'Hara, Dartmouth College (United States); Hamid Dehghani, Univ. of Exeter (United Kingdom); Subhadra Srinivasan, Dartmouth College (United States); Niculae Mincu, Mario Khayat, Michael Hutchins, ART Advanced Research Technologies, Inc. (Canada) [7171-05]

SESSION 2

Room: Conv. Ctr. Room D Sat. 9:50 am to 12:30 pm

Analysis and Reconstruction Techniques

Session Chairs: **Xavier Intes**, Rensselaer Polytechnic Institute; **Qianqian Fang**, Massachusetts General Hospital

9:50 am: **Wavelength optimization in spectral near-infrared optical tomography**, Matthew E. Eames, Univ. of Exeter (United Kingdom); Jia Wang, Brian W. Pogue, Dartmouth College (United States); Hamid Dehghani, Univ. of Exeter (United Kingdom) [7171-06]

Coffee Break 10:10 to 10:40 am

10:40 am: **An extensible imaging platform for optical imaging applications** (*Invited Paper*), Gianluca Paladini, Fred S. Azar, Siemens Corporate Research (United States) [7171-07]

11:10 am: **Application of a multicompartment dynamical model to multimodal optical imaging for CMRO₂ calibration and estimation of total baseline hemoglobin concentration**, Michèle Desjardins, Louis Gagnon, Ecole Polytechnique de Montréal (Canada) and Ctr. de Recherche Institut Univ. de Gériatrie de Montréal (Canada); Claudine Gauthier, Rick D. Hoge, Ctr. de Recherche Institut Univ. de Gériatrie de Montréal (Canada); Louis Bherer, Univ. du Québec à Montréal (Canada) and Ctr. de Recherche Institut Univ. de Gériatrie de Montréal (Canada); Frédéric Lesage, Ecole Polytechnique de Montréal (Canada) [7171-08]

11:30 am: **A coupled radiative transfer and diffusion approximation model for the solution of the forward problem and the a-priori fluorophore distribution estimation in fluorescence imaging**, Dimitris S. Gorpas, Kostas Politopoulos, Dido Yova, National Technical Univ. of Athens (Greece) [7171-09]

11:50 am: **Real-time evaluation of functional brain activity using a dynamic linear model**, Theodore J. Huppert, Farras Abdelnour, Univ. of Pittsburgh (United States) [7171-10]

12:10 pm: **Classification of rheumatoid arthritis in finger joints using frequency domain optical tomography**, Christian D. Klose, Hyun Keol, Columbia Univ. (United States); Uwe J. Netz, Charité Universitätsmedizin Berlin (Germany); Alexander D. Klose, Andreas H. Hielscher, Columbia Univ. (United States) [7171-11]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room D Sat. 1:30 to 3:30 pm

Multimodality Imaging

Session Chairs: **Fred S. Azar**, Siemens Corporate Research; **Regine Choe**, Univ. of Pennsylvania

1:30 pm: **fMRI and time domain NIRS combined: towards quantitative insight into neurovascular coupling**, Evgeniya Kirilina, Heidrun Wabnitz, Physikalisch-Technische Bundesanstalt (Germany); David R. Busch, Univ. of Pennsylvania (United States); Ruediger Bruehl, Andreas Kummrow, Physikalisch-Technische Bundesanstalt (Germany); Arjun G. Yodh, Univ. of Pennsylvania (United States); David A. Boas, Massachusetts General Hospital (United States); Bernd Iltermann, Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany) [7171-12]

1:50 pm: **Ultrasound and optical tissue-mimicking phantom for bi-modality imaging of prostate cancer diagnosis**, Jerome Boutet, Laurent Guyon, Mathieu Debourdeau, Jean-Marc Dinten, Commissariat à l'Energie Atomique (France); Didier Vray, INSA-Lyon (France); Philippe Rizo, Commissariat à l'Energie Atomique (France) [7171-13]

2:10 pm: **State-of-the-art in multimodal image processing techniques**, Ali Khamene, Fred S. Azar, Siemens Corporate Research (United States) [7171-14]

2:30 pm: **Development of a continuous-wave dual-band trans-rectal optical tomography system for concurrent sagittal imaging with trans-rectal ultrasound**, Jiang Zhen, Daqing Piao, Jerzy S. Krasinski, Oklahoma State Univ. (United States) [7171-15]

2:50 pm: **System design and calibration for radiative transport based multimodality small animal fluorescence tomography**, Anshul Haldipur, Marc Bartels, Shi Ke, Baylor College of Medicine (United States); Todd Wareing, John McGhee, Transpire Inc. (United States); Amit Joshi, Baylor College of Medicine (United States) [7171-16]

3:10 pm: **MRI-coupled fluorescence tomography of epidermal growth factor receptor in murine gliomas**, Scott C. Davis, Summer L. Gibbs-Strauss, Dartmouth College (United States); Hamid Dehghani, The Univ. of Exeter (United Kingdom) and Dartmouth College (United States); Brian W. Pogue, Keith D. Paulsen, Dartmouth College (United States) [7171-17]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: Conv. Ctr. Room D Sat. 4:00 to 6:00 pm

Breast Imaging

Session Chairs: **Fred S. Azar**, Siemens Corporate Research;
Albert E. Cerussi, Beckman Laser Institute and Medical Clinic

4:00 pm: **Why is diffuse optical spectroscopic imaging well-suited for therapeutic monitoring in breast cancer?** (*Invited Paper*), Albert E. Cerussi, Wendy Tanamai, Beckman Laser Institute and Medical Clinic (United States); David Hsiang M.D., Amanda Durkin, Univ. of California, Irvine (United States); Jing Liu, Beckman Laser Institute (United States); Lari Wenzel, Rita Mehta, Bruce J. Tromberg, Univ. of California, Irvine (United States). [7171-18]

4:30 pm: **In-vivo breast cancer detection, characterization, and therapy monitoring using diffuse optical techniques: correlation with MRI** (*Invited Paper*), Regine Choe, Turgut Durduran, Soren D. Konecky, Alper Corlu, Univ. of Pennsylvania (United States); Kijoon Lee, Nanyang Technological Univ. (Singapore); David R. Busch, Jr., Arjun G. Yodh, Univ. of Pennsylvania (United States). [7171-19]

5:00 pm: **Clinical study of malignant and benign breast lesions using a combined diffuse optical imaging and tomosynthesis**, Qianqian Fang, Stefan A. Carp, Juliette J. Selb, Richard H. Moore, Daniel B. Kopans, David A. Boas, Massachusetts General Hospital (United States) [7171-20]

5:20 pm: **A hybrid dynamical diffuse optical tomography & MRI mammography instrument**, David R. Busch, Jr., Avinash S. Rajput, Turgut Durduran, Regine Choe, Univ. of Pennsylvania (United States); Zhongyao Zhao, Drexel Univ. (United States); Xavier Intes, Rensselaer Polytechnic Institute (United States); Shoko Nioka, Britton Chance, Mark A. Rosen, Mitchell D. Schnall, Arjun G. Yodh, Univ. of Pennsylvania (United States). [7171-21]

5:40 pm: **Breast cancer targeting novel microRNA-nanoparticles for imaging**, Arutselvan Natarajan, Senthil K. Venugopal, Mark A. Zern M.D., Sally J. DeNardo M.D., Univ. of California, Davis (United States) [7171-22]

BIOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Optical coherence tomography and Raman spectroscopy of the retina, Julia W. Evans, Lawrence Livermore National Lab. (United States); Robert J. Zawadzki, Univ. of California, Davis Medical Ctr. (United States); Rui Liu, Univ. of California, Davis (United States); James W. Chan, Lawrence Livermore National Lab. (United States); Stephen M. Lane, Univ. of California, Davis (United States); John S. Werner, Univ. of California, Davis Medical Ctr. (United States). [7171-23]

Non-linearity in hemodynamic response of motor cortex using simultaneous functional near infrared spectroscopy and magnetic resonance imaging, Renuka Parlapalli, Univ. of Texas, Arlington (United States) and Univ. of Texas, Southwestern Medical Ctr. (United States); Vikrant Sharma, Univ. of Texas, Arlington (United States); Kaundinya S. Gopinath, Univ. of Texas, Southwestern Medical Ctr. (United States); Fenghua Tian, George Alexandrakis, Univ. of Texas, Arlington (United States); Richard W. Briggs, Univ. of Texas, Southwestern Medical Ctr. (United States); Hanli Liu, Univ. of Texas, Arlington (United States). [7171-24]

Rodent brain imaging with simultaneous optical tomography and contrast enhanced magnetic resonance imaging, James M. Masciotti, Jong Hwan Lee, Hyun-Keol Kim, Andreas H. Hielscher, Columbia Univ. (United States). [7171-25]

Wavelet-based methods for quantification of collagenation of human breast tissue imaged by optical polarimeter: entropic and morphometric approach, Tomasz Soltysinski, Warsaw Univ. of Technology (Poland) . [7171-26]

A hierarchical spatial prior approach for prostate image reconstruction in trans-rectal optical tomography, Guan Xu, Charles F. Bunting, Oklahoma State Univ. (United States); Hamid Dehghani, Univ. of Exeter (United Kingdom); Daqing Piao, Oklahoma State Univ. (United States) [7171-27]

Simultaneous measurements of optical coherence tomography and fluorescence spectroscopy based on double clad fiber, Seon Young Ryu, Hae Young Choi, Jihoon Na, Gwangju Institute of Science and Technology (Korea, Republic of); Eun Seo Choi, Chosun Univ. (Korea, Republic of); Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [7171-28]

An approach to parameter estimation for breast tumor by finite element method, A-qing Xu, Hongqin Yang, Fujian Normal Univ. (China); Zhen Ye, Yi Ming Su, Fujian Medical Univ. (China); Shusen Xie, Fujian Normal Univ. (China) [7171-29]

Refractive index mapping of layered samples using multi-angle optical coherence tomography, Matthew Tedaldi, Peter H. Tomlins, Peter Woolliams, Christian J. Hart, Andrew Beaumont, National Physical Lab. (United Kingdom). [7171-30]

Spatial-temperature high resolution map for early cancer diagnosis, Gheorghe V. Gavriloaia, Univ. of Pitesti (Romania); Anca Hurduc, Oncologic Institute of Bucharest (Romania); Adina Mariana Ghemigian, Medical and Pharmacy Univ. Bucharest (Romania); Radu Fumarel, Oncologic Institute of Bucharest (Romania) [7171-31]

Quality assessment for spectral domain optical coherence tomography (OCT) images, Shuang Liu, Amit S. Paranjape, Badr Elmaanaoui, Jordan Dewelle, Henry G. Rylander III, Mia K. Markey, Thomas E. Milner, The Univ. of Texas at Austin (United States) [7171-32]

Statistical pattern recognition algorithms for autofluorescence imaging, Zbigniew M. Kulas, Elzbieta M. Pawlik, Wroclaw Univ. of Technology (Poland); Jaroslaw Wierzbicki, Wroclaw Medical Univ. (Poland) [7171-33]

Imaging retinal degeneration in mice by combining Fourier domain optical coherence tomography and fluorescent scanning laser ophthalmoscopy, Nima Javaheri, Marinko V. Sarunic, Jing Xu, Simon Fraser Univ. (Canada); Laurie L. Molday, Robert S. Molday, The Univ. of British Columbia (Canada) [7171-34]

In vivo harmonic generation imaging of the human skin, Szu-Yu Chen, Chi-Kuang Sun, National Taiwan Univ. (Taiwan). [7171-35]

Estimation of cortical functional connectivity using NIRS, Chang-Hwan Im, Young-Jin Jung, Seungduk Lee, Dalkwon Koh, Do-Won Kim, Beop-Min Kim, Yonsei Univ. (Korea, Republic of) [7171-36]

Unmixing multiple markers with spectral lifetime measurements, Krenar Tasimi, GE Global Research (United States); Badrinath Roysam, Xavier Intes, Rensselaer Polytechnic Institute (United States) [7171-37]

Diffuse optical tomography with time-gated perturbation Monte Carlo method, Jin Chen, Xavier Intes, Rensselaer Polytechnic Institute (United States). [7171-38]

Accurate quantification of functional tissue parameters in small animals using MR-guided multispectral time-resolved imaging, Vivek Venugopal, Xavier Intes, Rensselaer Polytechnic Institute (United States) [7171-39]

Tuesday 27 January

WORKSHOP

Fairmont: Garden Room Tues. 6:30 to 9:30 pm

A Novel Standardized Open-Source eXtensible Imaging Platform (XIP) for the Rapid Development of Advanced Applications

Workshop Organizers:

Gianluca Paladini, Siemens Corporate Research and
Fred S. Azar, Siemens Corporate Research

WS937 is FREE to registered attendees of Photonics West. You must register in advance. See cashier to register.

See p. 21 for more information

Conference 7172 · Room: Conv. Ctr. Room A3

Sunday-Monday 25-26 January 2009 • Proceedings of SPIE Vol. 7172

Endoscopic Microscopy IV

Conference Chairs: **Guillermo J. Tearney**, Wellman Ctr. for Photomedicine, Massachusetts General Hospital; **Thomas D. Wang**, Univ. of Michigan

Program Committee: **Arthur F. Gmitro**, The Univ. of Arizona; **Martin Harris**, Optiscan (Australia); **Ralf Kiesslich**, Johannes Gutenberg Univ. Mainz (Germany); **Francois Lacombe**, Mauna Kea Technologies (France); **Stephen Lam**, The BC Cancer Research Ctr. (Canada); **Hiroshi Mashimo**, Harvard Medical School; **Kenzi Murakami**, Olympus Corp. (Japan); **Norman S. Nishioka**, Massachusetts General Hospital; **Mark J. Schnitzer**, Stanford Univ. School of Medicine; **Peter T. C. So**, Massachusetts Institute of Technology

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room A3 Sun. 8:15 to 9:30 am

Micromirror Techniques

Session Chair: **Thomas D. Wang**, Univ. of Michigan

8:15 am: **Contrast in endoscopic microscopy: a pathologist's perspective** (*Invited Paper*), Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7172-01]

8:45 am: **A confocal micro-imaging system incorporating a thermally actuated two axis MEMS scanner**, Simon P. Poland, Lijie Li, Deepak G. Uttamchandani, John M. Girkin, Univ. of Strathclyde (United Kingdom) [7172-02]

9:00 am: **New developments in two photon endoscopy**, Martin Schwarz, Iris Riemann, Fraunhofer-Institut für Biomedizinische Technik (Germany); Martin Weinigel, Karsten König, JenLab GmbH (Germany); Bernhard Messerschmidt, Grintech GmbH (Germany); Ronan Le Harzic, Fraunhofer-Institut für Biomedizinische Technik (Germany) [7172-04]

9:15 am: **MEMS scanner based dual-axes confocal fluorescence endoscope**, Wibool Piyawattanametha, Michael J. Mandella, Hyejun Ra, Jonathan T. C. Liu, Stanford Univ. (United States); Shai Friedland, Stanford Univ. School of Medicine (United States); Zhen Qiu, Univ. of Michigan (United States); Gordon S. Kino, Stanford Univ. (United States); Thomas D. Wang, Univ. of Michigan (United States); Olav D. Solgaard, Stanford Univ. (United States); Christopher H. Contag, Stanford Univ. School of Medicine (United States) [7172-05]

SESSION 2

Room: Conv. Ctr. Room A3 Sun. 9:30 to 11:00 am

New Techniques

Session Chair: **Guillermo J. Tearney**,

Wellman Ctr. for Photomedicine, Massachusetts General Hospital

9:30 am: **A combined spectrally encoded confocal microscopy and optical frequency domain imaging system**, DongKyun Kang, Wellman Ctr. for Photomedicine (United States); Melissa J. Suter, Massachusetts General Hospital (United States); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada); Patrick S. Yachimski, Massachusetts General Hospital (United States); Brett E. Bouma, Wellman Ctr. for Photomedicine (United States); Norman S. Nishioka M.D., Massachusetts General Hospital (United States); Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7172-06]

9:45 am: **Imaging characteristics of spectrally encoded endoscopy**, Dvir Yelin, Technion-Israel Institute of Technology (Israel) [7172-07]

Coffee Break 10:00 to 10:15 am

10:15 am: **Spectrally-encoded RGB color imaging**, DongKyun Kang, Wellman Ctr. for Photomedicine (United States); Dvir Yelin, Technion-Israel Institute of Technology (Israel); Brett E. Bouma, Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7172-08]

10:30 am: **Fluorescence endomicroscopy with out-of-focus background rejection**, Silvia Santos, Nenad Bozinovic, Timothy Ford, Aaron Bartoo, Cathie Ventalon, Satish Singh, Jerome Mertz, Boston Univ. (United States) [7172-09]

10:45 am: **3-D endoscopic visual system based on single CCD and optical channel**, Hyung-Ro Yoon, Yonsei Univ. (Korea, Republic of); Young-Ha Lee, Wasol Co., Ltd. (Korea, Republic of); Youngwoo Bae, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [7172-10]

SESSION 3

Room: Conv. Ctr. Room A3 Sun. 11:00 am to 12:00 pm

OCT/OFDI

Session Chair: **Stephen Lam**, The BC Cancer Research Ctr. (Canada)

11:00 am: **Optical frequency domain imaging with laser marking to guide surveillance biopsies in the esophagus**, Melissa J. Suter, Benjamin J. Vakoc, Priyanka A. Jillella, Norman S. Nishioka M.D., Brett E. Bouma, Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7172-11]

11:15 am: **Tuning of optical paths in endoscopic common-path OCT**, Jae Seok Park, Hyung Seok Lee, Eun Joo Jung, Myung-Yung Jeong, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of) [7172-12]

11:30 am: **Design of a handheld optical coherence microscopy endoscope**, Vrushali R. Korde, Erica Liebmann, Jennifer K. Barton, The Univ. of Arizona (United States) [7172-13]

11:45 am: **Comprehensive microscopy of the pulmonary airways**, Melissa J. Suter, Massachusetts General Hospital (United States); David R. Riker, Lahey Clinic Medical Ctr. (United States); Brett E. Bouma, Massachusetts General Hospital (United States); John F. Beamis, Jr., Lahey Clinic Medical Ctr. (United States); Guillermo J. Tearney, Massachusetts General Hospital (United States) [7172-14]

Lunch/Exhibition Break 12:00 to 1:15 pm

SESSION 4

Room: Conv. Ctr. Room A3 Sun. 1:15 to 2:30 pm

Clinical Systems

Session Chair: **Arthur F. Gmitro**, The Univ. of Arizona

1:15 pm: **New approaches in diagnostic minimally invasive surgery procedures and confocal endomicroscopy**, France Schwarz, Anne Osdoit, Francois Lacombe, Magalie Genet, Mauna Kea Technologies (France) [7172-15]

1:30 pm: **Deep high-resolution fluorescence microscopy of full organs: the benefit of ultraminiature confocal miniproboscopes**, France Schwarz, Anne Osdoit, Arnaud Le Nevez, Francois Lacombe, Magalie Genet, Mauna Kea Technologies (France) [7172-16]

1:45 pm: **Clinical results with acridine orange using a novel confocal laparoscope**, Anthony A. Tanbakuchi, Andrew R. Rouse, Josh A. Udovich, Kenneth Hatch M.D., Arthur F. Gmitro, The Univ. of Arizona (United States) [7172-17]

2:00 pm: **Catheter-based confocal microscopy for assessment of lung cancer in mice**, Eman Namati, Jacqueline R. Thiesse, Jessica C. de Ryk, Geoffrey McLennan M.D., The Univ. of Iowa (United States) [7172-18]

2:15 pm: **Affinity fluorescence-labeled peptides for the early detection of cancer in Barrett's esophagus**, Meng Li, Univ. of Michigan (United States); Shaoying Lu, Xi'an Jiaotong Univ. (China); Thomas D. Wang, Cyrus R. Piraka, Lymari Lopez-Diaz, Erin Shugard, Chris Komarck, Univ. of Michigan (United States) [7172-19]

SESSION 5

Room: Conv. Ctr. Room A3 Sun. 2:30 to 3:45 pm

Spectroscopic Methods

Session Chair: **Thomas D. Wang**, Univ. of Michigan

2:30 pm: **Fiber optic FTIR instrument for in vivo detection of colonic neoplasia**, Matthew J. Van Nortwick, Univ. of Michigan (United States); John Hargrove, Rolf Wolters, STI Medical Systems (United States); Thomas D. Wang, Univ. of Michigan (United States)[7172-20]

2:45 pm: **Real-time monitoring of esophageal laser thermal therapy**, Lisa A. Bartlett, Benjamin J. Vakoc, Milen S. Shishkov, Wellman Ctr. for Photomedicine (United States) and Harvard Medical School (United States); Andrew Z. Soroka, Wellman Ctr. for Photomedicine (United States); Guillermo J. Tearney, Brett E. Bouma, Wellman Ctr. for Photomedicine (United States) and Harvard Medical School (United States) and Massachusetts Institute of Technology (United States).....[7172-21]

Coffee Break3:00 to 3:15 pm

3:15 pm: **Development of a CARS endoscope: from modeling to design**, Jean-François Cormier, Luc Langevin, Ozzy Mermut, Jean-Pierre Bouchard, Michel Fortin, Marcia L. Vernon, INO (Canada); Michel Piché, Daniel Côté, Univ. Laval (Canada).....[7172-22]

3:30 pm: **Compact beveled multi-fiber probe for depth sensitive optical spectroscopy of pre-cancer**, Linda T. Nieman, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Marko Jakovljevic, The Univ. of Texas at Austin (United States); Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States).....[7172-23]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Rotational second harmonic generation endoscopy with 1µm fiber laser system, Gangjun Liu, Tuqiang Xie, Lingfeng Yu, Ivan V. Tomov, Beckman Laser Institute (United States); Jianping Su, Univ. of California, Irvine (United States); Zhongping Chen, Beckman Laser Institute (United States) and Univ. of California, Irvine (United States)[7172-24]

Dual-reference full-range frequency domain optical coherence tomography, Kye-Sung Lee, Panomsak Meemon, College of Optics & Photonics, Univ. of Central Florida (United States); William J. Dallas, The Univ. of Arizona (United States); Jannick P. Rolland, College of Optics & Photonics, Univ. of Central Florida (United States).....[7172-27]

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Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications IX

Conference Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

Program Committee: **Ilko K. Ilev**, U.S. Food and Drug Administration; **Karl-Friedrich Klein**, Fachhochschule Giessen-Friedberg (Germany); **Pierre Lucas**, Univ. of Arizona; **Yuji Matsuura**, Tohoku Univ. (Japan); **Urs Utzinger**, The Univ. of Arizona

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room C2 Sat. 8:30 to 10:10 am

Session Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

8:30 am: **Optical fibers in instrumental UV-analytics** (*Invited Paper*), Karl-Friedrich Klein, Univ. of Applied Sciences Giessen-Friedberg (Germany); Joachim Mannhardt, J&M Analytische Messtechnik GmbH (Germany); Cornell P. Gonschior, Hanns-Simon Eckhardt, Univ. of Applied Sciences Giessen-Friedberg (Germany) [7173-36]

8:50 am: **Guided-mode resonance sensors for rapid medical diagnostic testing applications**, Debra D. Wawro, Susanne Gimlin, Yiwu Ding, Shelby Zimmerman, Charles Kearney, Resonant Sensors, Inc. (United States); Karen Pawlowski, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Robert Magnusson, Resonant Sensors, Inc. (United States) [7173-01]

9:10 am: **Nanoporous thin film platform for biophotonic sensors**, Mahmoud R. Shahrari, Robert Bishop, Rina Solanki, Yvette D. Mattley, Ocean Optics, Inc. (United States) [7173-02]

9:30 am: **Polymer optical fiber tapers for biosensing applications**, Roberto Gravina, Romeo Bernini, Consiglio Nazionale delle Ricerche (Italy) [7173-03]

9:50 am: **Ag/ZnS-coated hollow glass waveguides for the transmission of IR radiation**, Paul Mark, James A. Harrington, Rutgers Univ. (United States) [7173-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room C2 Sat. 10:40 am to 12:00 pm

Session Chair: **Ronald W. Waynant**, U.S. Food and Drug Administration

10:40 am: **Novel method for tissue thermal spectroscopy: demonstration through theoretical oxygen saturation estimation**, Israel Gannot, Tel Aviv Univ. (Israel); Moshe Ben-David, Michal Tepper, Tel-Aviv Univ. (Israel) [7173-05]

11:00 am: **All-fiber optic confocal microscope with submicron depth resolution**, Pabitra Nath, Gauhati Univ. (India) [7173-06]

11:20 am: **Implantable optical biosensor for in vivo molecular imaging**, Thomas D. O'Sullivan, Stanford Univ. (United States); Elizabeth Munro, Univ. of Toronto (Canada); Adam de la Zerda, Natesh Parashurama M.D., Robert Teed, Stanford Univ. (United States); Ofer Levi, Univ. of Toronto (Canada); Sanjiv S. Gambhir, James S. Harris, Jr., Stanford Univ. (United States) [7173-07]

11:40 am: **Influence of polarization gating probe design parameters on the signal penetration depth**, Vladimir M. Turzhitzsky, Andrew J. Gomes, Alexey K. Kromine, Jeremy D. Rogers, Vadim Backman, Northwestern Univ. (United States) [7173-08]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room C2 Sat. 1:30 to 3:10 pm

Session Chair: **Pierre Lucas**, The Univ. of Arizona

1:30 pm: **Advanced confocal fiber-optic imaging and sensing approaches**, Do-Hyun Kim, U.S. Food and Drug Administration (United States); Jin U. Kang, Johns Hopkins Univ. (United States); Ilko K. Ilev, U.S. Food and Drug Administration (United States) [7173-09]

1:50 pm: **UV-visible diffuse reflectance spectroscopy with a self-calibrating fiber optic probe**, Bing Yu, Henry Fu, Nirmala Ramanujam, Duke Univ. (United States) [7173-11]

2:10 pm: **Inner wall coated hollow core waveguide SERS probe**, Chao Shi, Chao Lu, Claire Gu, Lei Tian, Rebecca Newhouse, Shaowei Chen, Jin Zhang, Univ. of California, Santa Cruz (United States) [7173-12]

2:30 pm: **Study of laser-induced damage to large core silica fiber by Nd:YAG and Alexandrite laser**, Xiaoguang Sun, Jie Li, Adam S. Hokansson, Daniel J. Whelan, OFS Fitel, LLC (United States); Michael G. Clancy, Candela Corp. (United States) [7173-13]

2:50 pm: **Singlemode fibers for UV applications: properties and characterization**, Karl-Friedrich Klein, Univ. of Applied Sciences Giessen-Friedberg (Germany); Tommy Halim, Univ. of Applied Sciences Giessen-Friedberg (Germany); Cornell P. Gonschior, Univ. of Applied Sciences Giessen-Friedberg (Germany); Georg Hillrichs, Univ. of Applied Sciences Merseburg (Germany) [7173-35]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room C2 Sat. 3:40 to 5:20 pm

Session Chair: **Karl-Friedrich Klein**, Fachhochschule Giessen-Friedberg (Germany)

3:40 pm: **Fabrication of SiO₂/Ag/SiO₂/Ag hollow glass fiber for infrared transmission**, Ke-Rong Sui, Xiao Lin, Xiao-Song Zhu, Yi-Wei Shi, Fudan Univ. (China); Katsumasa Iwai, Mitsunobu Miyagi, Sendai National College of Technology (Japan) [7173-14]

4:00 pm: **250 um inner diameter hollow waveguide for Er:YAG laser radiation**, Michal Nemeč, Helena Jelinkova, Czech Technical Univ. in Prague (Czech Republic); Mitsunobu Miyagi, Katsumasa Iwai, Sendai National College of Technology (Japan); Yuji Matsuura, Tohoku Univ. (Japan) [7173-15]

4:20 pm: **Two-photon in vivo flow cytometry through a dual-clad fiber**, Yu-Chung Chang, Jing-Yong Ye, Thommey P. Thomas, Alina Kotlyar, Eric R. Tkaczyk, James R. Baker, Jr., Theodore B. Norris, Univ. of Michigan (United States) [7173-16]

4:40 pm: **Miniature Fresnel-based fiber optic pressure sensors for biomedical applications**, Wei-Cheng Huang, Nan-Fu Chiu, National Taiwan Univ. (Taiwan); Chia-Chin Chiang, Ping-Kun Tsai, National Kaohsiung Univ. of Applied Sciences (Taiwan); Jaw-Lin Wang, National Taiwan Univ. (Taiwan) [7173-17]

5:00 pm: **Double clad and microstructured crystalline fibers for the middle infrared**, Leonid N. Butvina, Olesya V. Sereida, Alexey L. Butvina, Eugeny M. Dianov, RAS Fiber Optics Research Ctr. (Russian Federation); Ninel V. Lichkova, Vladimir N. Zagorodnev, Institute of Microelectronics Technology and High Purity Materials (Russian Federation) [7173-18]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 5

Room: Conv. Ctr. Room C2 Sun. 8:50 to 10:10 am

Session Chair: Yuji Matsuura, Tohoku Univ. (Japan)

8:50 am: **Evaluation of tissue viability using the CritiView in pig models of abdominal aortic occlusion and graded hemorrhage**, Avraham Mayevsky, Bar-Ilan Univ. (Israel); Sergie Preisman, Tel Aviv Univ. (Israel); Ehud P. Willenz, David Castel, Sheba Medical Ctr. (Israel); Azriel Perel, Tel Aviv Univ. (Israel); Dalia Givony, Nava Dekel, Levi Oren, Elyahu Pewzner, CritiSense Ltd. (Israel)[7173-10]

9:10 am: **Optical wire guided lumpectomy**, Amanda Dayton, Scott Prael, Oregon Health & Science Univ. (United States)[7173-19]

9:30 am: **The effect of dielectric absorption on the transmission characteristics of terahertz hollow fibers**, Xiao-Li Tang, Yi-Wei Shi, Fudan Univ. (China); Yuji Matsuura, Tohoku Univ. (Japan); Mitsunobu Miyagi, Sendai National College of Technology (Japan) and Miyagi National College of Technology (Japan)[7173-20]

9:50 am: **Hollow core waveguides for sensing: Monte Carlo, ray tracing computer simulation**, Israel Gannot, Tel Aviv Univ. (Israel); Idan Steinberg, Moshe Ben-David, Tel-Aviv Univ. (Israel)[7173-21]

Coffee Break10:10 to 10:40 am

SESSION 6

Room: Conv. Ctr. Room C2 Sun. 10:40 am to 12:00 pm

Session Chair: James A. Harrington, Rutgers Univ.

10:40 am: **In-bed fibre optic breathing and movement sensor for non-intrusive monitoring**, Zhihao Chen, Ju-Teng Teo, Xiufeng Yang, A*STAR Institute for Infocomm Research (Singapore)[7173-23]

11:00 am: **Fabrication of hollow optical fiber with a vitreous film for CO₂ laser light delivery**, Katsumasa Iwai, Mitsunobu Miyagi, Sendai National College of Technology (Japan); Yi-Wei Shi, Xiao-Song Zhu, Fudan Univ. (China); Yuji Matsuura, Tohoku Univ. (Japan)[7173-24]

11:20 am: **Simultaneous radiation of Er:YAG and Ho:YAG lasers for efficient ablation of hard tissues**, Tomonori Watanabe, Tohoku Univ. (Japan); Katsumasa Iwai, Sendai National College of Technology (Japan); Yuji Matsuura, Tohoku Univ. (Japan)[7173-25]

11:40 am: **Fabrication and measurement of PANDA PM fibers by PCVD-based method**, Honghai Wang, Yangtze Optical Fibre and Cable Co., Ltd. (China)[7173-26]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Room C2 Sun. 1:30 to 3:10 pm

Session Chair: Urs Utzinger, The Univ. of Arizona

1:30 pm: **Noninvasive subsurface analyzing technique using multiple miniaturized Raman probes**, Yuko S. Yamamoto, The Institute of Physical and Chemical Research (RIKEN) (Japan); Yuichi Komachi, Machida Endoscope Co., Ltd. (Japan); Hideyuki Shinzawa, Atsushi Maruyama, Bibin B. Andriana, The Institute of Physical and Chemical Research (RIKEN) (Japan); Yuji Matsuura, Tohoku Univ. (Japan); Yukihiko Ozaki, Kwansai Gakuin Univ. (Japan); Hidetoshi Sato, The Institute of Physical and Chemical Research (RIKEN) (Japan)[7173-27]

1:50 pm: **Highly specific and sensitive detection of IL-6 protein using combination tapered fiber-optic biosensor dip-probe**, Chun-Wei Wang, Rakesh Kapoor, The Univ. of Alabama at Birmingham (United States)[7173-28]

2:10 pm: **Tellurium based glasses for use as an electrode and sensing element in the electro-deposition of viruses in an aqueous environment**, Allison A. Wilhelm, Pierre Lucas, Mark R. Riley, Kelly A. Reynolds, The Univ. of Arizona (United States); Catherine Boussard-Plédel, Patrick Houzot, Bruno Bureau, Jacques Lucas, Univ. de Rennes I (France)[7173-29]

2:30 pm: **Wide range force feedback for catheter insertion mechanism for use in minimally invasive mitral valve repair surgery**, Roozbeh Ahmadi, Concordia Univ. (Canada); Saeed Sokhanvar, Massachusetts Institute of Technology (United States); Packirisamy Muthukumaran, Javad Dargahi, Concordia Univ. (Canada)[7173-30]

2:50 pm: **Quantitative estimation of IL-6 in serum/plasma samples using a rapid and cost-effective fiber-optic dip-probe**, Chun-Wei Wang, Upender Manne, Vishnu V. B. Reddy M.D., Rakesh Kapoor, The Univ. of Alabama at Birmingham (United States)[7173-31]

BIOS

Conference 7174 · Room: Conv. Ctr. Room A2

Sunday-Tuesday 25-27 January 2009 • Proceedings of SPIE Vol. 7174

Optical Tomography and Spectroscopy of Tissue VIII

Conference Chairs: Bruce Jason Tromberg, Beckman Laser Institute and Medical Clinic; Arjun G. Yodh, Univ. of Pennsylvania; Mamoru Tamura, Hokkaido Univ. (Japan); Eva Marie Sevick-Muraca, Baylor College of Medicine; Robert R. Alfano, City College/CUNY

Program Committee: Samuel Achilefu, Washington Univ. in St. Louis; David A. Boas, Massachusetts General Hospital; Sergio Fantini, Tufts Univ.; Marco Ferrari, Univ. degli Studi dell'Aquila (Italy); Amir H. Gandjbakhche, National Institutes of Health; Jeremy C. Hebden, Univ. College London (United Kingdom); Andreas H. Hielscher, Columbia Univ.; Brian W. Pogue, Dartmouth College; Quing Zhu, Univ. of Connecticut

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room A2 Sun. 8:20 to 10:00 am

Theory, Algorithms, and Modeling I

Session Chairs: Andreas H. Hielscher, Columbia Univ.;
Hamid Dehghani, The Univ. of Exeter (United Kingdom)

8:20 am: **Fourth order perturbation theory for the diffusion equation in the two-layer geometry: continuous-wave results for absorbing defects**, Angelo Sassaroli, Tufts Univ. (United States); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Sergio Fantini, Tufts Univ. (United States)[7174-11]

8:40 am: **Simplified spherical harmonics approximation of the time-dependent equation of radiative transfer for the forward problem in time-domain diffuse optical tomography**, Vivian Issa, Jorge Bouza-Dominguez, Yves Bérubé-Lauzière, Univ. de Sherbrooke (Canada)[7174-12]

9:00 am: **Forward modeling of axial trans-luminal diffuse optical imaging with a cylindrical applicator using continuous-wave photon-illumination**, Daqing Piao, Oklahoma State Univ. (United States); Gang Yao, Univ. of Missouri, Columbia (United States); Charles F. Bunting, Jerzy S. Kraskinski, Oklahoma State Univ. (United States); Brian W. Pogue, Dartmouth College (United States)[7174-13]

9:20 am: **Applications of delta-P1 and delta-P3 approximations to optical tomography in small imaging volumes**, Baohong Yuan, The Catholic Univ. of America (United States)[7174-14]

9:40 am: **A parallel reduced-space sequential-quadratic programming approach to small animal optical tomography**, Xuejun Gu, James M. Masciotti, Hyun-Keol Kim, Andreas H. Hielscher, Columbia Univ. (United States)[7174-15]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room A2 Sun. 10:30 am to 12:10 pm

Instrumentation and Algorithms

Session Chairs: Amir H. Gandjbakhche, National Institutes of Health;
Andreas H. Hielscher, Columbia Univ.

10:30 am: **Double layer estimation of flow changes using diffuse correlation spectroscopy**, Louis Gagnon, Michèle Desjardins, Ecole Polytechnique de Montréal (Canada); Louis Bherer, Univ. du Québec à Montréal (Canada); Frédéric Lesage, Ecole Polytechnique de Montréal (Canada)[7174-16]

10:50 am: **Non-invasive skin oxygenation imaging using a multi-spectral camera system: effectiveness of various concentration algorithms on human skin**, John H. G. M. Klaessens, Herke Jan Noordmans, Rowland de Roode, Rudolf M. Verdaasdonk, Univ. Medisch Ctr. Utrecht (Netherlands)[7174-17]

11:10 am: **Spectroscopic technique with wide range of wavelength information improves near-infrared spectroscopy**, Hideo Eda, Hiromichi Aoki, Shigeru Eura, The Graduate School for the Creation of New Photonics Industries (Japan); Kazutoshi Ebe, Toyota Central Research and Development Labs., Inc. (Japan)[7174-18]

11:30 am: **Multi-wavelength measurement of cytochrome oxidase and water in biomedical tissues using optical topography system**, Tsukasa Funane, Hirokazu Atsumori, Hiroki Sato, Masashi Kiguchi, Atsushi Maki, Hitachi, Ltd. (Japan)[7174-19]

11:50 am: **Relative capacities of time-gated versus CW imaging to localize tissue embedded vessels with increasing depth**, George Alexandrakis, Nimit L. Patel, Pavan Rajamahendrarapu, Zi-Jing Lin, The Univ. of Texas at Arlington (United States); Edward H. Livingston, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Hanli Liu, The Univ. of Texas at Arlington (United States)[7174-20]

Lunch/Exhibition Break 12:10 to 1:10 pm

SESSION 3

Room: Conv. Ctr. Room A2 Sun. 1:10 to 3:20 pm

Advances in Instrumentation and Technology

Session Chair: Brian W. Pogue, Dartmouth College

1:10 pm: **Undoing tissue scattering by optical phase conjugation** (*Invited Paper*), Emily J. McDowell, Changhuei Yang, California Institute of Technology (United States)[7174-21]

1:40 pm: **Angular domain optical tomography in turbid media**, Fartash Vasefi, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada); Bozena Kaminska, Simon Fraser Univ. (Canada); Kevin J. Jordan, London Health Sciences Ctr. (Canada); Glenn H. Chapman, Simon Fraser Univ. (Canada)[7174-22]

2:00 pm: **Imaging of highly scattering media by spatially modulated pulsed light**, Andrea Bassi, Cosimo D'Andrea, Gianluca Valentini, Rinaldo Cubeddu, Politecnico di Milano (Italy); Simon R. Arridge, Univ. College London (United Kingdom)[7174-23]

2:20 pm: **Three-dimensional diffuse optical tomography of the whole finger: a step towards full hand imaging**, Qizhi Zhang, Yiyong Tan, Zhen Yuan, Eric S. Sobel, Huabei Jiang, Univ. of Florida (United States)[7174-24]

2:40 pm: **3D optical contrast-recovery in MR guided diffuse optical spectroscopy**, Colin M. Carpenter, Brian W. Pogue, Shudong Jiang, Keith D. Paulsen, Dartmouth College (United States)[7174-25]

3:00 pm: **MRI-guided broadband NIR tomography**, Jia Wang, Brian W. Pogue, Colin M. Carpenter, Shudong Jiang, Keith D. Paulsen, Dartmouth College (United States)[7174-26]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Conv. Ctr. Room A2 Sun. 3:50 to 5:10 pm

Preclinical/Clinical Applications

Session Chairs: Hanli Liu, The Univ. of Texas at Arlington;
Regine Choe, Univ. of Pennsylvania

3:50 pm: **Combined hyperspectral and Doppler optical coherence tomography microscope for hemoglobin saturation and blood flow imaging in tumors**, Melissa C. Skala, Hansford C. Hendargo, Andrew N. Fontanella, Mark W. Dewhurst, Joseph A. Izatt, Duke Univ. (United States)[7174-54]

4:10 pm: **Chronic hypoxia as a factor of enhanced autofluorescence of endogenous porphyrins in soft biological tissues**, Dmitrii A. Rogatkin, The M. Vladimirovsky Moscow Regional Research and Clinical Institute (Russian Federation); Vladimir V. Tchernyi, Scientific Agency (Russian Federation); Roman V. Gorenkov, Vasilii N. Karpov, Vyacheslav I. Shumskiy, The M. Vladimirovsky Moscow Regional Research and Clinical Institute (Russian Federation) [7174-55]

4:30 pm: **Image-guided optical spectroscopy in diagnosis of osteoarthritis by combining spectral and spatial a-priori information**, Zhen Yuan, Qizhi Zhang, Eric S. Sobel, Huabei Jiang, Univ. of Florida (United States)[7174-56]

4:50 pm: **Non-invasive assessment of testicular torsion in rabbits with near-infrared spectroscopy: prospects for pediatric urology**, Bertan Hallacoglu, Richard Matulewicz, Tufts Univ. (United States); Harriet J. Paltiel, Horacio Padua, Patricio Gargollo, Glenn Cannon, Ahmad Alomari, Children's Hospital Boston (United States); Angelo Sassaroli, Sergio Fantini, Tufts Univ. (United States)[7174-57]

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room A2 Mon. 8:30 to 9:50 am

Breast Cancer Diagnosis I (Instrumentation)

Session Chair: Sergio Fantini, Tufts Univ.

8:30 am: **Spectral imaging of the human breast for quantitative oximetry**, Ning Liu, Yang Yu, Angelo Sassaroli, Sergio Fantini, Tufts Univ. (United States) [7174-27]

8:50 am: **Multicolor frequency-domain diffuse optical tomography for detection of breast cancer**, Anna G. Orlova, Vladislav A. Kamensky, German Y. Golubiatnikov, Anna V. Masiennikova M.D., Vladimir I. Plehanov, Natalia M. Shakhova M.D., Mikhail S. Kleshnin, Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [7174-28]

9:10 am: **Dynamic optical tomographic breast imaging with digital detection techniques**, Molly L. Flexman, Yang Li, James M. Masciotti, Columbia Univ. (United States); Rabah M. Al Abdi, Randall L. Barbour, SUNY/Downstate Medical Ctr. (United States); Andreas H. Hielscher, Columbia Univ. (United States) [7174-29]

9:30 am: **Tissue-type image segmentation in optical mammography with population-derived probability functions: a step towards optical computer aided diagnosis**, David R. Busch, Jr., Regine Choe, Turgut Durduran, Univ. of Pennsylvania (United States); Kijoon Lee, Nanyang Technological Univ. (Singapore); Han Y. Ban, Univ. of Pennsylvania (United States); Mary E. Putt, Wensheng Guo, Mark A. Rosen, Mitchell D. Schnall, The Univ. of Pennsylvania Health System (United States); Arjun G. Yodh, Univ. of Pennsylvania (United States) [7174-30]

Coffee Break 9:50 to 10:30 am

SESSION 6

Room: Conv. Ctr. Room A2 Mon. 10:30 am to 12:10 pm

Breast Cancer Diagnosis II (Clinical Studies)

Session Chair: Quing Zhu, Univ. of Connecticut

10:30 am: **Optical tomography guided by ultrasound can improve diagnosis of early-stage invasive breast cancers**, Quing Zhu, Univ. of Connecticut (United States); Mark Kane M.D., Univ. of Connecticut Health Ctr. (United States); Yasaman Ardeshirpour, Chen Xu, Univ. of Connecticut (United States); Edward Cronin, Hartford Hospital (United States) [7174-31]

10:50 am: **Differentiation of benign and malignant breast tumors by in-vivo three-dimensional parallel-plate diffuse optical tomography**, Regine Choe, Soren D. Konecky, Alper Corlu, Kijoon Lee, Turgut Durduran, David R. Busch, Univ. of Pennsylvania (United States); Mary E. Putt, Mitchell D. Schnall, Mark A. Rosen, The Univ. of Pennsylvania Health System (United States); Britton Chance, Arjun G. Yodh, Univ. of Pennsylvania (United States) [7174-32]

11:10 am: **Non-invasive monitoring of tumor pathological grade during neoadjuvant chemotherapy by measuring tissue water state using diffuse optical spectroscopic imaging**, So Hyun Chung, Albert E. Cerussi, Rita Mehta, David Hsiang M.D., Bruce J. Tromberg, Univ. of California, Irvine (United States) [7174-33]

11:30 am: **Pressure-enhanced near-infrared breast imaging: toward cancer patient imaging**, Shudong Jiang, Brian W. Pogue, Keith D. Paulsen, Dartmouth College (United States) [7174-34]

11:50 am: **Mechanical and metabolic markers in compressed breast tissue**, Stefan A. Carp, Nadege Roche, Qianqian Fang, Daniel B. Kopans, David A. Boas, Massachusetts General Hospital (United States) [7174-35]

Lunch Break 12:10 to 1:10 pm

SESSION 7

Room: Conv. Ctr. Room A2 Mon. 1:10 to 2:30 pm

Breast Cancer Diagnosis III (Clinical Studies)

Session Chair: Mamoru Tamura, Hokkaido Univ. (Japan)

1:10 pm: **An optical tomography method that accounts for a tiled chest-wall in breast imaging**, Yasaman Ardeshirpour, Univ. of Connecticut (United States); Minming Huang, Memorial Sloan-Kettering Cancer Ctr. (United States); Quing Zhu, Univ. of Connecticut (United States) [7174-36]

1:30 pm: **Optical mammography: improved sensitivity by combined absorption and fluorescence analysis**, Anais Leproux, Marjolein van der Voort, Rik Harbers, Wim Verhaegh, Philips Research (Netherlands); Leon Bakker, Philips Research (China); Tim Nielsen, Bernhard J. Brendel, Philips Research (Germany); Martin B. van der Mark, Philips Research (Netherlands) [7174-37]

1:50 pm: **In-vivo fluorescence imaging of breast cancer**, Axel J. Hagen, Dirk Grosenick, Physikalisch-Technische Bundesanstalt (Germany); Alexander Pöllinger, Susen Burock, Peter Warnick, Charité Universitätsmedizin Berlin (Germany); Rainer Macdonald, Herbert H. Rinneberg, Physikalisch-Technische Bundesanstalt (Germany); Peter M. Schlag, Charité Universitätsmedizin Berlin (Germany) [7174-38]

2:10 pm: **In vivo studies of 144 breast masses by phase contrast diffuse optical tomography**, Ruixin Jiang, Xiaoping Liang, Qizhi Zhang, Stephen R. Grobmyer, Univ. of Florida (United States); Laurie L. Fajardo, The Univ. of Iowa (United States); Huabei Jiang, Univ. of Florida (United States) [7174-39]

SESSION 8

Room: Conv. Ctr. Room A2 Mon. 2:30 to 5:10 pm

Fluorescence Imaging/Spectroscopy I (Algorithm/Tomography)

Session Chair: Vasilis Ntziachristos, Massachusetts General Hospital

2:30 pm: **Quantitative fluorescence tomography in small animal models (Invited Paper)**, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7174-40]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Numerical comparison of different penalty modified barrier functions for optical tomography problems**, Ranadhir Roy, The Univ. of Texas-Pan American (United States) [7174-41]

3:50 pm: **Fluorescence tomography with the equation of radiative transfer on block-structured grids**, Ludguier D. Montejo, Alexander D. Klose, Andreas H. Hielscher, Columbia Univ. (United States) [7174-42]

4:10 pm: **Data-driven excitation leakage removal in NIR fluorescence tomography**, Marc Bartels, Baylor College of Medicine (United States); Wolfgang Bangerth, Texas A&M Univ. (United States); Amit Joshi, Baylor College of Medicine (United States) [7174-43]

4:30 pm: **Depth information of inhomogeneity in human breast tissue through spatially resolved fluorescence technique**, Arunabha Ghosh, Indian Institute of Technology Kanpur (India) [7174-44]

4:50 pm: **An information-theoretic treatment of fluorescent molecular tomography**, Pouyan Mohajerani, Ali Behrooz, Ali Adibi, Georgia Institute of Technology (United States) [7174-45]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Measurement of brain activation difference during different mathematical tasks by near infrared spectroscopy, Naoko Okamoto, Osaka Univ. (Japan); Yasufumi Kuroda, Bukkyo Univ. (Japan); Britton Chance, Shoko Nioka, Univ. of Pennsylvania (United States); Hideo Eda, The Graduate School for the Creation of New Photonics Industries (Japan); Takanori Maesako, Osaka Univ. (Japan) [7174-05]

Time-domain fluorescence molecular tomography based on experimental data, Limin Zhang, Jiao Li, Feng Gao, Huiyuan He, Huijuan Zhao, Tianjin Univ. (China) [7174-58]

Fast inverse Monte Carlo simulation for extracting the optical properties of cylindrical tissue, Huijuan Zhao, Xiaoqing Zhou, Shunqi Zhang, Jierong Ma, Shaohua Hou, Tianjin Univ. (China) [7174-59]

- Theoretical limitations of diffusion based optical fluorescence tomography,** Hermann Scharfetter, Manuel Freiburger, Graz Univ. of Technology (Austria) [7174-60]
- Enhancing time-domain optical mammography by relocating optodes,** Yiwen Ma, Feng Gao, Jingyi Wang, Fang Yang, Huijuan Zhao, Tianjin Univ. (China) [7174-61]
- A continuous-wave mode, elliptic-region-based DOT methodology based on BEM-diffusion modeling,** Pingqiao Ruan, Yanfang Liu, Feng Gao, Huijuan Zhao, Tianjin Univ. (China) [7174-62]
- Optical tomographic imaging of breast with time-domain detection: methodology and phantom validation,** Fang Yang, Jingyi Wang, Feng Gao, Yiwen Ma, Huijuan Zhao, Tianjin Univ. (China) [7174-63]
- In vivo trans-rectal ultrasound coupled trans-rectal near-infrared optical tomography of canine prostate bearing transmissible venereal tumor,** Jiang Zhen, Jerry W. Ritchey, G. Reed Holyoak, Kenneth E. Bartels, Guan Xu, Charles F. Bunting, Oklahoma State Univ. (United States); Gennady Slobodov, Univ. of Oklahoma Health Sciences Ctr. (United States); Jerzy S. Krasinski, Daqing Piao, Oklahoma State Univ. (United States) [7174-64]
- When cross-talk offers signal: feasibility of recovering absorbing target in endoscopic diffuse imaging geometry using spread-spectral-encoding of wide-band light based on the feature of spectral cross-talk among source channels,** Daqing Piao, Oklahoma State Univ. (United States); Gang Yao, Univ. of Missouri, Columbia (United States); Brian W. Pogue, Dartmouth College (United States); Jerzy S. Krasinski, Oklahoma State Univ. (United States) [7174-65]
- Time-resolved near infrared spectral wing emission of human native cancerous and normal prostate tissues,** Yang Pu, Wubao B. Wang, Bidyut B. Das, Robert R. Alfano, City Univ. of New York (United States) [7174-66]
- Time-resolved fluorescence tomography in cancer research: backward versus forward geometry,** Laurent Guyon, Lionel Hervé, Jerome Boutet, Mathieu Deboudeau, Nadia Djaker, Anabela da Silva, Philippe Peltié, Jean-Marc Dinten, Philippe Rizo, Commissariat à l'Energie Atomique (France) [7174-67]
- Biophysical interpretation and ex vivo characterization of backscattered light from tumor-associated breast stroma using micro-sampling reflectance spectroscopy,** Ashley M. Laughney, Brian W. Pogue, Dartmouth College (United States); Mary C. Schwab, Dartmouth Hitchcock Medical Ctr. (United States); Venkataraman Krishnaswamy, Dartmouth College (United States); Wendy A. Wells, Dartmouth Hitchcock Medical Ctr. (United States); Keith D. Paulsen, Dartmouth College (United States) [7174-68]
- Visualization of children's mathematics solving process using near infrared spectroscopic approach,** Yasufumi Kuroda, Bukkyo Univ. (Japan); Naoko Okamoto, Osaka Univ. (Japan); Britton Chance, Shoko Nioka, Univ. of Pennsylvania (United States); Hideo Eda, The Graduate School for the Creation of New Photonics Industries (Japan); Takanori Maesako, Osaka Univ. (Japan) [7174-69]
- Multidistance probe arrangement to eliminate motion artifact in fNIRS,** Toru Yamada, Shinji Umeyama, Keiji Matsuda, National Institute of Advanced Industrial Science and Technology (Japan) [7174-70]
- Frequency domain 3D simplified spherical harmonics approximation: development, validation, and implication in bioluminescence imaging,** Michael Chu, The Univ. of Exeter (United Kingdom); Alexander D. Klose, Columbia Univ. (United States); Hamid Dehghani, The Univ. of Exeter (United Kingdom) [7174-72]
- 5:30 pm: **Optode optimization for diffuse optical tomography with spherical geometry,** Ling Chen, Nanguang Chen, National Univ. of Singapore (Singapore) [7174-73]
- Accuracy of the nonlinear fitting procedure for time-resolved measurements on diffusive phantoms at NIR wavelengths,** Lorenzo Spinelli, Politecnico di Milano (Italy); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Andrea Farina, Antonio Pifferi, Alessandro Torricelli, Rinaldo Cubeddu, Politecnico di Milano (Italy); Giovanni Zaccanti, Univ. degli Studi di Firenze (Italy) [7174-74]
- Measurement of micro-vascular blood flow in the human breast during compression with diffuse correlation spectroscopy,** David R. Busch, Jr., Regine Choe, Turgut Durduran, Univ. of Pennsylvania (United States); Lauren Chaby, Clarkson Univ. (United States); Mark A. Rosen, The Univ. of Pennsylvania Health System (United States); Arjun G. Yodh, Univ. of Pennsylvania (United States) [7174-75]
- Noninvasive diffuse optical measurements of hemodynamics in head and neck tumors,** Regine Choe, Shih-Ki Liu, Turgut Durduran, Ulas Sunar, Sungheon Kim, Harish Poptani, Alex Kilger, Harry Quon, Britton Chance, Arjun G. Yodh, Univ. of Pennsylvania (United States) [7174-76]
- Towards quantitative bedside Kaposi's sarcoma imaging,** Jana M. Kainerstorfer, Franck Amyot, Jason A. Riley, Moinuddin Hassan, Victor V. Chernomordik, Robert Yarchoan, National Institutes of Health (United States); Christoph K. Hitzberger, Medical Univ. of Vienna (Austria); Amir H. Gandjbakhche, National Institutes of Health (United States) [7174-77]
- Evaluation of reconstructed absolute reduced scattering coefficient and chromophore concentration in phantoms using broadband diffuse reflectance spectroscopy at two large source-detector separations,** Kuan-Chieh Huang, Hsing-Wen Wang, National Yang-Ming Univ. (Taiwan) [7174-78]
- An all-at-once reduced Hessian SQP algorithm for frequency domain optical tomography,** Hyun-Keol Kim, Xuejun Gu, Andreas H. Hielscher, Columbia Univ. (United States) [7174-79]
- The hemodynamic effects of acupuncture (LR3, ST36) on rat mammary tissue monitored by diffuse optical imaging,** Jae Gwan Kim, Univ. of California, Irvine (United States); Myoung-Rae Cho, Dongshin Univ. (Korea, Republic of); Bruce J. Tromberg, Univ. of California, Irvine (United States) [7174-80]
- Optimal frequencies for small-tissue imaging based on the equation of radiative transfer,** Hyun-Keol Kim, Columbia Univ. (United States); Uwe J. Netz, Juergen Beuthan, Charité Universitätsmedizin Berlin (Germany); Andreas H. Hielscher, Columbia Univ. (United States) [7174-81]
- Multispectral and phase-contrast diffuse optical tomography of breast cancer during neoadjuvant chemotherapy: A case study,** Xiaoping Liang, Qizhi Zhang, Stephen Staal, Stephen R. Grobmyer, Huabei Jiang, Univ. of Florida (United States) [7174-82]
- Three-dimensional optical tomography imaging of finger joints using simplified spherical harmonics approximated higher-order diffuse model,** Zhen Yuan, Qizhi Zhang, Eric S. Sobel, Huabei Jiang, Univ. of Florida (United States) [7174-83]
- Differential optical imaging of breast tissue: exogenous contrast via hyperoxic gas inhalation,** Sanhita Dixit, Hanyoung Kim, SRI International (United States); Christopher Comstock, Univ. of California, San Diego (United States); Gregory W. Faris, SRI International (United States) [7174-84]
- Calibration of redox scanning for tissue samples,** He N. Xu, Baohua Wu, The Univ. of Pennsylvania Health System (United States); Shoko Nioka, Britton Chance, Univ. of Pennsylvania (United States); Lin Z. Li, The Univ. of Pennsylvania Health System (United States) [7174-85]
- MRI guided video-rate near infrared tomography for imaging pulsatile hemodynamics of tumors,** Zhiqiu Li, Venkataraman Krishnaswamy, Julia A. O'Hara, Brian W. Pogue, Colin M. Carpenter, Dartmouth College (United States) [7174-86]
- Histologic models for optical tomography and spectroscopy of tissues,** Rohit Bhargava, Brynmor J. Davis, Univ. of Illinois at Urbana-Champaign (United States) [7174-87]
- Differential hemodynamic effects of cyanide poisoning on brain and muscle tissue as observed by near infrared spectroscopy,** Jae Gwan Kim, Jangwoen Lee, Kelly A. Kreuter, David S. Mukai, Sari B. Mahon, Beckman Laser Institute and Medical Clinic (United States); Gerry R. Boss, Univ. of California, San Diego (United States); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (United States); Matthew Brenner, Univ. of California, Irvine (United States) [7174-88]
- Combining low-coherence enhanced backscattering and polarization gating from the periampullary duodenum for pancreatic cancer screening,** Vladimir M. Turzhitzky, Yang Liu, Northwestern Univ. (United States); Randall Brand M.D., Nahla Hasabou M.D., Michael J. Goldberg M.D., Hemant K. Roy M.D., Evanston Northwestern Healthcare Corp. (United States); Vadim Backman, Northwestern Univ. (United States) [7174-89]
- Diffuse optical spectroscopy monitoring of hemodynamic and physiological responses to lower body negative pressure applications in human,** Jangwoen Lee, Jae Gwan Kim, Sari B. Mahon, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (United States); Kathy L. Ryan, Victor A. Convertino, U.S. Army Institute of Surgical Research (United States); Matthew Brenner, Beckman Laser Institute and Medical Clinic (United States) and Univ. of California, Irvine (United States) [7174-95]
- Application of novel wide-field functional imaging (WiFi) instrument to a preclinical study of breast cancer progression and response to therapy,** Austin Moy, Univ. of California, Irvine (United States); Jae Kim, Beckman Laser Institute and Medical Clinic (United States); Bruce Tromberg, Univ. of California, Irvine (United States); Albert Cerussi, Beckman Laser Institute and Medical Clinic (United States); Bernard Choi, Eva Y. H. Lee, Univ. of California, Irvine (United States) [7174-97]

Tuesday 27 January

SESSION 9

Room: Conv. Ctr. Room A2 Tues. 8:30 to 9:50 am

**Fluorescence Imaging/Spectroscopy II
(Small Animal Imaging)**

Session Chair: Eva Marie Sevick-Muraca, Baylor College of Medicine

8:30 am: **Small animal fluorescence tomographic imaging with early-arriving photons: trading resolution for sensitivity?**, Mark J. Niedre, Northeastern Univ. (United States); Vasilis Ntziachristos, Technische Univ. München (Germany) [7174-46]

8:50 am: **A high sensitivity multi-spectral three-dimensional fluorescence optical tomography system for small animal imaging**, Changqing Li, Gregory S. Mitchell, Univ. of California, Davis (United States); Joyita Dutta, Sangtae Ahn, Richard M. Leahy, Univ. of Southern California (United States); Simon R. Cherry, Univ. of California, Davis (United States) [7174-47]

9:10 am: **Near infrared fluorescence imaging of small animals in-vivo with a prior structural information**, Nrusingh C. Biswal, John K. Gamelin, Univ. of Connecticut (United States); Baohong Yuan, The Catholic Univ. of America (United States); Joseph M. Backer, SibTech, Inc. (United States); Quing Zhu, Univ. of Connecticut (United States) [7174-48]

9:30 am: **Fluorescence diffuse tomography for detection of marked tumors in small animals**, Mikhail S. Kleshnin, Ilya I. Fiks, Vladislav A. Kamensky, Vladimir I. Plehanov, Anna G. Orlova, Mikhail Y. Kirillin, Institute of Applied Physics (Russian Federation); Marina V. Shirmanova, Nizhny Novgorod State Univ. (Russian Federation); Alexander P. Savitsky, A.N. Bach Institute of Biochemistry (Russian Federation); Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [7174-49]

Coffee Break 9:50 to 10:30 am

SESSION 10

Room: Conv. Ctr. Room A2 Tues. 10:30 to 11:50 am

Fluorescence Imaging/Spectroscopy III (Instrumentation)

Session Chair: Robert R. Alfano, City College/CUNY

10:30 am: **Application of time gated, intensified CCD camera for imaging of absorbing and fluorescent inclusions in optically turbid medium**, Piotr L. Sawosz, Norbert S. Zolek, Roman Maniewski, Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland) [7174-50]

10:50 am: **Sensor optimization for fluorescence optical tomography by experimental design methods**, Manuel Freiburger, Hermann Scharfetter, Graz Univ. of Technology (Austria) [7174-51]

11:10 am: **Three-dimensional localization of discrete fluorescent inclusions from multiple tomographic projections in the time-domain**, Yves Bérubé-Lauzière, Julien Pichette, Univ. de Sherbrooke (Canada) [7174-52]

11:30 am: **Multi-projection based fluorescence optical tomography using a hand-held probe based optical imager**, Jiajia Ge, Sarah J. L. Erickson, Anuradha Godavarty, Florida International Univ. (United States) [7174-53]

Lunch/Exhibition Break 11:50 am to 12:50 pm

SESSION 11

Room: Conv. Ctr. Room A2 Tues. 12:50 to 3:00 pm

Brain, Neuro, and Functional Imaging I

Session Chair: David A. Boas, Massachusetts General Hospital

12:50 pm: **Optical characterization of near-infrared signals associated with electrical stimulation of peripheral nerves** (*Invited Paper*), Sergio Fantini, Debbie K. Chen, Tufts Univ. (United States); Jeffrey M. Martin, Boston Univ. (United States); Angelo Sassaroli, Tufts Univ. (United States); Peter R. Bergethon, Boston Univ. (United States) [7174-01]

1:20 pm: **Traveling waves of neuronal activity allow mapping of functional borders within the visual cortex using diffuse optical tomography**, Brian R. White, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7174-02]

1:40 pm: **Fast changes in near-infrared transmission and reflection spectra associated with neural activity in rat brain slices**, Jonghwan Lee, Jung-Hun Kim, Sung June Kim, Seoul National Univ. (Korea, Republic of) [7174-03]

2:00 pm: **Novel regression of superficial hemodynamics improves diffuse optical imaging of the brain in both adults and infants**, Nicholas M. Gregg, Washington Univ. in St. Louis School of Medicine (United States); Brian R. White, Steve M. Liao, Terrie E. Inder, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7174-04]

2:20 pm: **Atlas-guided diffuse optical tomography of human brain function**, David A. Boas, Massachusetts General Hospital (United States); Anna Custo, Massachusetts General Hospital, Harvard Medical School (United States); Sandy Wells, Brigham & Women's Hospital (United States) and Harvard Medical School (United States); Rickson Mesquita, Massachusetts General Hospital, Harvard Medical School (United States) [7174-96]

2:40 pm: **Application of near-infrared spectroscopy for discrimination of mental workloads**, Angelo Sassaroli, Feng Zheng, Leanne Hirshfield, Audrey Girouard, Erin Treacy, Robert Jacob, Sergio Fantini, Tufts Univ. (United States) [7174-06]

Coffee Break 3:00 to 3:30 pm

SESSION 12

Room: Conv. Ctr. Room A2 Tues. 3:30 to 4:50 pm

Brain, Neuro, and Functional Imaging II

Session Chair: David A. Boas, Massachusetts General Hospital

3:30 pm: **An adaptive general linear model for removal of physiological fluctuations in optical brain studies**, Farras Abdelnour, Theodore J. Huppert, Univ. of Pittsburgh Medical Ctr. (United States) [7174-07]

3:50 pm: **Depth sensitivity and image reconstruction analysis of high-density imaging arrays for mapping brain function with diffuse optical tomography**, Hamid Dehghani, Univ. of Exeter (United Kingdom); Brian R. White, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (United States) [7174-08]

4:10 pm: **Diffuse optical measurements of cerebral blood flow and oxygenation in patients after traumatic brain injury or subarachnoid hemorrhage**, Meeri N. Kim, Turgut Durduran, Univ. of Pennsylvania (United States); Suzanne Frangos, Hospital of the Univ. of Pennsylvania (United States); Erin M. Buckley, Chao Zhou, Guoqiang Yu, Univ. of Pennsylvania (United States); Heather Moss, Hospital of the Univ. of Pennsylvania (United States); Brian L. Edlow, Eileen Maloney-Wilensky, John A. Detre, Joel H. Greenberg, Univ. of Pennsylvania (United States); W. Andrew Kofke, Hospital of the Univ. of Pennsylvania (United States); Arjun G. Yodh, Univ. of Pennsylvania (United States); M. Sean Grady, Hospital of the Univ. of Pennsylvania (United States); John H. Woo, Ronald L. Wolf, Joshua Levine, Univ. of Pennsylvania (United States) [7174-09]

4:30 pm: **Functional brain tomography using a time-gated ICCD camera**, Antonio Pifferi, Qing Zhao, Lorenzo Spinelli, Andrea Bassi, Gianluca Valentini, Davide Contini, Rinaldo Cubeddu, Alessandro Torricelli, Politecnico di Milano (Italy) [7174-10]

Tuesday 27 January

WORKSHOP

Fairmont: Garden Room Tues. 6:30 to 9:30 pm

A Novel Standardized Open-Source eXtensible Imaging Platform (XIP) for the Rapid Development of Advanced Applications

Workshop Organizers:

Gianluca Paladini, Siemens Corporate Research and
Fred S. Azar, Siemens Corporate Research

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See p. 21 for more information

Conference 7175 · Room: Conv. Ctr. Room A3

Monday-Wednesday 26-28 January 2009 • Proceedings of SPIE Vol. 7175

Optical Interactions with Tissue and Cells XX

Conference Chairs: Steven L. Jacques, Oregon Health & Science Univ.; E. Duco Jansen, Vanderbilt Univ.; William P. Roach, Air Force Research Lab.

Program Committee: Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio; Jessica C. Ramella-Roman, The Catholic Univ. of America; Robert J. Thomas, Air Force Research Lab.; Alfred Vogel, Univ. zu Lübeck (Germany); Lihong V. Wang, Washington Univ. in St. Louis

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room A3 Mon. 8:00 to 10:10 am

Spectroscopy, Optics, and Scattering I

Session Chair: Jessica C. Ramella-Roman, The Catholic Univ. of America

8:00 am: **Optical spectroscopy of adipose tissue to assess inflammation and risk of diabetes** (*Invited Paper*), Steven L. Jacques, Oregon Health & Science Univ. (United States)[7175-01]

8:30 am: **Estimation and measurement of biological tissues using optical simulation method**, Ganesan Jagajothi, Periyar Maniammai Univ. (India); Singaravelu Raghavan, National Institute of Technology (India)[7175-02]

8:50 am: **Monitoring changes of proteins and lipids by Raman spectroscopy in laser tissue welding**, Cheng-Hui Liu, Wubao B. Wang, Alexandra N. Alimova, Vidyasagar Sriramoju, Vladimir Kartazayev, Robert R. Alfano, City College/CUNY (United States)[7175-03]

9:10 am: **Development of a novel Raman spectral correction scheme for improved concentration prediction in turbid media**, Ishan Barman, Gajendra P. Singh, Ramachandra R. Dasari, Michael S. Feld, Massachusetts Institute of Technology (United States)[7175-04]

9:30 am: **Noninvasive in-vivo optical properties of skin tumors**, Alejandro Garcia-Urbe, Elizabeth B. Smith, Jun Zou, Texas A&M Univ. (United States); Madeleine Duvic, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States)[7175-05]

9:50 am: **The optical properties of biological tissues in the terahertz wavelength range**, Gerald J. Wilmink, Luisiana Cundin, Bennett L. Ibey, William P. Roach, Air Force Research Lab. (United States)[7175-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room A3 Mon. 10:40 am to 12:10 pm

Spectroscopy, Optics, and Scattering II

Session Chair: Lihong V. Wang, Washington Univ. in St. Louis

10:40 am: **In vivo volumetric blood flow imaging using optical microangiography at capillary level resolution** (*Invited Paper*), Ruikang Wang, Oregon Health & Science Univ. (United States)[7175-07]

11:10 am: **Angular distribution of quasi-ballistic light measured through turbid media using angular domain optical imaging**, Fartash Vasefi, Bozena Kaminska, Glenn H. Chapman, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada)[7175-08]

11:30 am: **Spatiofrequency filter in turbid medium enhanced by background scattered light subtraction from a deviated laser source**, Polly B. L. Tsui, Glenn H. Chapman, Rongen L. K. Cheng, Fartash Vasefi, Bozena Kaminska, Nick Pfeiffer, Simon Fraser Univ. (Canada)[7175-09]

11:50 am: **Jones phase microscopy of cells and tissues**, Gabriel Popescu, Zhuo Wang, Univ. of Illinois at Urbana-Champaign[7175-10]

Lunch Break 12:10 to 1:10 pm

SESSION 3

Room: Mon. 1:10 to 2:40 pm

Spectroscopy, Optics, and Scattering III

Session Chair: Lihong V. Wang, Washington Univ. in St. Louis

1:10 pm: **Mechanical tissue optical clearing devices: modified optical properties measured using OCT** (*Invited Paper*), C. G. Rylander, C. Drew, Virginia Polytechnic Institute and State Univ. (United States)[7175-11]

1:40 pm: **Changes in morphology and optical properties of sclera due to hyper-osmotic agent**, Raiyan T. Zaman, Henry G. Rylander III, Narasimhan Rajaram, Tianyi Wang, Nitin Asokan, James W. Tunnell, Ashley J. Welch, The Univ. of Texas at Austin (United States)[7175-11]

2:00 pm: **Video goniometry using screen projection for studies of angular scattering of photons by tissues**, Laurel R. Jones, Steven L. Jacques, Oregon Health & Science Univ. (United States)[7175-12]

2:20 pm: **Models for depth-resolved spectroscopy of the oral cavity**, Crystal E. Redden Weber, Richard A. Schwarz, Wen Gao, Rice Univ. (United States); Ann M. Gillenwater, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Rebecca R. Richards-Kortum, Rice Univ. (United States)[7175-13]

SESSION 4

Room: Conv. Ctr. Room A3 Mon. 2:40 to 3:30 pm

Photo-Thermal Interaction I

Session Chair: William P. Roach, Air Force Research Lab.

2:40 pm: **Determination of threshold temperature for cell death in an in vitro retinal model using thermography** (*Invited Paper*), Michael L. Denton, Michael S. Foltz, Gary D. Noojin, Northrop Grumman Mission Systems (United States); Robert J. Thomas, Benjamin A. Rockwell, Air Force Research Lab. (United States)[7175-34]

3:10 pm: **In vivo investigation of near infrared retinal lesions utilizing two adaptive optics enhanced imaging modalities**, Jeffrey W. Oliver, Air Force Research Lab. (United States); Gary D. Noojin, Kurt J. Schuster, Northrop Grumman Mission Systems (United States); Benjamin A. Rockwell, Air Force Research Lab. (United States)[7175-15]

Coffee Break 3:30 to 4:00 pm

SESSION 5

Room: Conv. Ctr. Room A3 Mon. 4:00 to 5:40 pm

Photo-Thermal Interaction II

Session Chair: William P. Roach, Air Force Research Lab.

4:00 pm: **Thermal lensing from 1110-1150 and 1300-nm near-infrared laser radiation in an artificial eye**, Rebecca L. Vincelette, The Univ. of Texas at Austin (United States); Jeffrey W. Oliver, Benjamin A. Rockwell, Robert J. Thomas, Air Force Research Lab. (United States); Ashley J. Welch, The Univ. of Texas at Austin (United States)[7175-16]

4:20 pm: **Limiting mechanism for NIR laser retinal damage**, Benjamin A. Rockwell, Rebecca L. Vincelette, Jeffrey W. Oliver, Semih S. Kumru, Air Force Research Lab. (United States); Gary D. Noojin, Kurt J. Schuster, David J. Stolarski, Aurora Shingledecker, Clifton D. Clark, Northrop Grumman Mission Systems (United States); David Wooddell, Robert J. Thomas, Air Force Research Lab. (United States)[7175-17]

4:40 pm: **Scar prevention by laser-assisted scar healing (LASH) using thermal post-conditioning**, Alban Gosse, Gwen Iarmarcovai, Ekkyo (France); Alexandre Capon, Ctr. Hospitalier Regional Univ. de Lille (France); Alain Cornil, Ekkyo (France); Serge Mordon, Ctr. Hospitalier Regional Univ. de Lille (France)[7175-18]

5:00 pm: **Melanoma thickness measurement in two-layer tissue phantoms using pulsed photothermal radiometry (PPTR)**, Tianyi Wang, Jinze Qiu, Amit S. Paranjape, Thomas E. Milner, The Univ. of Texas at Austin (United States). [7175-19]

5:20 pm: **Control of thermal injury depth using a wavelength-agile Tm-doped fiber laser**, Andrew Z. Soroka, Lisa A. Bartlett, Benjamin J. Vakoc, Brett E. Bouma, Massachusetts General Hospital (United States) [7175-20]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Propagation of polarized light in anisotropic medium, Wei Li, Nan Zeng, Yonghong He, Hui Ma, Tsinghua Univ. (China). [7175-48]

Optical density variance based estimation of oral cancer ex vivo using a spatially mapping fiber optic probe: a feasibility study, Youngjin Oh, Yonsei Univ. (Korea, Republic of); Nam K. Jeon, Korea Electrotechnology Research Institute (Korea, Republic of); Kyujung Kim, Jin Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7175-49]

Finite element analysis for photon transport in multi-layered turbid media, Jianling Chen, Hongqin Yang, Hui Li, Shusen Xie, Fujian Normal Univ. (China) [7175-50]

Tuesday 27 January

SESSION 6

Room: Conv. Ctr. Room A3 Tues. 8:20 to 10:00 am

Photo-Thermal Interaction III

Session Chair: E. Duco Jansen, Vanderbilt Univ.

8:20 am: **Comparison of thermal tissue effects produced by medium-power 1.46, 1.94, and 10.6 micron infrared lasers**, Vladimir G. Lemberg, Dmitry Rozhetskin, Christopher Jadcak, Lumenis Ltd. (United States) [7175-21]

8:40 am: **Comparison of commercial temperature measurement instruments**, David N. Schaaf, Jr., Thomas E. Johnson, Colorado State Univ. (United States). [7175-22]

9:00 am: **Determination of sensation threshold from 2.01µm laser light**, Dan C. Dugan, Thomas E. Johnson, Colorado State Univ. (United States). [7175-23]

9:20 am: **Determination of optical property changes by laser treatments using inverse adding-doubling method**, Norihiro Honda, Katsunori Ishii, Akinori Kimura, Makoto Sakai, Kunio Awazu, Osaka Univ. (Japan) [7175-24]

9:40 am: **Development of novel short-term heating angioplasty: dynamics of thermal denaturation of artery wall collagen**, Natsumi Shimazaki, Hisako Tokunaga, Yuki Katoh, Tomoyuki Hayashi, Tsunenori Arai, Keio Univ. (Japan). [7175-25]

Coffee Break 10:00 to 10:30 am

SESSION 7

Room: Conv. Ctr. Room A3 Tues. 10:30 am to 12:00 pm

Cellbiology and Photochemistry I

Session Chair: Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio

10:30 am: **Effective photothermal and photochemical laser therapy design (Invited Paper)**, Marissa N. Rylander, Jessica W. Fisher, Saugata Sarkar, Jon Whitney, Virginia Polytechnic Institute and State Univ. (United States). [7175-26]

11:00 am: **Novel approaches for selective laser-induced transport of histological sections and cells**, Sebastian Eckert, Maïke Blessenohl, Dorthe von Smolinski, Antje Klinger, Univ. zu Lübeck (Germany); Kristina Lachmann, Claus-Peter Klages, Fraunhofer-Institut für Schicht- und Oberflächentechnik (Germany) and Technical Univ. Braunschweig (Germany); Andreas Gebert, Alfred Vogel, Univ. zu Lübeck (Germany) [7175-27]

11:20 am: **A signature miRNA expression profile for the cellular response to thermal stress**, Gerald J. Wilmink, Air Force Research Lab. (United States); Maria Suarez, Highlands High School (United States); Caleb Roth, General Dynamics (United States); William P. Roach, Air Force Research Lab. (United States). [7175-28]

11:40 am: **In vitro study for laser gene transfer in ‘BHK-21’ cell line**, Y. Badr, National Institute of Laser Enhanced Sciences (Egypt); M. S. Salama, Ain-Shams Univ. (Egypt); M. Abdel Aziz, D. S. Salem, National Institute of Laser Enhanced Science (Egypt) [7175-29]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 8

Room: Conv. Ctr. Room A3 Tues. 1:30 to 2:50 pm

Cellbiology and Photochemistry II

Session Chair: Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio

1:30 pm: **Laser-induced tissue oxygenation: new optical technology of local tissue hypoxia elimination and its biomedical application**, Mustafó M. Asimov, B.I. Stepanov Institute of Physics (Belarus). [7175-30]

1:50 pm: **Spectroscopic measurements with frequency domain optical coherence tomography in single- and multilayered weakly scattering phantoms**, Christoph Meier, Cardiff Univ. (United Kingdom) and Berne Univ. of Applied Sciences (Switzerland); Boris M. Hermann, Bernd Hofer, Boris Povazay, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7175-31]

2:10 pm: **Online monitoring of bubble formation for dosimetry of optoporation and nanosurgery**, Alfred Vogel, Sebastian Eckert, Joe Liang, Tobias Jachowski, Sebastian Freidank, Norbert Linz, Univ. zu Lübeck (Germany) [7175-32]

2:30 pm: **In vivo assessment of collateral tissue damage associated with infrared laser thermal stress of skin**, Mark A. Mackanos, Mike W. Helms, Dmitrii M. Simanovskii, Christopher H. Contag, Stanford Univ. (United States). [7175-33]

Coffee Break 2:50 to 3:30 pm

SESSION 9

Room: Conv. Ctr. Room A3 Tues. 3:30 to 5:00 pm

Photo-Thermal Ablation

Session Chair: Alfred Vogel, Univ. zu Lübeck (Germany)

3:30 pm: **Wavelength dependence of nanosecond and femtosecond optical breakdown in water (Invited Paper)**, Norbert Linz, Sebastian Freidank, Univ. zu Lübeck (Germany); Hannes Vogelmann, Thomas Trickl, Forschungszentrum Karlsruhe (Germany); Cord L. Arnold, Laser Zentrum Hannover e.V. (Germany); Alfred Vogel, Univ. zu Lübeck (Germany) [7175-36]

4:00 pm: **Ultrasound characterization of cavitation microbubbles produced by femtosecond laser pulses**, Andrei B. Karpouk, Salavat R. Aglyamov, Frederic G. Bourgeois, Adela Ben-Yakar, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States). [7175-38]

4:20 pm: **Dynamic analysis of laser ablation of biological tissue using a real-time OCT**, Makoto Ohnishi, Daisuke Takada, Masato Ohmi, Masamitsu Haruna, Osaka Univ. (Japan). [7175-39]

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4:40 pm: **Time-resolved studies of plasma-mediated ablation of a cell culture with nanosecond laser pulses**, Francisco G. Perez-Gutierrez, Univ. of California, Riverside (United States); Rodger Evans, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Gabriel V. Guillen, Univ. Nacional Autónoma de México (Mexico); Santiago Camacho-Lopez, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Guillermo Aguilar, Univ. of California, Riverside (United States).[7175-40]

Wednesday 28 January

SESSION 10

Room: Conv. Ctr. Room A3 Wed. 8:00 to 10:30 am

Modeling and Computation

Session Chair: Robert J. Thomas, Air Force Research Lab.

8:00 am: **Model-based real-time control for laser induced thermal therapy (LITT) with application to prostate cancer treatment** (*Invited Paper*), Yusheng Feng, J. Tinsley Oden, The Univ. of Texas at Austin (United States); David Fuentes, M. D. Anderson Cancer Ctr. (United States)[7175-41]

8:30 am: **Empirical comparison of Pennes' bio-heat equation**, Luisiana Cundin, William P. Roach, Nancy J. Millenbaugh, Air Force Research Lab. (United States).[7175-42]

8:50 am: **Dielectric properties of human skin**, William P. Roach, Luisiana Cundin, Gerald J. Wilmink, Air Force Research Lab. (United States) . . .[7175-43]

9:10 am: **Combined Monte Carlo and path-integral method for simulated library of time-resolved reflectance curves from layered tissue models**, Robert H. Wilson, Karthik Vishwanath, Mary-Ann Mycek, Univ. of Michigan (United States).[7175-44]

9:30 am: **General-purpose computing on graphics processing units for high speed Monte Carlo simulation of photon migration**, Erik Alerstam, Tomas Svensson, Stefan Andersson-Engels, Lund Univ. (Sweden).[7175-45]

9:50 am: **Generalized Fokker-Planck models of light propagation in layered media**, Kevin G. Phillips, Steven L. Jacques, Oregon Health & Science Univ. (United States).[7175-46]

10:10 am: **Incoherent and coherent backscattering of light beyond diffusion for subsurface reflectance spectroscopy**, Min Xu, Fairfield Univ. (United States).[7175-47]

Dynamics and Fluctuations in Biomedical Photonics VI

Conference Chairs: **Valery V. Tuchin**, Saratov State Univ. (Russia); **Lihong V. Wang**, Washington Univ. in St. Louis; **Donald D. Duncan**, Oregon Health & Science Univ.

Program Committee: **Vadim S. Anischenko**, Saratov State Univ. (Russia); **Wei R. Chen**, Univ. of Central Oklahoma; **Joseph P. Culver**, Washington Univ. in St. Louis; **Jingying Jiang**, Tianjin Univ. (China); **Sean J. Kirkpatrick**, Oregon Health & Science Univ.; **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Kirill V. Larin**, Univ. of Houston; **Hong Liu**, Univ. of Oklahoma; **Qingming Luo**, Huazhong Univ. of Science and Technology (China); **Igor V. Meglinski**, Cranfield Univ. (United Kingdom); **Vladislav Y. Toronov**, Ryerson Univ. (Canada); **Ruikang Wang**, Oregon Health & Science Univ.; **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences; **Dmitry A. Zimnyakov**, Saratov State Univ. (Russia)

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room B4 Sat. 8:00 to 9:50 am

Dynamic Light Scattering and Speckle Technologies

Session Chair: **Sean J. Kirkpatrick**, Oregon Health & Science Univ.

8:00 am: **Recent advances in imaging the microcirculation** (*Invited Paper*), Martin J. Leahy, Joey G. Enfield, Neil T. Clancy, Paul McNamara, Jim O'Doherty, Univ. of Limerick (Ireland) [7176-01]

8:30 am: **Laser speckle imaging for the quantitative assessment of flow**, Donald D. Duncan, Sean J. Kirkpatrick, James C. Gladish, Oregon Health & Science Univ. (United States) [7176-02]

8:50 am: **Spatial and temporal effects in speckle perfusion measurement**, Oliver B. Thompson, Michael K. Andrews, Industrial Research Ltd. (New Zealand) [7176-03]

9:10 am: **Characterization of dental composite curing kinetics using dynamic light scattering**, Elaine M. Wells-Gray, Ron L. Sakaguchi, Sean J. Kirkpatrick, Oregon Health & Science Univ. (United States) [7176-04]

9:30 am: **Ocular microtremor laser speckle metrology**, Mohammed Ali Al-Kalbani, St. James's Hospital (Ireland); Emilia M. Mihaylova, Dublin Institute of Technology (Ireland); Niamh Collins, Royal Victoria Eye and Ear Hospital (Ireland); Vincent Toal, Dublin Institute of Technology (Ireland); Davis Coakley, Gerard Boyle, St. James's Hospital (Ireland) [7176-05]

Coffee Break 9:50 to 10:20 am

SESSION 2

Room: Conv. Ctr. Room B4 Sat. 10:20 to 11:30 am

Cell and Tissue Spectroscopy and Imaging

Session Chair: **Wei R. Chen**, Univ. of Central Oklahoma

10:20 am: **Fluorescence and polarization imaging of membrane dynamics in living cells** (*Invited Paper*), Herbert Schneckenburger, Michael Wagner, Petra Weber, Thomas Bruns, Hochschule Aalen (Germany); Wolfgang S. L. Strauss, Institut für Lasertechnologien an der Univ. Ulm (Germany) [7176-06]

10:50 am: **Comparing spectral features of normal and cancerous human breast tissues with laser and lamp as excitation sources**, Anita H. Gharekhan, C. U. Shah Science College (India); Dharitri Rath, Indian Institute of Technology Kanpur (India); Ashok Oza, C. U. Shah Science College (India); Asima Pradhan, Indian Institute of Technology Kanpur (India); M. B. Sureshkumar, M.S. Univ. of Baroda (India); Prasanta K. Panigrahi, Physical Research Lab. (India) [7176-07]

11:10 am: **Automated segmentation and analysis of fluorescent in situ hybridization (FISH) signals in interphase nuclei of pap-smear specimens**, Xingwei Wang, Univ. of Oklahoma (United States); Bin Zheng, Univ. of Pittsburgh (United States); Shibo Li, Roy Zhang, John J. Mulvihill, Univ. of Oklahoma Health Sciences Ctr. (United States); Wei R. Chen, Univ. of Central Oklahoma (United States); Hong Liu, Univ. of Oklahoma (United States) [7176-08]

Lunch/Exhibition Break 11:30 am to 1:20 pm

SESSION 3

Room: Conv. Ctr. Room B4 Sat. 1:20 to 2:20 pm

Nanophotonics in Medical Applications

Session Chair: **Kirill V. Larin**, Univ. of Houston

1:20 pm: **Medical application-oriented nanostructure design: physical basics and limitations** (*Invited Paper*), Leonid D. Shvartsman, Boris Laikhtman, The Hebrew Univ. of Jerusalem (Israel) [7176-10]

1:50 pm: **In vivo integration of multiwavelength photoacoustic lymphography, sentinel lymph nodes mapping, and metastasis assessment using multiplex nanoparticle targeting** (*Invited Paper*), Ekaterina I. Galanzha, Univ. of Arkansas for Medical Sciences (United States); Valery V. Tuchin, Saratov State Univ. (Russian Federation); Evgeny V. Shashkov, Univ. of Arkansas for Medical Sciences (United States); Jin-Woo Kim, Univ. of Arkansas (United States); Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (United States) [7176-11]

SESSION 4

Room: Conv. Ctr. Room B4 Sat. 2:20 to 3:30 pm

Optical Clearing and Monitoring of Drug Delivery

Session Chair: **Ruikang Wang**, Oregon Health & Science Univ.

2:20 pm: **SHG imaging and modeling of the optical clearing mechanism in striated muscle and tendon** (*Invited Paper*), Paul J. Campagnola, Oleg Nadiarykh, Ronald LaComb, Univ. of Connecticut Health Ctr. (United States) [7176-12]

2:50 pm: **The nonlinear relationship between concentration of analyte and its permeability coefficient in ocular tissues**, Mohamad G. Ghosn, Univ. of Houston (United States); Valery V. Tuchin, Saratov State Univ. (Russian Federation); Kirill V. Larin, Univ. of Houston (United States) [7176-13]

3:10 pm: **Study on microvisualizing assay of delivered drug infiltration using 2-color optical coherence dosigraphy**, Yu Nakamichi, Souichi Saeki, Takashi Saito, Takafumi Hiro, Masunori Matsuzaki M.D., Yamaguchi Univ. (Japan) [7176-14]

Coffee Break 3:30 to 4:00 pm

SESSION 5

Room: Conv. Ctr. Room B4 Sat. 4:00 to 5:30 pm

Dynamics and Fluctuations in Biological Systems

Session Chair: **Vladislav Y. Toronov**, Ryerson Univ. (Canada)

4:00 pm: **Dynamics and fluctuations in molecule orientations and electrical signal propagations in neurons with second harmonic generation microscopy** (*Invited Paper*), Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [7176-15]

4:30 pm: **Spontaneous neuronal fluctuations measured with diffuse optical tomography reveal functional connectivity networks**, Brian R. White, Abraham Z. Snyder, Alexander L. Cohen, Steven E. Petersen, Marcus E. Raichle, Bradley L. Schlaggar, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7176-16]

4:50 pm: **The generation of the synchronized burst in the cultured neuron networks**, Xiangning Li, Jing Sun, Jiangbo Pu, Shaoqun Zeng, Qingming Luo, Britton Chance Ctr. for Biomedical Photonics (China) [7176-17]

Conference 7176

5:10 pm: **Error analysis in the measurement of x-ray photon fluence**, Da Zhang, Univ. of Oklahoma (United States); Xizeng Wu, The Univ. of Alabama at Birmingham (United States); Molly Wong, Univ. of Oklahoma (United States); John X. Rong, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Wei R. Chen, Hong Liu, Univ. of Central Oklahoma (United States)[7176-18]

BiOS Hot Topics Sat. 7:00 to 9:30 pm
See p. 20 for details.

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Improved double-integrating-spheres system for multiwavelength optical properties measurement: investigation and application, Chenxi Li, Huijuan Zhao, Jierong Ma, Julan Liang, Kexin Xu, Tianjin Univ. (China)[7176-19]

Potential of Chinese traditional medicine (CTM) as enhancers for tissue optical clearing, Wei Chen, Jingying Jiang, Tianjin Univ. (China); Ruikang Wang, Oregon Health & Science Univ. (United States); Kexin Xu, Tianjin Univ. (China)[7176-20]

Skin Monte Carlo model and experimental validation for quantitatively describing optical properties, Wei Chen, Jingying Jiang, Wenjun Zhang, Tianjin Univ. (China); Ruikang Wang, Oregon Health & Science Univ. (United States); Kexin Xu, Tianjin Univ. (China)[7176-21]

Separation of extracellular spikes with wavelets and neural networks, Alexey N. Pavlov, Anatoly N. Tupitsyn, Saratov State Univ. (Russian Federation); Valeri A. Makarov, Univ. Complutense de Madrid (Spain)[7176-22]

Wavelet-based analysis of blood pressure dynamics in rats, Alexey N. Pavlov, Alexey A. Anisimov, Oxana V. Semyachkina-Glushkovskaya, Veronika A. Berdnikova, Ekaterina G. Matasova, Saratov State Univ. (Russian Federation)[7176-23]

Monitoring of interaction of hemoglobin and glucose molecules by spectral method, Ekaterina N. Lazareva, Valery V. Tuchin, Saratov State Univ. (Russian Federation)[7176-24]

Influence factors for the optical parameters measurement with time-resolved diffusion reflectance, Biying Yu, Hui Li, Hongqin Yang, Fujian Normal Univ. (China)[7176-25]

Accessing the structure and function information of deep skin blood vessels with noninvasive optical method, Jing Wang, Zhenzhen Han, Zongzhen Mao, Xiang Wen, Shaoqun Zeng, Qingming Luo, Dan Zhu, Britton Chance Ctr. for Biomedical Photonics (China)[7176-26]

Discussion on backscattered polarization patterns: single scattering versus multiple scattering, Lanqing Xu, Zhengying Xiao, Hui Li, Wenming Xie, Fujian Normal Univ. (China)[7176-27]

Photons Plus Ultrasound: Imaging and Sensing 2009

Conference Chairs: **Alexander A. Oraevsky**, Fairway Medical Technologies, Inc.; **Lihong V. Wang**, Washington Univ. in St. Louis

Program Committee: **Mark A. Anastasio**, Illinois Institute of Technology; **Paul C. Beard**, Univ. College London (United Kingdom); **Claude Boccara**, Ctr. National de la Recherche Scientifique (France); **Gerald J. Diebold**, Brown Univ.; **Charles A. DiMarzio**, Northeastern Univ.; **Stanislav Y. Emelianov**, The Univ. of Texas at Austin; **Rinat O. Esenaliev**, The Univ. of Texas Medical Branch at Galveston; **Martin Frenz**, Univ. Bern (Switzerland); **Steven L. Jacques**, Oregon Health & Science Univ.; **Robert A. Kruger**, OptoSonics, Inc.; **Pai-Chi Li**, National Taiwan Univ. (Taiwan); **Andreas Mandelis**, Univ. of Toronto (Canada); **Matthew O'Donnell**, Univ. of Washington; **Günther Paltauf**, Karl-Franzens-Univ. Graz (Austria); **Wiendelt Steenbergen**, Univ. Twente (Netherlands); **William M. Whelan**, Univ. of Prince Edward Island (Canada); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences; **Quing Zhu**, Univ. of Connecticut

BIOS

SPIE and the organizers gratefully acknowledge the following award sponsor:



Sunday 25 January

OPENING REMARKS

Room: Conv. Ctr. Room A1 Sun. 8:00 to 8:30 am
Alexander A. Oraevsky, Fairway Medical Technologies, Inc.

SESSION 1

Room: Conv. Ctr. Room A1 Sun. 8:30 to 10:10 am

Clinical Applications

Session Chair: **Alexander A. Oraevsky**, Fairway Medical Technologies, Inc.

- 8:30 am: **Quantitative analysis with the optoacoustic/ultrasound system OPUS**, Christoph Haisch, Karin Zell, Technische Univ. München (Germany); Jonathan I. Sperl, Mika W. Vogel, GE Global Research (Germany); Peter Menzenbach, Innolas GmbH (Germany); Reinhard Niessner, Technische Univ. München (Germany) [7177-01]
- 8:50 am: **Optoacoustic imaging of breast cancer using hand-held array probes**, Sergey A. Ermilov, André Conjusteau, Peter Brecht, Ketan Mehta, Richard Su, Tom Miller, Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (United States) [7177-02]
- 9:10 am: **Real-time photoacoustic and ultrasound imaging of human vasculature**, Roy G. M. Kolkman, Univ. Twente (Netherlands); Peter J. Brands, Esaote Europe B.V. (Netherlands); Wiendelt Steenbergen, Ton G. C. van Leeuwen, Univ. Twente (Netherlands) [7177-03]
- 9:30 am: **Clinical tests of highly portable, 2-lb, laser diode-based, noninvasive, optoacoustic hemoglobin monitor**, Irina Y. Petrova, Yuriy Y. Petrov, Donald S. Prough, Rinat O. Esenaliev, The Univ. of Texas Medical Branch at Galveston (United States) [7177-04]
- 9:50 am: **Clinical tests of noninvasive, optoacoustic, cerebral venous oxygenation monitoring system**, Yuriy Y. Petrov, Irina Y. Petrova, Donald S. Prough, Rinat O. Esenaliev, The Univ. of Texas Medical Branch at Galveston (United States) [7177-05]
- Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room A1 Sun. 10:40 am to 12:00 pm

Towards Clinical Applications

Session Chair: **Steven L. Jacques**, Oregon Health & Science Univ.

- 10:40 am: **Photoacoustic guidance of diffusive optical tomography with a hybrid reflection geometry probe**, John K. Gamelin, Yasaman Ardehshirpour, Andres S. Aguirre, Devis Dishnica, Anastasios Maurudis, Quing Zhu, Univ. of Connecticut (United States) [7177-06]
- 11:00 am: **Photoacoustic characterization of ovarian tissue**, Andres S. Aguirre, John K. Gamelin, Univ. of Connecticut (United States); Puyun Guo, Electrocore LLC (United States); Shikui Yan, Siemens Molecular Imaging (United States); Molly A. Brewer, Univ. of Connecticut Health Ctr. (United States); Quing Zhu, Univ. of Connecticut (United States) [7177-07]

- 11:20 am: **Reflection mode photoacoustic imaging through infant skull toward noninvasive imaging of neonatal brains**, Xueding Wang, David Chamberland, Guohua Xi, J. Brian Fowlkes, Univ. of Michigan (United States) [7177-08]
- 11:40 am: **Photoacoustic characterisation of vascular tissue at NIR wavelengths**, Thomas J. Allen, Paul C. Beard, Univ. College London (United Kingdom) [7177-09]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room A1 Sun. 1:30 to 3:10 pm

Preclinical Imaging in Small Animals

Session Chair: **Robert A. Kruger**, OptoSonics, Inc.

- 1:30 pm: **A fast 512-elemental ring array photoacoustic tomographic imaging system for small animals**, Anastasios Maurudis, John K. Gamelin, Andres S. Aguirre, Kevin Arpin, Puyun Guo, Fei Huang, Univ. of Connecticut (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States); Quing Zhu, Univ. of Connecticut (United States) [7177-10]
- 1:50 pm: **Mouse brain blood-oxygenation dynamics visualize by photoacoustic microscopy**, Konstantin I. Maslov, Erich W. Stein, Lihong V. Wang, Washington Univ. in St. Louis (United States) [7177-11]
- 2:10 pm: **Whole-body imaging of fluorescent proteins using multi-spectral optoacoustic tomography (MSOT)**, Daniel Razansky, Martin Distel, Helmholtz Zentrum München, GmbH (Germany); Claudio Vinegoni, Norbert Perrimon, Harvard Medical School (United States); Reinhard Koster, Vasilis Ntziachristos, Helmholtz Zentrum München, GmbH (Germany) [7177-12]
- 2:30 pm: **Multi-wavelength optoacoustic 3D whole-body tomography: experiments in nude mice**, Hans-Peter F. Brecht, Richard Su, André Conjusteau, Sergey A. Ermilov, Fairway Medical Technologies, Inc. (United States); Anton Liopo, Massoud Motamedi, The Univ. of Texas Medical Branch at Galveston (United States); Matthew Fronheiser, Seno Medical Instruments, Inc. (United States); Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (United States) [7177-13]
- 2:50 pm: **HYPR-spectral photoacoustic CT for preclinical imaging**, Robert A. Kruger, Daniel R. Reinecke, OptoSonics, Inc. (United States); Michael Thornton, Endra, Inc. (United States); Keith M. Stantz, Purdue Univ. (United States) [7177-14]
- Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room A1 Sun. 3:40 to 5:40 pm

High-Resolution Imaging/Microscopy

Session Chair: **Lihong V. Wang**, Washington Univ. in St. Louis

- 3:40 pm: **Fast handheld 3D photoacoustic microscopy in vivo with a 30-MHz ultrasound array towards clinical applications**, Liang Song, Konstantin I. Maslov, Washington Univ. in St. Louis (United States); Rachel Bitton, K. Kirk Shung, Univ. of Southern California (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States) [7177-15]
- 4:00 pm: **Study of microvascular autoregulation in response to physiological state change using optical-resolution photoacoustic microscopy**, Song Hu, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (United States) [7177-16]
- 4:20 pm: **In-vivo imaging of microcirculation using integrated photoacoustic and optical-coherence microscopy**, Li Li, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (United States) [7177-17]

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4:40 pm: **Photoacoustic microscopy with optically defined transverse resolution**, Geng Ku, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-18]

5:00 pm: **Three-dimensional rat brain imaging with a curved array photoacoustic tomographic system**, Xinmai Yang, Changhui Li, Washington Univ. in St. Louis (United States); Anastasios Maurudis, John K. Gamelin, Andres S. Aguirre, Qing Zhu, Univ. of Connecticut (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-19]

5:20 pm: **Laser-scanning optical-resolution photoacoustic microscopy**, Hao F. Zhang, Univ. of Wisconsin, Milwaukee (United States); Shuliang Jiao, Univ. of Miami School of Medicine (United States); Zhixing Xie, Univ. of Wisconsin, Milwaukee (United States)[7177-20]

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room A1 Mon. 8:30 to 9:50 am

New Optoacoustic Systems

Session Chair: **Martin Frenz**, Univ. Bern (Switzerland)

8:30 am: **Deep tissue optoacoustic imaging of polarized structures**, Daniel Razansky, Helmholtz Zentrum München, GmbH (Germany); Claudio Vinegoni, Harvard Medical School (United States); Vasilis Ntziachristos, Helmholtz Zentrum München, GmbH (Germany)[7177-22]

8:50 am: **Endoscopic photoacoustic microscope**, Joon-Mo Yang, Konstantin I. Maslov, Washington Univ. in St. Louis (United States); Hao-Chung Yang, Qifa Zhou, Univ. of Southern California (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-23]

9:10 am: **Novel optoacoustic array for noninvasive monitoring of blood parameters**, Valeriy G. Andreev, Lomonosov Moscow State Univ. (Russian Federation); Yuriy Y. Petrov, Rinat O. Esenaliev, Donald S. Prough, Univ. of Texas Medical Branch at Galveston (United States)[7177-24]

9:30 am: **Laminar photoacoustic microscopy for optical scattering measurements**, Xuhui Chen, Kory Mathewson, Roger J. Zemp, Univ. of Alberta (Canada)[7177-26]

Coffee Break 9:50 to 10:40 am

SESSION 6

Room: Conv. Ctr. Room A1 Mon. 10:40 am to 12:00 pm

New Transducers and Arrays

Session Chair: **Wiendelt Steenbergen**, Univ. Twente (Netherlands)

10:40 am: **High-NA-based virtual point detectors for photoacoustic imaging**, Changhui Li, Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-27]

11:00 am: **Photoacoustic imaging with limited diffraction beam transducers**, Günther Paltauf, Robert Nuster, Sibylle Gratt, Klaus Passler, Karl-Franzens-Univ. Graz (Austria); Peter Burgholzer, Upper Austrian Research GmbH (Austria)[7177-28]

11:20 am: **Comparison of optical and piezoelectric integrating line detectors**, Robert Nuster, Sibylle Gratt, Klaus Passler, Karl-Franzens-Univ. Graz (Austria); Hubert Grün, Peter Burgholzer, Upper Austrian Research GmbH (Austria); Günther Paltauf, Karl-Franzens-Univ. Graz (Austria)[7177-29]

11:40 am: **Characterization of optoacoustic transducers through the analysis of angular-dependent impulse response**, André Conjusteau, Sergey A. Ermilov, Hans-Peter F. Brecht, Richard Su, Tom Miller, Alexander A. Oraevsky, Fairway Medical Technologies, Inc. (United States)[7177-30]

Lunch Break 12:00 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Room A1 Mon. 1:30 to 3:10 pm

Improving and Testing System Parameters

Session Chair: **Rinat O. Esenaliev**,
The Univ. of Texas Medical Branch at Galveston

1:30 pm: **High sensitivity intravascular photoacoustic imaging of macrophages**, Bo Wang, Evgeniya Yantsen, The Univ. of Texas at Austin (United States); Konstantin V. Sokolov, The Univ. of Texas at Austin (United States) and The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States)[7177-31]

1:50 pm: **3D photoacoustic imaging of a moving target**, Pinhas Ephrat, Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada)[7177-32]

2:10 pm: **Optoacoustic imaging: application to the detection of foreign bodies**, Leland Page, Saher M. Maswadi, Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio (United States); Norman Barsalou, Naval Health Research Ctr. Detachment (United States); Ron L. Branstetter, Scott Thompson, Seno Medical Instruments, Inc. (United States)[7177-33]

2:30 pm: **Simultaneous recovery of chromophore concentrations and ultrasound velocity by spectrally resolved photoacoustic tomography**, Zhen Yuan, Qizhi Zhang, Stephen R. Grobmyer, Huabei Jiang, Univ. of Florida (United States)[7177-34]

2:50 pm: **Reduction of echo background in optoacoustic image sequences obtained under tissue deformation**, Michael Jaeger, Martin Frenz, Univ. Bern (Switzerland)[7177-35]

Coffee Break 3:10 to 3:40 pm

SESSION 8

Room: Conv. Ctr. Room A1 Mon. 3:40 to 4:40 pm

Combined Ultrasound and Optoacoustics

Session Chair: **Stanislav Y. Emelianov**, The Univ. of Texas at Austin

3:40 pm: **Real-time photoacoustic and ultrasound imaging to monitor photothermal therapy in mice**, Jignesh Shah, Andrei B. Karpiouk, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States)[7177-36]

4:00 pm: **A fast-scanning combined ultrasound-photoacoustic biomicroscope with realtime display**, Kory Mathewson, Xuhui Chen, Roger J. Zemp, Univ. of Alberta (Canada)[7177-38]

4:20 pm: **A dual-band transducer for ultrasonic/photoacoustic multimodality imaging**, Jian-Hung Liu, Chen-Wei Wei, Yu-Hsin Wang, Pai-Chi Li, National Taiwan Univ. (Taiwan)[7177-39]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Development of catheters for combined intravascular ultrasound and photoacoustic imaging, Andrei B. Karpiouk, Bo Wang, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States)[7177-77]

Photoacoustic molecular imaging using single walled carbon nanotubes in living mice, Adam de la Zerda, Cristina Zavaleta, Shay Keren, Srikanth Vaithilingam, Suni Bodapati, Robert Teed, Zhuang Liu, Jelena Levi, Bryan R. Smith, Te-Jen Ma, Ömer Oralkan, Zhen Cheng, Xiaoyuan Chen, Hongjie Dai, Butrus T. Khuri-Yakub, Sanjiv S. Gambhir, Stanford Univ. (United States)[7177-78]

Design and characterization of a photo-acoustic lens to generate focused high-frequency ultrasound, Hyoungwon Baac, Tao Ling, Sheng-Wen Huang, Shai Ashkenazi, L. Jay Guo, Univ. of Michigan (United States)[7177-79]

Spectroscopic intravascular photoacoustic imaging of neovasculature: phantom studies, Jimmy Su, Bo Wang, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States)[7177-80]

Studying the feasibility of sonic IR imaging crack detection in teeth with ultrasonic dental cleaner, Xiaoyan Han, Wayne State Univ. (United States)[7177-81]

Opto-photo-thermo-elastic detection using coherent confocal microscope, Igal Eliyahu, Charles A. DiMarzio, Northeastern Univ. (United States)[7177-82]

Enhancement of multiphoton excitation-induced photoacoustic signals by using gold nanoparticles surrounded by fluorescent dyes, Yoshihisa Yamaoka, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan)[7177-83]

Wideband photoacoustic tomography using polymer microring resonators, Sung-Liang Chen, Sheng-Wen Huang, Tao Ling, Shai Ashkenazi, L. Jay Guo, Univ. of Michigan (United States)[7177-84]

In vivo photoacoustic monitoring of photosensitizer in skin: application to dosimetry for antibacterial photodynamic treatment, Akihiro Hirao, Keio Univ. (Japan); Shunichi Sato, Daizoh Saitoh, Nariyoshi Shinomiya, Hiroshi Ashida, National Defense Medical College (Japan); Minoru Obara, Keio Univ. (Japan).....[7177-85]

Minimizing cell toxicity of gold nanorod-based photoacoustic contrast agents by polymer treatment, Rajagopal Rayavarapu, Wilma Petersen, Liesbeth Hartsuiker, Cornelis Otto, Univ. Twente (Netherlands); Wim de Jong, Rijksinstituut voor Volksgezondheid en Milieu (Netherlands); Srirang Manohar, Ton G. C. van Leeuwen, Univ. Twente (Netherlands)[7177-86]

A study on optical modulation signal and tissue displacement in ultrasound modulated optical tomography, Rui Li, Daniel S. Elson, Christopher W. Dunsby, Robert J. Eckersley, Mengxing Tang, Imperial College London (United Kingdom).....[7177-87]

Development of an omni-directional photoacoustic source for the characterization of a hemispherical sparse detector array, Michael B. Roumeliotis, Pinhas Ephrat, Jeffrey J. L. Carson, Lawson Health Research Institute (Canada)[7177-88]

Novel breast cancer detection system combining both thermoacoustic (TA) and photoacoustic (PA) tomography using carbon nanotube (CNT) as a dual contrast agent, Manojit Pramanik, Geng Ku, Changhui Li, Washington Univ. in St. Louis (United States); Magdalena Swierczewska, Danielle Green, Balaji Sitharaman, Stony Brook Univ. (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-89]

Compact semiconductor laser sources for photoacoustic imaging, Claus-Stefan Friedrich, Mona-Carina Wawreczko, Martin P. Mienkina, Nils C. Gerhardt, Georg Schmitz, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany)[7177-90]

Monitoring wound healing in mouse microvasculature using optical-resolution photoacoustic microscopy, Song Hu, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-91]

The speckle-free nature of photoacoustic imaging, Zijian Guo, Li Li, Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-92]

Enhanced sensitivity targeted photoacoustic molecular imaging agents in living mice, Adam de la Zerda, Zhuang Liu, Cristina Zavaleta, Suni Bodapati, Srikant Vaithilingam, Te-Jen Ma, Ömer Oralkan, Xiaoyuan Chen, Butrus T. Khuri-Yakub, Hongjie Dai, Sanjiv S. Gambhir, Stanford Univ. (United States).....[7177-93]

Noninvasive photoacoustic sentinel lymph node mapping using Au nanocages as a lymph node tracer in a rat model, Kwang Hyun Song, Chulhong Kim, Claire M. Coble, Younan Xia, Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-94]

M-mode photoacoustic flow imaging, Hui Fang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-95]

Ultrasound-modulated optical microscopy for ex-vivo imaging of scattering biological tissue, Sri-Rajasekhar Kothapalli, Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-96]

Novel combined optoacoustic and laser-ultrasonic focused transducer array, Varvara A. Simonova, Joint Institute on Laser and Information Technologies (Russian Federation); Alexander A. Karabutov, Lomonosov Moscow State Univ. (Russian Federation)[7177-97]

Improved ultrasound modulated optical tomography based on photorefractive detection, Xiao Xu, Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-98]

8:50 am: **Quantitative measurement of tissue optical absorption spectrum in a scattering medium by photoacoustic technique**, Justin R. Rajan, Xueding Wang, Univ. of Michigan (United States)[7177-42]

9:10 am: **Fast, tissue-realistic models of ultrasound propagation for photoacoustic tomography**, Bradley E. Treeby, Benjamin T. Cox, Univ. College London (United Kingdom)[7177-43]

9:30 am: **Monte Carlo simulation of light transport in dark-field confocal photoacoustic microscopy**, Zhixing Xie, Univ. of Wisconsin, Milwaukee (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States); Hao F. Zhang, Univ. of Wisconsin, Milwaukee (United States).....[7177-44]

9:50 am: **Discriminating between absorption and scattering coefficients in optical characterisation measurements on gold nanoparticle based photoacoustic contrast agents**, Constantin Ungureanu, Univ. Twente (Netherlands); Arjen Amelink, Henricus J. C. M. Sterenberg, Univ. Medisch Ctr. Rotterdam (Netherlands); Srirang Manohar, Ton G. C. van Leeuwen, Univ. Twente (Netherlands)[7177-45]

Coffee Break10:10 to 10:40 am

SESSION 10

Room: Conv. Ctr. Room A1 Tues. 10:40 am to 12:00 pm

Signal Processing and Image Reconstruction

Session Chair: Mark A. Anastasio, Illinois Institute of Technology

10:40 am: **Photoacoustic image reconstruction using adaptive methods**, Suhyun Park, Andrei B. Karpouk, Salavat R. Aglyamov, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States).....[7177-46]

11:00 am: **Image reconstruction in photoacoustic tomography with variable speed of sound using a higher order geometrical acoustics approximation**, Dimple Modgil, The Univ. of Chicago (United States); Kun Wang, Mark A. Anastasio, Illinois Institute of Technology (United States); Patrick J. LaRiviere, The Univ. of Chicago (United States)[7177-47]

11:20 am: **Photoacoustic image reconstruction in an attenuating medium using singular value decomposition**, Dimple Modgil, The Univ. of Chicago (United States); Mark A. Anastasio, Illinois Institute of Technology (United States); Patrick J. LaRiviere, The Univ. of Chicago (United States)[7177-48]

11:40 am: **Improvements in time resolution of tomographic photoacoustic imaging using a priori information for multiplexed systems**, John K. Gamelin, Anastasios Maurudis, Quing Zhu, Univ. of Connecticut (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-49]

Lunch/Exhibition Break12:00 to 1:30 pm

SESSION 11

Room: Conv. Ctr. Room A1 Tues. 1:30 to 3:10 pm

Ultrasound Modulated (Acousto-Optical) Imaging I

Session Chair: Claude Boccara, Ctr. National de la Recherche Scientifique (France)

1:30 pm: **Ultrasound-modulated optical imaging using a photorefractive interferometer and a powerful long pulse laser**, Guy Rousseau, Alain Blouin, Jean-Pierre Monchalain, National Research Council Canada (Canada)[7177-50]

1:50 pm: **Ultrasound-modulated optical imaging using a confocal Fabry-Perot interferometer and a powerful long pulse laser**, Guy Rousseau, Alain Blouin, Jean-Pierre Monchalain, National Research Council Canada (Canada)[7177-51]

2:10 pm: **Ring-shaped light illumination ultrasound-modulated optical tomography in transmission and reflection modes and its application for sentinel lymph node mapping ex vivo**, Chulhong Kim, Kwang Hyun Song, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (United States).....[7177-52]

2:30 pm: **Pressure contrast imaging: a new approach to the acousto-optic detection of optical scattering inhomogeneities at depth in diffuse media**, Puxiang Lai, Todd W. Murray, Ronald A. Roy, Boston Univ. (United States).....[7177-53]

2:50 pm: **Three-dimensional acousto-optic mapping using planar scanning with ultrasound bursts**, Aliaksandr Bratchenia, Robert Molenaar, Rob P. H. Kooyman, Univ. Twente (Netherlands)[7177-54]

Coffee Break3:10 to 3:40 pm

Tuesday 27 January

SESSION 9

Room: Conv. Ctr. Room A1 Tues. 8:00 to 10:10 am

Quantitative Optoacoustic Imaging and Modeling

Session Chair: Paul C. Beard, Univ. College London (United Kingdom)

8:00 am: **Model-based inversions for quantitative photoacoustic tomography (Invited Paper)**, Benjamin T. Cox, Jan G. Laufer, Simon R. Arridge, Paul C. Beard, Univ. College London (United Kingdom).....[7177-40]

8:30 am: **Model-based approach to the quantitative determination of chromophore concentrations from multiwavelength photoacoustic images**, Jan G. Laufer, Benjamin T. Cox, Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom).....[7177-41]

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SESSION 12

Room: Conv. Ctr. Room A1 Tues. 3:40 to 5:00 pm

Ultrasound Modulated (Acousto-Optical) Imaging II

Session Chair: Charles A. DiMarzio, Northeastern Univ.

3:40 pm: **Comparison of detection sensitivity for ultrasound-modulated optical tomography and opto-elastography**, Khalid Daoudi, Claude Boccara, Emmanuel Bossy, Ecole Supérieure de Physique et de Chimie Industrielles (France)[7177-55]

4:00 pm: **Ultrasonic modulation of fluorescence in turbid media**, Baohong Yuan, The Catholic Univ. of America (United States)[7177-56]

4:20 pm: **Fluorescence tomography based-on acousto-optic modulations with phased-array ultrasound transducer**, Quang Duc Trinh, Yuya Nanbu, Tomoyoshi Suzuki, Tohoku Institute of Technology (Japan); Motohiro Takeda, Tohoku Univ. (Japan); Masaki Kobayashi, Tohoku Institute of Technology (Japan)[7177-57]

4:40 pm: **Detection of ultrasound-modulated photons and enhancement with ultrasound microbubbles**, David J. Hall, Mark J. Hsu, Sadik C. Esener, Robert F. Mattrey, Univ. of California, San Diego (United States)[7177-58]

Wednesday 28 January

SESSION 13

Room: Conv. Ctr. Room A1 Wed. 8:00 to 10:10 am

Molecular Imaging and Sensing Using Nanoparticles

Session Chair: Pai-Chi Li, National Taiwan Univ. (Taiwan)

8:00 am: **Combined ultrasound and photoacoustic imaging of pancreatic cancer using nanocage contrast agents** (*Invited Paper*), Kimberly A. Homan, Jignesh Shah, Sobeyda Gomez, Heidi Gensler, Andrei B. Karpiouk, Lisa Brannon-Peppas, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States)[7177-59]

8:30 am: **In vivo photoacoustic (PA) mapping of sentinel lymph node (SNL) using carbon nanotube (CNT) as contrast agent**, Manojit Pramanik, Kwang Hyun Song, Washington Univ. in St. Louis (United States); Magdalena Swierczewska, Danielle Green, Balaji Sitharaman, Stony Brook Univ. (United States); Lihong V. Wang, Washington Univ. in St. Louis (United States)[7177-60]

8:50 am: **Multi wavelength photoacoustic imaging of plasmon resonance coupling of gold nanoparticles for selective detection of cancer**, Srivalleesha Mallidi, Timothy A. Larson, Konstantin V. Sokolov, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States)[7177-61]

9:10 am: **Detection of gold-nanorod targeted pathogens in blood samples using optical and pizelectric optoacoustic sensors: comparative study**, Saher M. Maswadi, Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio (United States); Norman Barsalou, Naval Health Research Ctr. Detachment (United States); Alexander A. Oraevsky, Peter Brecht, André Conjusteau, Ron Lacewell, Fairway Medical Technologies, Inc. (United States)[7177-62]

9:30 am: **Optoacoustic detection of viral antigens using targeted gold nanorods**, Saher M. Maswadi, Randolph D. Glickman, Lee Woodward, The Univ. of Texas Health Science Ctr. at San Antonio (United States); Norman Barsalou, Naval Health Research Ctr. Detachment (United States)[7177-63]

9:50 am: **Tracking contrast agents using real-time 2D photoacoustic imaging system for cardiac applications**, Ragnar Olafsson, Leonardo G. Montilla, Pier Ingram, Russell S. Witte, The Univ. of Arizona (United States)[7177-64]

Coffee Break 10:10 to 10:40 am

SESSION 14

Room: Conv. Ctr. Room A1 Wed. 10:40 am to 12:00 pm

Monitoring Thermal Lesions

Session Chair: William M. Whelan, Univ. of Prince Edward Island (Canada)

10:40 am: **Photoacoustic temperature measurements for monitoring of thermal therapy**, Shiou-Han Wang, Chen-Wei Wei, Shiou-Hwa Jee, National Taiwan Univ. (Taiwan); Churng-Ren Wang, National Chung Cheng Univ. (Taiwan); Pai-Chi Li, National Taiwan Univ. (Taiwan)[7177-65]

11:00 am: **Phantoms for thermoacoustic tomography with RF heating**, Mike Schrauth, Univ. of Wisconsin, Milwaukee (United States); Andrew Eckhart, Univ. of Wisconsin, Madison (United States); Mark Rhodes, Gerald Becker, Sarah K. Patch, Univ. of Wisconsin, Milwaukee (United States)[7177-66]

11:20 am: **RF testbed for thermoacoustic tomography**, Dan Fallon, Electronics Research, Inc. (United States); Liping Yan, George W. Hanson, Sarah K. Patch, Univ. of Wisconsin, Milwaukee (United States)[7177-67]

11:40 am: **Optoacoustic imaging of thermal lesions**, William M. Whelan, Univ. of Prince Edward Island (Canada); Michael C. Kolios, Ryerson Univ. (Canada); Kris T. Lund, Michelle P. MacPhee, Univ. of Prince Edward Island (Canada)[7177-68]

Lunch/Exhibition Break 12:00 to 1:40 pm

SESSION 15

Room: Conv. Ctr. Room A1 Wed. 1:40 to 3:00 pm

Imaging with Optical Detectors

Session Chair: Günther Paltauf, Karl-Franzens-Univ. Graz (Austria)

1:40 pm: **Novel FP acoustic sensor interrogation schemes for in vivo photoacoustic imaging**, Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom)[7177-69]

2:00 pm: **Assessment of opto-mechanical behavior of biological samples by interferometry**, Behrouz Soroushian, Ryerson Univ. (Canada); William M. Whelan, Univ. of Prince Edward Island (Canada); Michael C. Kolios, Ryerson Univ. (Canada)[7177-70]

2:20 pm: **Photoacoustic detection of exogenous melanoma cells in a mouse model**, Sagar Gupta, Univ. of Missouri, Columbia (United States); Gerardo Gutierrez-Juarez, Univ. de Guanajuato (Mexico); Luis Polo-Parada, Paul S. Dale, John A. Viator, Univ. of Missouri, Columbia (United States)[7177-71]

2:40 pm: **Detection of melanoma cells suspended in mononuclear cells and blood plasma using photoacoustic generation**, Emily Spradling, Univ. of Missouri, Columbia (United States); Gerardo Gutierrez-Juarez, Univ. de Guanajuato (Mexico); Sagar Gupta, Paul S. Dale, John A. Viator, Univ. of Missouri, Columbia (United States)[7177-72]

Coffee Break 3:00 to 3:30 pm

SESSION 16

Room: Conv. Ctr. Room A1 Wed. 3:30 to 4:50 pm

Frequency Domain and Time Reversal Imaging

Session Chair: Andreas Mandelis, Univ. of Toronto (Canada)

3:30 pm: **Frequency-domain photothermoacoustics: alternative imaging modality of biological tissues**, Sergey A. Telenkov, Bahman Lashkari, Andreas Mandelis, Univ. of Toronto (Canada)[7177-73]

3:50 pm: **E-field polarization in thermoacoustic tomography**, Sarah K. Patch, Lipin K. Yan, Univ. of Wisconsin, Milwaukee (United States)[7177-74]

4:10 pm: **On the promise of guiding HIFU by time-reversal of photoacoustic signals from a selective optical contrast**, Arik R. Funke, Jean-François Aubry, Mathias Fink, Claude Boccara, Emmanuel Bossy, Ecole Supérieure de Physique et de Chimie Industrielles (France)[7177-75]

4:30 pm: **Information changes and time reversal for diffusion-related periodic fields**, Peter Burgholzer, Francisco Camacho-Gonzales, Daniel Sponseiler, Upper Austrian Research GmbH (Austria); Günther Mayr, Günther Hendorfer, Upper Austria Univ. of Applied Sciences (Austria)[7177-76]

AWARDS SESSION

Room: Conv. Ctr. Room A1 Wed. 4:50 to 5:10 pm

The Best Paper Award and Best Poster

Award will be announced by

Alexander Oraevsky, Fairway Medical Technologies, Inc. and
Lihong V. Wang, Washington Univ. in St. Louis.

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Biophotonics and Immune Responses IV

Conference Chair: **Wei R. Chen**, Univ. of Central Oklahoma

Program Committee: **Samuel Achilefu**, Washington Univ. in St. Louis; **Gianfranco L. Canti**, Univ. degli Studi di Milano (Italy); **Xing Da**, South China Normal Univ. (China); **Sandra O. Gollnick**, Roswell Park Cancer Institute; **Michael R. Hamblin**, Massachusetts General Hospital; **Zheng Huang**, Univ. of Colorado at Denver; **Mladen Korbelik**, British Columbia Cancer Agency (Canada); **Mark F. Naylor**, Univ. of Oklahoma; **Karl-Goran Tranberg**, Lunds Univ. (Sweden); **Xunbin Wei**, Fudan Univ. (China); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room B2 Sun. 8:30 to 10:00 am

PDT-induced Immune Responses

Session Chairs: **Michael R. Hamblin**, Massachusetts General Hospital; **Mladen Korbelik**, British Columbia Cancer Agency (Canada)

8:30 am: **Molecular program for facilitating dead cell disposal induced by photodynamic therapy treatment** (*Invited Paper*), Mladen Korbelik, Soroush Merchant, British Columbia Cancer Agency (Canada) [7178-01]

9:00 am: **Stimulation of dendritic cells enhances immune response after photodynamic therapy** (*Invited Paper*), Pawel Mroz, Michael R. Hamblin, Massachusetts General Hospital (United States) [7178-02]

9:30 am: **The IL-23/IL-17 cytokine axis and PDT** (*Invited Paper*), Sandra O. Gollnick, Craig M. Brackett, Roswell Park Cancer Institute (United States) [7178-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room B2 Sun. 10:30 am to 12:20 pm

Photoimmunotherapy I

Session Chairs: **Mark F. Naylor**, Univ. of Oklahoma; **Sandra O. Gollnick**, Roswell Park Cancer Institute

10:30 am: **How phototherapeutic effects on the immune system modulate wound healing** (*Invited Paper*), Mary Dyson, King's College London (United Kingdom) [7178-04]

11:00 am: **Treatment of persistent stage III melanoma patients using a combination of imiquimod and laser irradiation**, Mark F. Naylor, Univ. of Oklahoma (United States); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (United States); Henry Le, Chet Joshi, Univ. of Central Oklahoma (United States); Hong Liu, Univ. of Oklahoma (United States); Wei R. Chen, Univ. of Central Oklahoma (United States) [7178-05]

11:20 am: **The roles of treated tumor cells in immunological responses following laser immunotherapy**, Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (United States); Wei R. Chen, Kelvin Le, Halie Ferguson, Univ. of Central Oklahoma (United States); John A. Nordquist, Wound Healing of Oklahoma, Inc. (United States); Hong Liu, Univ. of Oklahoma (United States) [7178-06]

11:40 am: **In situ photoimmunotherapy: a tumor-directed treatment for stage IV melanoma with cutaneous metastases: a phase I study**, Ana M. Ciurea, Murad Alam, Northwestern Univ. (United States) [7178-07]

12:00 pm: **Generation of antitumor vaccines for H22 tumor of mouse model using photodynamic therapy**, Yingxin Li, Tianjin Medical Univ. (China) [7178-08]

Lunch/Exhibition Break 12:20 to 2:00 pm

SESSION 3

Room: Conv. Ctr. Room B2 Sun. 2:00 to 3:20 pm

Photoimmunotherapy II

Session Chairs: **Zheng Huang**, Univ. of Colorado at Denver; **Wei R. Chen**, Univ. of Central Oklahoma

2:00 pm: **Effects of immunostimulant in phototherapy for cancer treatment**, Wei R. Chen, Akhee Sarker, Univ. of Central Oklahoma (United States); Hong Liu, Univ. of Oklahoma (United States); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (United States) [7178-09]

2:20 pm: **Possible role of laser phototherapy in laser immunotherapy**, Tomas L. M. Hode, Irradia USA (United States) and Portland State Univ. (United States) [7178-10]

2:40 pm: **Study of effects of photodynamic therapy and immunotherapy on human pancreatic cancer cells**, Luowei Wang, Univ. of Colorado at Denver (United States) and Changhai Hospital (China); Lizhi Gao, Bolin Liu, Yang K. Chen, Fred W. Hetzel, Univ. of Colorado at Denver (United States); Zhaoshen Li, Univ. of Colorado at Denver (United States) and Changhai Hospital (China); Zheng Huang, Univ. of Colorado at Denver (United States) [7178-11]

3:00 pm: **HSP70 inhibit Bax translocation during Photofrin-PDT apoptosis**, Feifan Zhou, Xing Da, South China Normal Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (United States) [7178-12]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Conv. Ctr. Room B2 Sun. 3:50 to 5:20 pm

Detections of Photoimmune Activities

Session Chairs: **Xunbin Wei**, Fudan Univ. (China); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences

3:50 pm: **Monitoring tumor metastasis by in vivo imaging and flow cytometer** (*Invited Paper*), Xunbin Wei, Yan Li, Yun Chen, Li Zhang, Guangda Liu, Fudan Univ. (China) [7178-13]

4:20 pm: **In vivo optical imaging to visualize photodynamic therapy-induced immune responses**, Soumya Mitra, Thomas H. Foster, Univ. of Rochester Medical Ctr. (United States) [7178-14]

4:40 pm: **Two-photon autofluorescence microscopy for in vivo leukocytes imaging**, Chunqiang Li, Massachusetts General Hospital (United States); Judith M. Runnels, Massachusetts General Hospital (United States) and Dana-Farber Cancer Institute (United States); Mehron Puoris'haag M.D., Massachusetts General Hospital (United States); Costas M. Pitsillides, Massachusetts General Hospital (United States) and Boston Univ. (United States); Daniel Côté, Univ. Laval Robert-Giffard (Canada); Charles P. Lin, Massachusetts General Hospital (United States) [7178-15]

5:00 pm: **In vivo photoacoustic flow cytometry of immune-related cells and pathogens with label-free detection and multicolor nanoparticle contrast agents in whole living animals**, Ekaterina I. Galanzha, Evgeny V. Shashkov, Univ. of Arkansas for Medical Sciences (United States); Jin-Woo Kim, Univ. of Arkansas (United States); Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (United States) [7178-16]

Conference 7178

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Emission spectral analysis of caspase-3 activation during artesunate-induced apoptosis of human lung adenocarcinoma cell, Wenliang Pan, Tongsheng Chen, South China Normal Univ. (China)[7178-18]

Bax translocation into mitochondria during dihydroartemisinin(DHA)-induced apoptosis in human lung adenocarcinoma cells, Yingying Lu, Tongsheng Chen, South China Normal Univ. (China)[7178-19]

Taxol-induced cytoplasmic vacuolization is not mediated by reactive oxygen species (ROS), Qingrui Sun, Tongsheng Chen, South China Normal Univ. (China)[7178-20]

Mitochondrial injury caused by reactive oxygen species generation under high fluence low-power laser irradiation treatment, Shengnan Wu, Xing Da, South China Normal Univ. (China)[7178-21]

PI3K/Akt regulates proliferation induced by low-power laser irradiation in COS-7 cells, Lingling Zhang, Xing Da, Xuejuan Gao, South China Normal Univ. (China)[7178-22]

Involvement of caspase-dependent and -independent apoptotic pathways in cisplatin-induced apoptosis, Lei Liu, Xing Da, South China Normal Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (United States)[7178-23]

Effect of PDT-treated apoptotic cells on macrophages, Sheng Song, Xing Da, Feifan Zhou, South China Normal Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (United States)[7178-24]

Circularly permuted Venus increase the dynamical range of a FRET-based genetic encoded ROS probe, Shuang Sha, Ting Su, Shaoqun Zeng, Zhihong Zhang, Huazhong Univ. of Science and Technology (China)[7178-25]

Controlled laser hyperthermia with/without gold nanoparticles and immune response investigation, Georgy S. Terentyuk, Saratov State Univ. (Russian Federation); Nikolay G. Khlebtsov, Boris N. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); Garif G. Akchurin, Irina L. Maksimova, Valery V. Tuchin, Saratov State Univ. (Russian Federation)[7178-26]

Optics in Tissue Engineering and Regenerative Medicine III

Conference Chairs: **Sean J. Kirkpatrick**, Oregon Health & Science Univ.; **Ruikang Wang**, Oregon Health & Science Univ.

Program Committee: **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Irene Georgakoudi**, Tufts Univ.; **Miya Ishihara**, National Defense Medical College (Japan); **Stephen J. Matcher**, The Univ. of Sheffield (United Kingdom); **Steve P. Morgan**, The Univ. of Nottingham (United Kingdom); **Peter H. Tomlins**, National Physical Lab. (United Kingdom); **Ying Yang**, Keele Univ. (United Kingdom)

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room C3 Sat. 8:30 to 10:15 am

OCT in Tissue Engineering

Session Chair: **Ruikang Wang**, Oregon Health & Science Univ.

8:30 am: **Visualization of 3D cell migration using high speed ultrahigh resolution optical coherence tomography** (*Invited Paper*), Sara M. Rey, Adrian Harwood, Boris Povaay, Bernd Hofer, Angelika Unterhuber, Boris Hermann, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7179-01]

9:00 am: **Monitoring the effect of magnetically aligned collagen fiber scaffolds on tendon tissue engineering by PSOCT**, Ying Yang, Mark Ahearne, Keele Univ. (United Kingdom); Jim Torbet, Grenoble High Magnetic Field Lab. (France) [7179-02]

9:15 am: **Model for complex refractive index calculation from optical coherence tomography measurements**, Costel Fluieraru, Sherif Sherif, Youxin Mao, Shoude Chang, National Research Council Canada (Canada) [7179-03]

9:30 am: **Optically characterizing collagen gels made with different cell types**, David Levitz, Monica T. Hinds, Niloy Choudhury, Stephen R. Hanson, Steven L. Jacques, Oregon Health & Science Univ. (United States) [7179-04]

9:45 am: **The effect of wavelength on the optical properties of engineered tissues**, David Levitz, Ravikant V. Samatham, Kevin G. Phillips, Niloy Choudhury, Monica T. Hinds, Stephen R. Hanson, Steven L. Jacques, Oregon Health & Science Univ. (United States) [7179-05]

10:00 am: **Effect of elastin on lung cancer cell growth using optical coherence tomography**, Josep Sulé-Suso, Jacek K. Pijanka, Pierre-Olivier Bagnaninchi, Ying Yang, Keele Univ. (United Kingdom) [7179-06]

Coffee Break 10:15 to 10:45 am

SESSION 2

Room: Conv. Ctr. Room C3 Sat. 10:45 to 11:45 am

Polarization

Session Chair: **Miya Ishihara**, National Defense Medical College (Japan)

10:45 am: **Polarized light based birefringence measurements for monitoring myocardial regeneration**, Michael F. G. Wood, Nirmalya Ghosh, Princess Margaret Hospital (Canada); Shu-Hong Li, Richard D. Weisel, MaRS Ctr. (Canada); Brian C. Wilson, Princess Margaret Hospital (Canada); Ren-Ke Li, MaRS Ctr. (Canada); Alex Vitkin, Princess Margaret Hospital (Canada) [7179-07]

11:00 am: **Spectral polarimetry for assessing cell alignment in cultured tissues**, James C. Gladish, Donald D. Duncan, Oregon Health & Science Univ. (United States) [7179-08]

11:15 am: **Raman spectroscopy and rotating orthogonal polarization imaging for non-destructive testing of collagen deposition in tissue engineered skin substitutes**, Melissa L. Mather, Steve P. Morgan, John A. Crowe, David E. Morris, Qun Zhu, Ioan Notingher, Alina Zoladek, Univ. of Nottingham (United Kingdom); Jasmin Kee, Loughborough Univ. (United Kingdom); Penny Johnson, Intercytex (United Kingdom) [7179-09]

11:30 am: **Regeneration of spine disc and joint cartilages under temporal and space modulated laser radiation**, E. N. Sobol, Institute of Laser and Information Technologies (Russian Federation) [7179-19]

Lunch/Exhibition Break 11:45 am to 1:45 pm

SESSION 3

Room: Conv. Ctr. Room C3 Sat. 1:45 to 3:00 pm

Functional Imaging and Mechanics

Session Chair: **Sean J. Kirkpatrick**, Oregon Health & Science Univ.

1:45 pm: **Destructive fat tissue engineering using photodynamic and selective photothermal effects** (*Invited Paper*), Valery V. Tuchin, Irina Y. Yanina, Georgy V. Simonenko, Saratov State Univ. (Russian Federation) [7179-11]

2:15 pm: **Application of laser to measurement of cyclic contractile movement of cultured myotubes**, Shigehiro Hashimoto M.D., Eiji Yamada, Shuichi Mochizuki, Toshia Fujisato, Mieko Ohsuga, Hiroyuki Kobayashi, Masahide Okada, Kohei Ono, Osaka Institute of Technology (Japan) [7179-12]

2:30 pm: **Cellular functional image using hyperspectral imaging technology for application to regenerative medicine**, Miya Ishihara M.D., National Defense Medical College (Japan); Mamoru Iwasa, Minoru Doshida, MOD Technical Research and Development Institute (Japan); Makoto Kikuchi M.D., National Defense Medical College (Japan) [7179-13]

2:45 pm: **Doppler optical coherence tomography imaging of local fluid flow and shear stress within microporous scaffolds**, Yali Jia, Oregon Health & Science Univ. (United States); Pierre-Olivier Bagnaninchi, Ying Yang, Alicia El Haj, Keele Univ. (United Kingdom); Monica T. Hinds, Sean J. Kirkpatrick, Ruikang Wang, Oregon Health & Science Univ. (United States) [7179-14]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room C3 Sat. 3:30 to 4:15 pm

Imaging

Session Chair: **Irene Georgakoudi**, Tufts Univ.

3:30 pm: **Ultrasound and photoacoustic imaging to monitor vascular growth in tissue engineered constructs**, Seung Yun Nam, Srivalleesha Mallidi, Ge Zhang, Laura Suggs, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States) [7179-15]

3:45 pm: **Two photon excited emission spectra: non invasive markers of engineered tissue status**, William Rice, Jonathan M. Levitt, Karl Mürnger, David L. Kaplan, Irene Georgakoudi, Tufts Univ. (United States) [7179-16]

4:00 pm: **Reconstruction of thin fluorophore-filled capillaries in thick scattering medium using fluorescence diffuse optical tomography within the diffusion approximation**, Johanne Desrochers, Patrick Vermette, Réjean Fontaine, Yves Bérubé-Lauzière, Univ. de Sherbrooke (Canada) [7179-17]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Conference 7180 · Room: Conv. Ctr. Room A4, Marriott Hotel, Willow Glen Room

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Photons and Neurons

Conference Chairs: **Anita Mahadevan-Jansen**, Vanderbilt Univ.; **E. Duco Jansen**, Vanderbilt Univ.

Program Committee: **Edward S. Boyden**, Massachusetts Institute of Technology; **Timothy J. Ebner**, Univ. of Minnesota; **Maarten Frens**, Erasmus Univ. Medical Ctr. (Netherlands); **Elizabeth M. C. Hillman**, Columbia Univ.; **Henry Hirschberg**, Univ. of California, Irvine; **Steen J. Madsen**, Univ. of Nevada, Las Vegas; **Agnella Izzo Matic**, Northwestern Univ.; **Jonathon D. Wells**, Lockheed Martin Aculight

Sunday 25 January

SESSION JT1

Room: Conv. Ctr. Room A4, Marriott Hotel,

Willow Glen Room. Sun. 8:30 to 10:10 am

Joint Session on Neurobiology with Conference 7161E: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas

8:30 am: **Optical detection of action potential propagation using phase-sensitive interferometry**, Boris H. Park, Massachusetts General Hospital (United States); Christopher L. Passaglia, Boston Univ. (United States); Johannes F. de Boer, Massachusetts General Hospital (United States) [7161E-520]

8:50 am: **Action potential detection by non linear microscopy**, Leonardo Sacconi, Jacopo Lotti, Univ. of Florence (Italy); Rodney P. O'Connor, Janelia Farm Research Campus (United States) and Univ. of Florence (Italy); Jonathan Mapelli, Daniela Gandolfi, Egidio D'Angelo, Univ. of Pavia (Italy); Francesco S. Pavone, Univ. of Florence (Italy) [7161E-521]

9:10 am: **Quantitative in vivo optical assessment of nerve myelination**, Boris H. Park, Frank P. Henry, Mark A. Randolph, Johannes F. de Boer, Massachusetts General Hospital (United States) [7161E-522]

9:30 am: **Neurobiological use of a micro-optrode using UV excitation light and signal-to-noise ratio optimization**, Suzie Dufour, Univ. Laval (Canada); Florin Amzica, Univ. de Montréal (Canada); Réal Vallée, Univ. Laval (Canada) [7161E-523]

9:50 am: **Reflected light imaging of ON and OFF responses in frog retina**, Xin-Cheng Yao, Chris Gorga, The Univ. of Alabama at Birmingham (United States) [7161E-524]

Coffee Break 10:10 to 10:40 am

SESSION JT2

Room: Conv. Ctr. Room A4, Marriott Hotel,

Willow Glen Room. Sun. 10:40 am to 12:00 pm

Joint Session Neuroimaging II with Conference 7161E: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Session Chair: **Henry Hirschberg**, Univ. of California, Irvine

10:40 am: **Investigation of the prefrontal cortex in response to duration-flexible anagram tasks using functional near infrared spectroscopy**, Fenghua Tian, The Univ. of Texas at Arlington (United States); Britton Chance, Univ. of Pennsylvania (United States); Hanli Liu, The Univ. of Texas at Arlington (United States) [7161E-525]

11:00 am: **Noninvasive optical micro-angiography for structural and functional in vivo imaging of cerebro-vascular blood perfusion**, Yali Jia, Ruikang Wang, Oregon Health & Science Univ. (United States) [7161E-526]

11:20 am: **Characterization of the newborn visual activation response using high density diffuse optical imaging (HD-DOI)**, Steve M. Liao, Nicholas M. Gregg, Brian R. White, Terrie E. Inder, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7161E-527]

11:40 am: **A simultaneous NIRS&EEG study during seizure in the mouse brain**, Seungduk Lee, Dalkwon Koh, Beop-Min Kim, Yonsei Univ. (Korea, Republic of); Mina Lee, Jee Hyun Choi, Korea Institute of Science and Technology (Korea, Republic of) [7161E-528]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 1

Room: Conv. Ctr. Room A4, Marriott Hotel,

Willow Glen Room. Sun. 1:30 to 3:10 pm

Joint Session on Detecting Neural Activity I with Conference 7161E: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Session Chair: **E. Duco Jansen**, Vanderbilt Univ.

1:30 pm: **Theoretical study on the origin of fast intrinsic optical responses**, Jonghwan Lee, Sung June Kim, Seoul National Univ. (Korea, Republic of) [7180-01]

1:50 pm: **Mitochondrial function and cerebral blood flow responses under unilateral carotid occlusion in rats**, Amir Livnat, Efrat Barbiro-Michaely, Avraham Mayevsky, Bar-Ilan Univ. (Israel) [7180-02]

2:10 pm: **Relation between the neuronal and hemodynamic response in the rat spinal cord following peripheral nerve stimulation**, Dubeau Simon, Frédéric Lesage, Ecole Polytechnique de Montréal (Canada); Éric Beaumont, Hopital Sacre Coeur de Montreal (Canada) [7180-03]

2:30 pm: **Translation of near infrared brain imaging to assess children with cerebral palsy**, George Alexandrakis, Khosrow Behbehani, Nayan Asanani, Bilal Khan, Fenghua Tian, The Univ. of Texas at Arlington (United States); Mauricio Delgado M.D., Texas Scottish Rite Hospital for Children (United States); Hanli Liu, The Univ. of Texas at Arlington (United States) [7180-04]

2:50 pm: **Limits to non-fluorescent voltage sensitivity using surface and particle plasmons**, Mark C. Pitter, John D. Paul, Jing Zhang, Mike G. Somekh, The Univ. of Nottingham (United Kingdom) [7180-05]

Coffee Break 3:10 to 3:30 pm

SESSION 2

Room: Conv. Ctr. Room A4, Marriott Hotel,

Willow Glen Room. Sun. 3:30 to 5:30 pm

Joint Session on Detecting Neural Activity II with Conference 7161E: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Session Chair: **Edward S. Boyden**, Massachusetts Institute of Technology

3:30 pm: **Of mice, men, and microscopes: watching cellular level dynamics in behaving subjects**, Mark J. Schnitzer, Stanford Univ. School of Medicine (United States) [7180-29]

3:50 pm: **Depth-encoded spectral domain phase microscopy for simultaneous multi-site nanoscale optical measurements of nerve activation**, Bradley A. Bower, Duke Univ. (United States); Neal Shepherd, Duke Univ. Medical Ctr. (United States); Alex S. Reinstein, Yuankai K. Tao, Joseph A. Izatt, Duke Univ. (United States) [7180-06]

4:10 pm: **Depth localization of neural action potentials using voltage sensitive dyes in optical coherence tomography**, Taner Akkin, Univ. of Minnesota (United States); David Landowne, Univ. of Miami (United States); Aarthi Sivaprakasam, Univ. of Minnesota (United States) [7180-07]

4:30 pm: **Optical probing of photoreceptor function: theoretical model and experimental verification in an in-vivo rat model**, Kostadinka K. Bizheva, Zhao Ren, Univ. of Waterloo (Canada); Aphrodite Dracopoulos, St. Michael's Hospital (Canada); Alireza Akhlagh Moayed, Sepideh Hariri, Univ. of Waterloo (Canada); Timothy W. Kraft, The Univ. of Alabama at Birmingham (United States); Bruce Doran, Diagnosys, LLC (United States); Shelley Boyd, St. Michael's Hospital (Canada) [7180-08]

4:50 pm: **Flavoprotein imaging in the cerebellar cortex in vivo: cellular and metabolic basis and insights into cerebellar function**, Wangcai Gao, Gang Chen, Timothy J. Ebner, Univ. of Minnesota (United States)[7180-09]

5:10 pm: **Flavoprotein imaging reveals low frequency oscillations in the cerebellar cortex of the tottering mouse**, Gang Chen, Wangcai Gao, Timothy J. Ebner, Univ. of Minnesota (United States)[7180-10]

Monday 26 January

SESSION 3

Room: Conv. Ctr. Room A4, Marriott Hotel, Willow Glen Room. Mon. 8:30 to 9:50 am

Optical Control I

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ.

8:30 am: **Fluorescence lifetime images of different green fluorescence proteins in fly brains**, Sih-Yu Lai, Yen-Yin Lin, Ann-Shyn Chiang, Yen-Chieh Huang, National Tsing Hua Univ. (Taiwan)[7180-11]

8:50 am: **Optical neural control for treating neurological and psychiatric disorders**, Edward S. Boyden, Massachusetts Institute of Technology (United States)[7180-12]

9:10 am: **Engineered channelrhodopsins for improved control neuronal activities**, John Y. Lin, Univ. of California, San Diego (United States); Paul A. Steinbach, Univ. of California, San Diego (United States) and Howard Hughes Medical Institute (United States); Michael Z. Lin, Univ. of California, San Diego (United States); Roger Y. Tsien, Univ. of California, San Diego (United States) and Howard Hughes Medical Institute (United States)[7180-30]

9:30 am: **Safety and efficacy of genetically-targeted optical neuromodulation in non-human primates**, Xue Han, Xiaofeng Qian, Jacob Bernstein, H. Zhou, A. Graybiel, R. Desimone, Edward S. Boyden, Massachusetts Institute of Technology (United States)[7180-14]

Coffee Break9:50 to 10:20 am

SESSION 4

Room: Conv. Ctr. Room A4, Marriott Hotel, Willow Glen Room. Mon. 10:20 to 11:40 am

Optical Control II

Session Chair: Anita Mahadevan-Jansen, Vanderbilt Univ.

10:20 am: **Light-activated channels targeted to ON bipolar cells restore visual function in retinal degeneration**, Pamela S. Lagali, David Balya, Friedrich Miescher Institute for Biomedical Research (Switzerland); Gautam B. Awatramani, Friedrich Miescher Institute for Biomedical Research (Switzerland) and Dalhousie Univ. (Canada); Thomas A. Muench, Friedrich Miescher Institute for Biomedical Research (Switzerland); Douglas S. Kim, Harvard Medical School (United States); Volker Busskamp, Friedrich Miescher Institute for Biomedical Research (Switzerland); Constance L. Cepko, Harvard Medical School (United States); Botond Roska, Friedrich Miescher Institute for Biomedical Research (Switzerland)[7180-13]

10:40 am: **Seeing the light: a photonic visual prosthesis for the blind**, Patrick Degenaar, Imperial College, London (United Kingdom)[7180-31]

11:00 am: **Light induced rescue of breathing after spinal cord injury**, Warren Allain, Case Western Reserve Univ. School of Medicine (United States); Xiang Li, Case Western Reserve Univ. (United States); Kevin P. Horn, Rishi Dhingra, Thomas E. Dick, Stefan Herlitzel, Jerry Silver, Case Western Reserve Univ. School of Medicine (United States)[7180-32]

11:20 am: **Using light activated ion channels to unravel complex neural circuits controlling hunger (Presentation Only)**, Deniz Atasoy, Yexica Aponte, Scott M. Sternson, HHMI (United States)[7180-33]

Lunch Break11:40 am to 1:30 pm

SESSION 5

Room: Conv. Ctr. Room A4, Marriott Hotel, Willow Glen Room. Mon. 1:30 to 3:10 pm

Optical Neural Stimulation I

Session Chair: Jonathon D. Wells, Lockheed Martin Aculight

1:30 pm: **Infrared neural stimulation and optical recording of somatosensory cortex**, Jonathan M. Cayce, Robert Friedman, Anna Roe, E. Duco Jansen, Peter Konrad M.D., Anita Mahadevan-Jansen, Vanderbilt Univ. (United States)[7180-15]

1:50 pm: **Optical stimulation of the human auditory nerve**, Andrew Fishman, Northwestern Univ. (United States); Piotr Winkler, Jozef Mierzwinski, Wojciech Beuth, Zygmunt Siedlecki, Univ. Mikolaja Kopernika (Poland); Agnella Izzo Matic, Northwestern Univ. (United States); Ingo U. Teudt, Hannes Maier, Univ. Medical Ctr. Hamburg-Eppendorf (Germany); Claus-Peter Richter, Northwestern Univ. (United States)[7180-16]

2:10 pm: **Diagnostic infrared nerve stimulator optimized for ENT nerve monitoring**, Dawn Meekhof, Jim Webb, Jonathon D. Wells, Lockheed Martin Aculight (United States); Claus-Peter Richter, Agnella Izzo Matic, Northwestern Univ. (United States)[7180-27]

2:30 pm: **Combined electrical and optical Stimulation in the rat sciatic nerve**, E. Duco Jansen, Austin R. Duke, Jonathan M. Cayce, Anita Mahadevan-Jansen, Vanderbilt Univ. (United States)[7180-18]

2:50 pm: **Effects of optical irradiation parameters on safe peripheral nerve stimulation with infrared light**, Elizabeth Katz, Do-Hyun Kim, Victor Krauthamer, Ilko K. Ilev, U.S. Food and Drug Administration (United States)[7180-19]

Coffee Break3:10 to 3:40 pm

SESSION 6

Room: Conv. Ctr. Room A4, Marriott Hotel, Willow Glen Room. Mon. 3:40 to 5:20 pm

Optical Neural Stimulation II

Session Chair: Agnella Izzo Matic, Northwestern Univ.

3:40 pm: **Stimulation of the auditory system with optical radiation is more selective than stimulation with electrical current**, Claus-Peter Richter, Andrew Fishman, Agnella Izzo Matic, Joseph T. Walsh, Jr., Northwestern Univ. (United States)[7180-20]

4:00 pm: **Optical nerve stimulation for a vestibular prosthesis**, David M. Harris, Bio-Medical Consultants, Inc. (United States); Steven M. Bierer, Univ. of Washington (United States); Jonathon D. Wells, Lockheed Martin Aculight (United States); James O. Phillips, Univ. of Washington (United States)[7180-21]

4:20 pm: **Optical stimulation in mice which lack the TRPV1 channel**, Eul Suh, Agnella Izzo Matic, Margarete Otting, Joseph T. Walsh, Jr., Claus-Peter Richter, Northwestern Univ. (United States)[7180-22]

4:40 pm: **VCSEL technology for medical diagnostics and therapeutics**, Mary K. Hibbs-Brenner, Klein Johnson, Vixar (United States); Mark P. Bendett, Lockheed Martin Aculight (United States)[7180-23]

5:00 pm: **Quantification of cell sensitivity to nanosecond duration electrical pulses**, Bennett L. Ibey, William P. Roach, Air Force Research Lab. (United States); Andrei G. Pakhomov, Old Dominion Univ. (United States) ... [7180-24]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Optical stimulation of the efferent vagus nerve in vivo, Austin R. Duke, Jonathan M. Cayce, Vanderbilt Univ. (United States); Ingeborg van Gessel, Univ. Twente (Netherlands); E. Duco Jansen, Vanderbilt Univ. (United States)[7180-17]

Optical stimulation of neurons cultured on a multi-electrode chip, Seyoung Moon, Pyung-Hwan Kim, Rimi Lee, Ji Yeon Song, Donghyun Kim, Chae-Ok Yun, Kyung-hwa Yoo, Jin-Suck Suh, Yonsei Univ. (Korea, Republic of)[7180-25]

High precision spatial and temporal control of neural circuitry using a semi-automated, multi-wavelength nanopatterning system, Sandhya N. Mithala, Michael Huebschman, Christian Herold, Joachim Herz, Harold R. Garner, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States)[7180-26]

Energy-based Treatment of Tissue and Assessment V

Conference Chair: **Thomas P. Ryan**, Avedro Inc.

Program Committee: **Chris J. Diederich**, Univ. of California/San Francisco; **P. Jack Hoopes**, Dartmouth Hitchcock Medical Ctr.; **Boris Rubinski**, Univ. of California/Berkeley; **Paul R. Stauffer**, Duke Univ.; **Sharon L. Thomsen**, Pathology Consultant to Engineers and Physicists

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room B4 Sun. 8:30 to 10:10 am

Tissue Thermal Injury

Session Chair: **Thomas P. Ryan**, Avedro, Inc.

8:30 am: **Targeted thermal tissue injury: mechanisms of cell death and body responses** (*Invited Paper*), James E. Coad, West Virginia Univ. (United States); Sharon L. Thomsen, Pathology Consultant to Engineers and Physicists (United States) and Univ. of Texas (United States)[7181-01]

9:40 am: **Relationship between Arrhenius models of thermal damage and the CEM 43 thermal dose** (*Invited Paper*), John A. Pearce, The Univ. of Texas at Austin (United States)[7181-02]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room B4 Sun. 10:40 to 11:55 am

New Technology for Thermal Therapy

Session Chair: **Nathan McDannold**, Brigham and Women's Hospital

10:40 am: **Numerical model and analysis of an energy-based system using microwaves for vision correction**, Radha Pertaub, Thomas P. Ryan, Avedro, Inc. (United States)[7181-03]

11:05 am: **Experimental results of a new system using microwaves for vision correction** (*Invited Paper*), Thomas P. Ryan, Radha Pertaub, Steven Meyers, Ronald Scharf, Avedro, Inc. (United States)[7181-04]

11:30 am: **Size reduction and radiation pattern shaping of multi-fed DCC slot antennas used in conformal microwave array hyperthermia applicators**, Paolo F. Maccarini, Kavitha Arunachalam, Carlos D. Martins, Paul R. Stauffer, Duke Univ. Medical Ctr. (United States)[7181-05]

Lunch/Exhibition Break 11:55 am to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room B4 Sun. 1:30 to 3:10 pm

Thermal Therapy and Ablation

Session Chair: **Paul R. Stauffer**, Duke Univ. Medical Ctr.

1:30 pm: **Novel microwave applicators for thermal therapy and ablation** (*Invited Paper*), Thomas P. Ryan, Avedro, Inc. (United States); Peter J. Clegg, Univ. of Bath (United Kingdom)[7181-06]

1:50 pm: **Treatment delivery platform for conformal catheter-based ultrasound hyperthermia**, Titania Juang, Jeffery H. Wootton, Xin Chen, I-Chow Hsu, Chris J. Diederich, Univ. of California, San Francisco (United States)[7181-07]

2:10 pm: **Virtual conductive thermal ablation**, Gal Shafirstein, Umit Topaloglu, Yulong Yan, Eduardo G. Moros, Petr Novak, James Y. Suen M.D., Univ. of Arkansas for Medical Sciences (United States)[7181-08]

2:30 pm: **The effect of initial and dynamic liver conditions on RF ablation size: a study in perfused and non-perfused animal models**, Anna Belous, Ronald J. Podhajsky, Covidien (United States)[7181-09]

2:50 pm: **Design optimization of water coupling bolus used in thermal therapy of large area superficial tissue disease**, Kavitha Arunachalam, Paolo F. Maccarini, Duke Univ. Medical Ctr. (United States); Jaime L. Schlorff, Bionix Development Corp. (United States); Paul R. Stauffer, Duke Univ. Medical Ctr. (United States)[7181-10]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room B4 Sun. 3:40 to 5:10 pm

Planning and Optimization for Thermal Treatment

Session Chair: **P. Jack Hoopes**, Dartmouth Hitchcock Medical Ctr.

3:40 pm: **Computerized planning of cryosurgery: from model reconstruction to cryoprobe placement strategies** (*Invited Paper*), Yoed Rabin, Carnegie Mellon Univ. (United States)[7181-11]

4:10 pm: **Patient-specific optimization-based treatment planning platform for catheter-based ultrasound hyperthermia in conjunction with HDR brachytherapy**, Xin Chen, Jeffery H. Wootton, Titania Juang, Adam M. Cunha, Jean Pouliot, I-Chow Hsu, Chris J. Diederich, Univ. of California, San Francisco (United States)[7181-12]

4:30 pm: **Control time reduction using virtual source projection for treating the shank sarcoma with nonlinear perfusion**, Kung-Shan Cheng, Duke Univ. Medical Ctr. (United States); Zhen Li, Duke Univ. (United States); Paul R. Stauffer, Duke Univ. Medical Ctr. (United States); William T. Joines, Duke Univ. (United States); Mark W. Dewhirst, Shiva K. Das, Duke Univ. Medical Ctr. (United States)[7181-13]

4:50 pm: **Several optimization methods to optimize the spacing between the elements of ultrasound linear phased array to produce a radiation control and treating cancer tumors in biological media**, Ashraf Talaat-Ibrahim, Alexandria Univ. (Egypt)[7181-14]

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room B4 Mon. 8:30 to 9:50 am

Image Guidance and Thermal Imaging

Session Chair: **Chris J. Diederich**, Univ. of California, San Francisco

8:30 am: **Pre-clinical evaluation of an MRI-guided transrectal focused ultrasound system for thermal ablation of prostate cancer in canines** (*Invited Paper*), Nathan McDannold, Harvard Medical School (United States); Hadas Ziso, Benny Assif, Arik Hananel, InSightec Ltd. (Israel); Natalia Vykhodtseva, Harvard Medical School (United States); Peri Grettton, InSightec Ltd. (United States); Magdalini Pilatou, Clare Tempany, Harvard Medical School (United States)[7181-15]

9:00 am: **Clinical utility of magnetic resonance thermal imaging (MRTI) for realtime guidance of deep hyperthermia treatments** (*Invited Paper*), Paul R. Stauffer, Oana I. Craciunescu, Paolo F. Maccarini, Zhen Li, Brian J. Soher, James MacFall, Omar Arabe, Kavitha Arunachalam, Vadim Stakhursky, Kung-Shan Cheng, Shiva K. Das, Zeljko Vujaskovic M.D., Ellen L. Jones M.D., Terrance Wong, Duke Univ. (United States)[7181-16]

9:30 am: **Integrated microwave thermal imaging system with mechanically steerable HIFU therapy device**, Tian Zhou, Paul M. Meaney, Margaret W. Fanning, Shireen D. Geimer, Keith D. Paulsen, Dartmouth College (United States)[7181-17]

Coffee Break 9:50 to 10:40 am

SESSION 6

Room: Conv. Ctr. Room B4 Mon. 10:40 am to 12:00 pm

Nanoparticles and Cancer Therapy I

Session Chair: James E. Coad, West Virginia Univ.

10:40 am: **Cytotoxicity comparison of iron oxide and waterbath hyperthermia**, Jessica A. Ogden, Jennifer A. Tate, Dartmouth Hitchcock Medical Ctr. (United States); Rob Ivkov, Johns Hopkins Univ. (United States); Rendall R. Strawbridge, P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States) [7181-19]

11:00 am: **Toxicity and biodistribution of activated and non-activated dextran-coated iron-oxide nanoparticles**, Jennifer A. Tate, Jessica A. Ogden, Zachary E. Pierce, Rendall R. Strawbridge, P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States) [7181-20]

11:20 am: **An in vivo transmission electron microscopy study of injected dextran-coated iron-oxide nanoparticle location in murine breast adenocarcinoma tumors versus time**, Andrew J. Giustini, Dartmouth Hitchcock Medical Ctr. (United States); Rob Ivkov, The Johns Hopkins Univ. (United States); P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States) [7181-21]

11:40 am: **Iron oxide nanoparticle hyperthermia and chemotherapy (CDDP) cancer treatment**, Alicia A. Petryk, Patrick Ryan, Christabell D. Makokha, Andrew J. Giustini, Rendall R. Strawbridge, P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States) [7181-22]

Lunch Break 12:00 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Room B4 Mon. 1:30 to 3:10 pm

Nanoparticles and Cancer Therapy II

Session Chair: Sharon L. Thomsen, Pathology Consultant to Engineers and Physicists

1:30 pm: **Iron oxide nanoparticle hyperthermia and radiation cancer treatment**, Shiraz M. Cassim, Andrew J. Giustini, Rendall R. Strawbridge, P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States) . . . [7181-23]

1:50 pm: **Comparison of systemic and intratumor antibody directed and non-antibody directed iron oxide nanoparticle hyperthermia cancer therapy (Invited Paper)**, P. Jack Hoopes, Dartmouth College (United States); Jennifer A. Tate, Dartmouth Medical School (United States); Jessica A. Ogden, Dartmouth Hitchcock Medical Ctr. (United States); Rendall R. Strawbridge, Dartmouth Medical School (United States); Alicia A. Petryk, Shiraz M. Cassim, Andrew J. Giustini, Dartmouth Hitchcock Medical Ctr. (United States); Stephen Barry, Allan R. Foreman, ADURO BIOTECH (United States) [7181-24]

2:35 pm: **Efficacy of photothermal ablation using intravenously delivered NIR-absorbing nanorods in colon cancer**, Glenn P. Goodrich, J. Donald Payne, Kelly Sharp, LiLi Bao, Kristina L. Sang, Nanospectra Biosciences, Inc. (United States) [7181-25]

Coffee Break 3:10 to 3:40 pm

SESSION 8

Room: Conv. Ctr. Room B4 Mon. 3:40 to 4:30 pm

Perfusion in Thermal Therapy

Session Chair: John A. Pearce, The Univ. of Texas at Austin

3:40 pm: **Effect of micro- and macro-vascular perfusion on tumor ablation (Invited Paper)**, Dieter Haemmerich, David Schutt, Medical Univ. of South Carolina (United States) [7181-26]

4:10 pm: **A novel micro thermal probe for the measurement of perfusion**, Ming Yi, Virginia Polytechnic Institute and State Univ. (United States); Aditya Kausik, Univ. of Colorado at Boulder (United States); Ronald J. Podhajsky, Covidien (United States); Roop L. Mahajan, Virginia Polytechnic Institute and State Univ. (United States) [7181-27]

SESSION 9

Room: Conv. Ctr. Room B4 Mon. 4:30 to 5:25 pm

Ultrasound and Cavitation

Session Chair: Dieter Haemmerich, Medical Univ. of South Carolina

4:30 pm: **An intrauterine ultrasound applicator for targeted delivery of thermal therapy in conjunction with HDR brachytherapy to the cervix**, Jeffery H. Wootton, Xin Chen, I-Chow Hsu, Chris J. Diederich, Univ. of California, San Francisco (United States) [7181-28]

4:55 pm: **Cavitation: understanding the driving force behind current and new clinical applications (Invited Paper)**, Rudolf M. Verdaasdonk, John H. G. M. Klaessens, Tjeerd De Boorder, Rowland de Roode, Univ. Medisch Ctr. Utrecht (Netherlands) [7181-29]

Conference 7182 · Room: Marriott Hotel, San Jose Ballroom Salons V/VI

Monday-Wednesday 26-28 January 2009 • Proceedings of SPIE Vol. 7182

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues VII

Conference Chairs: Daniel L. Farkas, Cedars-Sinai Medical Ctr.; Dan V. Nicolau, The Univ. of Liverpool (United Kingdom); Robert C. Leif, Newport Instruments

Conference Co-Chairs: J. Paul Robinson, Purdue Univ.; Attila Tarnok, Univ. Leipzig (Germany); Ramesh Raghavachari, U.S. Food and Drug Administration; James F. Leary, Purdue Univ.

Program Committee: Christopher H. Contag, Stanford Univ. School of Medicine; Paul Dan A. Cristea, Univ. Politehnica Bucharest (Romania); Alberto Diaspro, Univ. degli Studi di Genova (Italy); Erik G. Fällman, Umeå Univ. (Sweden); Jesper Glückstad, Danmarks Tekniske Univ. (Denmark); Ewa M. Goldys, Macquarie Univ. (Australia); Charles P. Lin, Massachusetts General Hospital; Andreas G. Nowatzky, Cedars-Sinai Medical Ctr.; Markus Sauer, Univ. Bielefeld (Germany)

Monday 26 January

SESSION 1

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Mon. 8:00 to 10:00 am**

Tissue Imaging

Session Chair: Daniel L. Farkas,
Cedars-Sinai Medical Ctr. (United States)

8:00 am: **In vivo optical analysis of pancreatic cancer tissue in a living model mice using fluorescence and Raman spectroscopic techniques**, Toshiaki Suzuki, Yusuke Hattori, Takashi Katagiri, Hiroki Mitsuoka, The Institute of Physical and Chemical Research (RIKEN) (Japan); Kennichi Satoh, Tohoku Univ. (Japan); Toru Asakura, Miyagi Gakuin Women's Univ. (Japan); Toru Shimosegawa, Tohoku Univ. (Japan); Hidetoshi Sato, The Institute of Physical and Chemical Research (RIKEN) (Japan) [7182-01]

8:20 am: **Multispectral FLIM of tissue autofluorescence**, Bertram Su, Wolfgang Becker, Becker & Hickl GmbH (Germany) [7182-02]

8:40 am: **Label-free biochemical imaging of arterial tissues using photonic crystal fiber (PCF) based nonlinear optical microscopic system**, Alex Chun-Te Ko, Andrew Ridsdale, Adrian F. Pegoraro, Michael S. D. Smith, Bernie J. Schattka, Mark D. Hewko, Albert Stolow, Michael G. Sowa, National Research Council Canada (Canada) [7182-03]

9:00 am: **Raman microspectroscopy of retinal pigment epithelium cells: real-time imaging the effects of photooxidative stress**, Vladislav V. Yakovlev, Univ. of Wisconsin, Milwaukee (United States) [7182-04]

9:20 am: **Spectral pathology in breast cancer using mid-infrared spectroscopic imaging**, Rohit Bhargava, Frances N. Pounder, Michael Walsh, Univ. of Illinois at Urbana-Champaign (United States) [7182-05]

9:40 am: **Full-pupil line-scanning confocal microscope for imaging weakly scattering tissues: comparison to divided pupil**, Daniel S. Gareau, Sanjee Abeytunge, Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (United States) [7182-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Mon. 10:30 am to 12:00 pm**

Cell Imaging I

Session Chair: Daniel L. Farkas,
Cedars-Sinai Medical Ctr. (United States)

10:30 am: **Stationary and time-resolved total internal reflection fluorescence screening of living cells (Invited Paper)**, Thomas Bruns, Hochschule Aalen (Germany); Brigitte Angres, Heiko Steuer, NMI an der Univ. Tübingen (Germany); Wolfgang S. L. Strauss, Univ. Ulm (Germany); Herbert Schneckeburger, Hochschule Aalen (Germany) [7182-07]

11:00 am: **Imaging living hair cells within the cochlear epithelium of mice using two-photon microscopy**, Tao Yuan, Baylor College of Medicine (United States); Simon S. Gao, Rice Univ. (United States); Peter Saggau, John S. Oghalai, Baylor College of Medicine (United States) [7182-08]

11:20 am: **Cellular imagery with total internal reflection holographic microscopy**, William M. Ash III, Myung K. Kim, Univ. of South Florida (United States) [7182-09]

11:40 am: **Heterodyne fluorescence tomography: adding molecular sensitivity to OCT**, Andreas G. Nowatzky, Cedars-Sinai Medical Ctr. (United States) [7182-82]

Lunch Break 12:00 to 1:30 pm

SESSION 3

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Mon. 1:30 to 3:30 pm**

Cell Imaging II:

Session Chair: James F. Leary, Purdue Univ. (United States)

1:30 pm: **Multiplexed FRET for live cell studies of protein-protein interactions**, Ewan McGhee, David M. Grant, Imperial College London (United Kingdom); Wei Zhang, Tom Bunney, Institute of Cancer Research (United Kingdom); Clifford B. Talbot, James A. McGinty, Ian Munro, Christopher W. Dunsby, Mark A. A. Neil, Imperial College London (United Kingdom); Matilda Katan-Muller, Institute of Cancer Research (United Kingdom); Paul M. W. French, Imperial College London (United Kingdom) [7182-11]

1:50 pm: **Spectral imaging of microvascular function in a renal cell carcinoma after treatment with a vascular disrupting agent**, Mamta Wankhede, Casey deDeugd, Lori Rice, Sharon Lepler, Dietmar Siemann, Brian S. Sorg, Univ. of Florida (United States) [7182-12]

2:10 pm: **Structural characterization of colored human iridal melanosomes by photoelectron emission microscopy**, Dana N. Peles, John D. Simon, Duke Univ. (United States) [7182-13]

2:30 pm: **Direct Raman imaging spectroscopy of lung cancer cells and apoptotic cells**, Yusuke Oshima, Hidetoshi Sato, The Institute of Physical and Chemical Research (RIKEN) (Japan); Chie Furihata, Aoyama Gakuin Univ. (Japan) [7182-14]

2:50 pm: **Functional imaging of a single cell: far-field infrared super-resolution microscopy using autofluorescence detection**, Tsutomu Ohmori, National Defense Medical College (Japan); Keiichi Inoue, Makoto Sakai, Masaaki Fujii, Tokyo Institute of Technology (Japan); Miya Ishihara M.D., Makoto Kikuchi M.D., National Defense Medical College (Japan) [7182-15]

3:10 pm: **Loss of sorting Nexin 1 impairs dopamine D5 receptor function in human proximal tubule cells**, Van Anthony M. Villar M.D., John E. Jones, Ines Armando, Annabelle A. Pascua D.V.M., Xiaoyan Wang M.D., Georgetown Univ. Medical Ctr. (United States); Cynthia P. Saloma, Univ. of the Philippines (Philippines); Pedro A. Jose M.D., Georgetown Univ. Medical Ctr. (United States) [7182-16]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Mon. 4:00 to 5:40 pm

Biomolecular Imaging

Session Chair: **Attila Tarnok**, Univ. Leipzig (Germany)

- 4:00 pm: **Dynamic molecular imaging in living cells by using Raman scattering**, Katsumasa Fujita, Keisaku Hamada, Nicholas I. Smith, Yasushi Inouye, Satoshi Kawata, Osaka Univ. (Japan). [7182-17]
- 4:20 pm: **Serum protein profile study of clinical samples using high performance liquid chromatography-laser induced fluorescence: case of cervical and oral cancers**, Gopal R. Karemore, Univ. of Copenhagen (Denmark); Sujatha N. Raja, Lavanya Rai, Keerthilatha M. Pai, V. B. Kartha, Santhosh Chidangil, Manipal Univ. (India). [7182-18]
- 4:40 pm: **Physical mechanism of delayed luminescence from human serum**, Hua Bai, Ping Chen, Lie Lin, Shengjiang Chang, Guoqing Tang, Guoguang Mu, Nankai Univ. (China) [7182-19]
- 5:00 pm: **Evaluation of optimal DNA staining for triggering by scanning fluorescence microscopy (SFM)**, Monika Marecka, Anja Mittag, Arkadiusz Pierzchalski, Univ. Leipzig (Germany); Wolf Malkusch, Carl Zeiss Imaging Solutions GmbH (Germany); Jozsef Bocsi, Attila Tarnok, Univ. Leipzig (Germany) [7182-20]
- 5:20 pm: **High-performance dispersive Raman and absorption spectroscopy as tools for drug identification**, Romuald Pawluczyk, Olga Pawluczyk, Sam Andrey, Andrew Roy, P&P Optica Inc. (Canada) [7182-21]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Automated feature extraction and fusion of multi-modality optic nerve head images, Hua Cao, Bahram Khoobehi, Louisiana State Univ. (United States) [7182-60]

High-resolution imaging of biological cell with fiber-based composite interferometer, I-Jen Hsu, Hsiu-I Hsu, Chun-Wei Chang, Chung Yuan Christian Univ. (Taiwan); Max T. Hou, National United Univ. (Taiwan) [7182-66]

Atmospheric pressure femtosecond laser imaging mass spectrometry, Yves Coello, Tissa C. Gunaratne, Marcos M. Dantus, Michigan State Univ. (United States) [7182-68]

Optical property of red blood cell with a phase microscopy, Jiyong Lee, Seungrag Lee, W. Z. Yang, Dug-Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7182-69]

Polarization microscope by single polarization modulation method: novel instrument for visualizing cytoskeleton, In Hee Shin, Namhui Ahn, Sang-Mo Shin, Dug-Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7182-70]

Study on mechanical/chemical properties of biomolecules at various conditions using optical tweezers, Jin-Woo Pyo, Yoo-Chan Hong, Yonsei Univ. (Korea, Republic of); Lan Jin, Korea Advanced Institute of Science and Technology (Korea, Republic of); Beop-Min Kim, Dae-Sung Yoon, Yonsei Univ. (Korea, Republic of); Kwangsoo No, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7182-71]

Influence calcium and calmodulin on deformation erythrocytes blood rats, Gayrat Khodjayev, Samarkand Agricultural Institute (Uzbekistan); Rustam Khodjayev, Eldar N. Kurtaliev, Negmat Nizomov, Zafar Ismailov, Samarkand State Univ. (Uzbekistan) [7182-72]

Quantification of optical disorder in nanoscale mass density fluctuations in biological tissue: inverse participation ratio (IPR) analysis of transmission electron microscopy (TEM) images, Prabhakar Pradhan, Dhwanil P. Damania, Vladimir M. Turzhitsky, Vadim Backman, Northwestern Univ. (United States); Hemant K. Roy M.D., Evanston Northwestern Healthcare Corp. (United States) [7182-73]

Automated tracking of migration and differentiation of fluorescently labeled human embryonic stem cells, Mahsa Ranji, Diego Calzolari, Natalie Prigozhina, Karen Wei, Mark Mercola, Jeffrey H. Price M.D., Burnham Institute for Medical Research (United States) [7182-74]

Tuesday 27 January

SESSION 5

Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Tues. 8:00 to 10:00 am

Microanalysis and Microarrays I

Session Chair: **J. Paul Robinson**, Purdue Univ. (United States)

8:00 am: **A high-speed automated fluorescence lifetime imaging Nipkow confocal multiwell plate reader**, Clifford B. Talbot, James A. McGinty, David M. Grant, Ewan McGhee, Imperial College London (United Kingdom); Wei Zhang, Tom Bunney, The Institute of Cancer Research (United Kingdom); Ian Munro, Imperial College London (United Kingdom); Matilda Katan-Muller, The Institute of Cancer Research (United Kingdom); Christopher W. Dunsby, Mark A. A. Neil, Paul M. W. French, Imperial College London (United Kingdom) [7182-22]

8:20 am: **Lensfree on-chip detection of bacteria at low concentrations using LUCAS**, Sungkyu Seo, Ting-Wei Su, Derek K. Tseng, Aydogan Ozcan, Univ. of California, Los Angeles (United States) [7182-23]

8:40 am: **Immobilization of small-molecule compound microarrays on solid support using macromolecular scaffolds and subsequent label-free optical detection of protein binding reactions with small-molecule microarrays**, Yung-Shin Sun, James P. Landry, Yiyang Fei, Xiangdong Zhu, Univ. of California, Davis (United States); Juntao Luo, Kit S. Lam, UC Davis Cancer Ctr. (United States) [7182-24]

9:00 am: **Screening small-molecule compound microarrays for protein ligands using high-throughput label-free optical scanning microscope**, Yiyang Fei, James P. Landry, Yung-shin Sun, Xiangdong Zhu, Univ. of California, Davis (United States); Xiaobing Wang, Juntao Luo, Chun-yi Wu, Kit S. Lam, UC Davis Cancer Ctr. (United States) [7182-25]

9:20 am: **Autoconfocal microscopy for simultaneous two-photon fluorescence and confocal imaging at 1.5 microns**, Chulmin Joo, Chun Zhan, Siavash Yazdanfar, GE Global Research (United States) [7182-26]

9:40 am: **Development of an all-optical real-time PCR system**, Hanyoung Kim, Sanhita Dixit, Christopher J. Green, Gregory W. Faris, SRI International (United States) [7182-27]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Tues. 10:30 am to 12:10 pm

Microanalysis and Microarrays II

Session Chair: **J. Paul Robinson**, Purdue Univ. (United States)

10:30 am: **Optically manipulated emulsion droplets: a new tool for microfluidics research**, Sanhita Dixit, Hanyoung Kim, Gregory W. Faris, SRI International (United States) [7182-28]

10:50 am: **Cell lysis technique using optical heating with a CW infrared laser**, Hanyoung Kim, Gregory W. Faris, SRI International (United States) [7182-29]

11:10 am: **Hollow fiber: a biophotonic implant for live cells**, Oscar F. Silvestre, Mark D. Holton, Huw D. Summers, Paul J. Smith, Rachel J. Errington, Cardiff Univ. (United Kingdom) [7182-30]

11:30 am: **Fluorescence confocal detection system in situ for analyzing metabolism of 3D cultured cells in microfluidic device**, Jong-ryul Choi, Yonsei Univ. (Korea, Republic of); Jong Hwan Sung, Michael L. Shuler, Cornell Univ. (United States); Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7182-31]

11:50 am: **Hyperspectral imaging based on Fourier transform spectrometry: application to DNA microarrays with metal nanoparticle probes**, Te-Yu Tseng, Po-Jen Lai, Kung-Bin Sung, National Taiwan Univ. (Taiwan) [7182-32]

Lunch Break 12:10 to 1:30 pm

SESSION 7

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Tues. 1:30 to 4:00 pm**

Optical Manipulation and Probing

*Session Chair: Daniel L. Farkas,
Cedars-Sinai Medical Univ. (United States)*

1:30 pm: **Probing the mechanical properties of Drosophila embryo epithelial cells in vivo by laser nanodissection**, Matteo Rauzi, Institut Fresnel (France); Eric P. Mottay, Amplitude Systemes (France); Thomas Lecuit, Univ. Paul Cézanne (France); Pierre-François Lenne, Institut Fresnel (France)[7182-33]

1:50 pm: **Photoablative dilution with pre-enrichment for the clonal isolation of rare cells**, Michael D. Zordan, Mary-Margaret Seale, James F. Leary, Purdue Univ. (United States)[7182-35]

2:10 pm: **Quantitative phase evaluation of dynamic changes on the cell membrane during laser microsurgery**, Lingfeng Yu, Samarendra Mohanty, Khyati Mohanty, Gangjun Liu, Suzanne Genc, Univ. of California, Irvine (United States); Myung K. Kim, Univ. of South Florida (United States); Zhongping Chen, Michael W. Berns, Univ. of California, Irvine (United States)[7182-36]

2:30 pm: **Cell palpation system for local mechanical properties of a cell with an optically manipulated particle**, Miyoshi Hideaki, Sugiura Tadao, Minato Kotaro, Nara Institute of Science and Technology (Japan)[7182-37]

2:50 pm: **Monitoring drug induced apoptosis of leukemic human T lymphocytes using laser trap Raman spectroscopy**, Tobias J. Moritz, Douglas S. Taylor, Denise M. Krol, Stephen M. Lane, Univ. of California, Davis (United States); James W. Chan, Univ. of California, Davis (United States) and Lawrence Livermore National Lab. (United States)[7182-38]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **Ventricular defibrillation combining DC electrical field and electrical pacing: an optical mapping study**, Sai Shruthi S. Musunuri, Liang Tang, Boyoung Joung M.D., Edward J. Berbari, Shien-Fong Lin, Indiana Univ. School of Medicine (United States)[7182-39]

SESSION 8

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Tues. 4:00 to 5:40 pm**

New Imaging Techniques

*Session Chair: Dan V. Nicolau,
The Univ. of Liverpool (United Kingdom)*

4:00 pm: **A compact multidimensional spectrofluorometer exploiting supercontinuum generation**, Hugh B. Manning, Gordon T. Kennedy, Dylan M. Owen, David M. Grant, Christopher W. Dunsby, Yoshifumi Itoh, Paul M. W. French, Imperial College London (United Kingdom)[7182-40]

4:20 pm: **Multiplexing streak camera based confocal FLIM microscope for monitoring protein-protein interaction using FRET**, Jin Ning, McMaster Univ. (Canada); Sandy Ng, Spectral Applied Research Inc. (Canada); Tony J. Collins, Fei Geng, McMaster Univ. (Canada); Peter M. Sinclair, Richard Berman, Spectral Applied Research Inc. (Canada); David W. Andrews, Qiying Fang, McMaster Univ. (Canada)[7182-41]

4:40 pm: **Effect of time gating and polarization discrimination of propagating light in turbid media in angular domain imaging (ADI)**, Fartash Vasefi, Simon Fraser Univ. (Canada); Eldon Ng, Univ. of Western Ontario (Canada); Bozena Kaminska, Glenn H. Chapman, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada)[7182-42]

5:00 pm: **Solid state photomultipliers for imaging applications**, Gin-Chung J. Wang, Jeffery S. Gordon, GE Global Research (United States)[7182-43]

5:20 pm: **High-speed fluorescence lifetime measurement for investigation of dynamic phenomena**, Young Jae Won, Sucbe Moon, Dongsoo Lee, Dug-Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of)[7182-44]

Wednesday 28 January

SESSION 9

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Wed. 8:00 to 11:10 am**

Image Analysis

*Session Chair: Dan V. Nicolau,
The Univ. of Liverpool (United Kingdom)*

8:00 am: **Red blood cell structure and dynamics explored with digital holographic microscopy**, Pierre P. Marquet, Rappaz Benjamin, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Alexander Barbul, Tel Aviv Univ. (Israel); Jonas Kuhn, Nicolas Pavillon, Etienne Shaffer, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Yves Emery, Lycée Tec SA (Switzerland); Rafi Korenstein, Tel Aviv Univ. (Israel); Christian D. Depeursinge, Pierre J. Magistretti, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7182-45]

8:20 am: **5-band real-time remote stereoscopic imaging photoplethysmography: continuing the development of contactless pulse oxigraphy**, Fokko P. Wieringa, TNO Science and Industry (Netherlands); Mireille V. Boot, Technische Univ. Delft (Netherlands); Frits Mastik, Univ. Medisch Ctr. Rotterdam (Netherlands); Rene G. M. van Melick, O2view (Netherlands); Anton F. W. van der Steen, Univ. Medisch Ctr. Rotterdam (Netherlands)[7182-46]

8:40 am: **Image contrast enhancement for time-angular domain imaging through turbid media by optimum estimation of background scattered light**, Eldon Ng, The Univ. of Western Ontario (Canada) and Lawson Health Research Institute (Canada); Fartash Vasefi, Bozena Kaminska, Glenn H. Chapman, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada)[7182-47]

9:00 am: **Dynamic reconfigurable spectral imaging microscopy**, Bing Chen, Univ. of Miami (United States); Jame J. Yang, New Span Opto-Technology Inc. (United States); Michael R. Wang, Univ. of Miami (United States)[7182-48]

9:20 am: **Three-dimensional visualization of the structure and growth dynamics**, Conor L. Evans, Imran Rizvi, Jon Celli, Tayyaba Hasan, Wellman Ctr. for Photomedicine (United States); Johannes F. de Boer, Vrije Univ. (Netherlands)[7182-49]

9:40 am: **Hyperspectral microscopy imaging with 10 color analysis reduces time and cost for cancer assays**, Michael L. Huebschman, Alice Lin, Dipen Rana, Nancy Lane, Huaying Liu, Lawrence Cheng, Jonathan W. Uhr, Harold R. Garner, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States)[7182-50]

Coffee Break 10:00 to 10:30 am

10:30 am: **Microscopy with spatial filtering for sorting particle and monitoring subcellular morphology**, Jing-Yi Zheng, Zhen Qian, Robert M. Pasternack, Nada N. Boustany, Rutgers Univ. (United States)[7182-51]

10:50 am: **Molecular analysis of arterial remodeling: a novel application of infrared imaging spectroscopy**, Brad C. Herman, Weill Cornell Medical College (United States); Rishi Kundi, Weill Cornell Medical College (United States) and Beth Israel Medical Ctr. (United States); K. Craig Kent, Weill Cornell Medical College (United States) and Columbia Univ. Medical Ctr. (United States); Bo Liu, Weill Cornell Medical College (United States); Nancy Pleshko, Exponent, Inc. (United States)[7182-52]

SESSION 10

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Wed. 11:10 am to 12:10 pm**

Optical Quantification I

Session Chair: Robert C. Leif, Newport Instruments (United States)

11:10 am: **Quantifying cellular biomarker expression in thick tissues with ratiometric three-dimensional microscopy**, Jonathan T. C. Liu, Mike W. Helms, Michael J. Mandella, Gordon S. Kino, Stanford Univ. (United States); Christopher H. Contag, Stanford Univ. School of Medicine (United States) [7182-53]

11:30 am: **Quantitative FRET measurement by fast EEM spectroscopy**, Leilei L. Peng, Jing Yuan, Brett E. Bouma, Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States) [7182-54]

11:50 am: **Measurements and analysis in imaging for biomedical applications**, Timothy L. Hoeller, DQR Testing Services (United States) [7182-55]

Lunch Break 12:10 to 1:30 pm

SESSION 11

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Wed. 1:30 to 3:10 pm**

Optical Quantification II

Session Chair: Robert C. Leif, Newport Instruments (United States)

1:30 pm: **Determination of glucose concentration using Fourier domain optical coherence tomogram**, Yasser H. El-Sharkawy M.D., Cairo Univ. (Egypt) [7182-56]

1:50 pm: **A two-stage morphological classifier of foci occurring in cell transformation assays**, Giovanni F. Crosta, Chiara Urani, Luca Bussinelli, Univ. degli Studi di Milano-Bicocca (Italy) [7182-57]

2:10 pm: **Spectroscopy for the classification of bruises**, Barbara Stam, Ton G. C. van Leeuwen, Maurice C. Aalders, Jr., Academisch Medisch Ctr. (Netherlands) [7182-58]

2:30 pm: **Dynamic fluorescence imaging for multiparametric measurement of tumor vasculature**, Myunghwan Choi, Taesu Chung, Kyungsun Choi, Chulhee Choi, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7182-61]

2:50 pm: **The measurement of red blood cell volume induced by Ca²⁺ based on quantitative phase microscopy**, Seungrag Lee, Jiyong Lee, W. Z. Yang, Dug-Young Kim, Gwangju Institute of Science and Technology (Korea, Republic of) [7182-62]

Coffee Break 3:10 to 4:00 pm

SESSION 12

**Room: Marriott Hotel,
San Jose Ballroom Salons V/VI Wed. 4:00 to 5:20 pm**

Cytomics

Session Chair: Attila Tarnok, Univ. Leipzig (Germany) 4:00 pm: **A modular approach to the advanced cytometry specification (ACS)**, Robert C. Leif, Newport Instruments (United States) [7182-63]

4:20 pm: **Evaluation of slide based cytometry (SBC) for concentration measurements of fluorescent dyes in solution**, Arkadiusz Pierzchalski, Monika Marecka, Univ. Leipzig (Germany); Hanswilly Müller, Sensovation AG (Germany); Jozsef Bocsi, Attila Tarnok, Univ. Leipzig (Germany) [7182-64]

4:40 pm: **Triggering of leukocytes by phase contrast in imaging cytometry with scanning fluorescence microscope (SFM)**, Jozsef Bocsi, Arkadiusz Pierzchalski, Monika Marecka, Univ. Leipzig (Germany); Wolf Malkusch, Carl Zeiss Imaging Solutions GmbH (Germany); Attila Tarnok, Univ. Leipzig (Germany) [7182-65]

5:00 pm: **Laser rastering flow cytometry: fast cell counting and identification**, Giacomo Vacca, Mahesh R. Junnarkar, Norman R. Goldblatt, Michael Yee, Abbott Hematology (United States); Thad Briese, Plexus Technology Group (United States) [7182-81]

Conference 7183 · Room: Marriott Hotel, San Jose Ballroom Salon IV

Sunday-Tuesday 25-27 January 2009 • Proceedings of SPIE Vol. 7183

Multiphoton Microscopy in the Biomedical Sciences IX

Conference Chairs: **Ammasi Periasamy**, Univ. of Virginia; **Peter T. C. So**, Massachusetts Institute of Technology

Program Committee: **Wolfgang Becker**, Becker & Hickl GmbH (Germany); **Keith M. Berland**, Emory Univ.; **Guy C. Cox**, The Univ. of Sydney (Australia); **Alberto Diaspro**, Univ. degli Studi di Genova (Italy); **Chen Y. Dong**, National Taiwan Univ. (Taiwan); **Kevin Eliceiri**, Univ. of Wisconsin/Madison; **Scott E. Fraser**, California Institute of Technology; **Paul M. W. French**, Imperial College London (United Kingdom); **Hans C. Gerritsen**, Univ. Utrecht (Netherlands); **Min Gu**, Swinburne Univ. of Technology (Australia); **Stefan W. Hell**, Max-Planck-Institut für Biophysikalische Chemie (Germany); **Brian A. Herman**, The Univ. of Texas Health Science Ctr. at San Antonio; **Satoshi Kawata**, Osaka Univ. (Japan); **Karsten König**, Saarland Univ. (Germany); **Arnd K. Krueger**, Spectra-Physics; **Joseph R. Lakowicz**, Univ. of Maryland/Baltimore; **Stephen M. McDonald**, Coherent, Inc.; **Simon C. Watkins**, Univ. of Pittsburgh; **Paul W. Wiseman**, McGill Univ. (Canada); **Sunney Xie**, Harvard Univ.; **Bernhard Zimmermann**, Carl Zeiss Jena GmbH (Germany); **Warren R. Zipfel**, Cornell Univ.

Conference Sponsored by: **Becker & Hickl, Boston Electronics, Carl Zeiss, Chroma Tech, Coherent, HighQ Laser, Jen Lab., Leica Microsystems, Newport-Spectra Physics, Olympus America, Omega Optical**

Sunday 25 January

WELCOME REMARKS

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 8:10 to 8:20 am
Ammasi Periasamy, Univ. of Virginia

KEYNOTE SESSION

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 8:20 to 9:45 am
Session Chair: **Ammasi Periasamy**, Univ. of Virginia

8:20 am: **What is behind all those lifetimes anyway, and where do we go from here?**, Robert M. Clegg, Univ. of Illinois at Urbana-Champaign (United States) [7183-01]
8:50 am: **Multicolor fluctuation spectroscopy in cells**, Enrico Gratton, Michelle A. Digman, Univ. of California, Irvine (United States) [7183-02]
9:20 am: **Medical multiphoton microscopic endoscopes and diagnostics (Presentation Only)**, Watt W. Webb, Hyungsik Lim, Chris Xu, Cornell Univ. (United States) [7183-03]

SESSION 2

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 9:50 am to 12:00 pm

FLIM/FRET/FCS I

Session Chair: **Angelika C. Rueck**, Univ. Ulm (Germany)

9:50 am: **Fast-acquisition multispectral FLIM by parallel TCSPC**, Wolfgang Becker, Bertram Su, Axel Bergmann, Becker & Hickl GmbH (Germany) [7183-04]
Coffee Break 10:10 to 10:30 am
10:30 am: **The characterization of optimized fluorescent proteins for Förster resonance energy transfer microscopy (Invited Paper)**, Richard N. Day, Univ. of Virginia Health System (United States); Yuansheng Sun, Univ. of Virginia (United States); Cynthia F. Booker, Sangeeta Kumari, Univ. of Virginia Health System (United States); Ammasi Periasamy, Univ. of Virginia (United States); Michael W. Davidson, Florida State Univ. (United States) [7183-05]
10:55 am: **Using Monte Carlo simulations of energy migration to model the time-correlated fluorescence anisotropy decay of fluorescent protein tagged CaMKII α** (Invited Paper), Steven S. Vogel, Paul S. Blank, Srinagesh V. Koushik, Christopher Thaler, National Institutes of Health (United States) [7183-06]

11:20 am: **Multi-dimensional fluorescence measurements**, Christoph U. Biskup, Birgit Hoffmann, Klaus Benndorf, Friedrich-Schiller-Univ. Jena (Germany) [7183-07]

11:40 am: **Metabolic mapping of cell culture growth by NADH fluorescence lifetime imaging**, Vladimir Ghukasyan, Tatyana Buryakina, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) [7183-08]

Lunch/Exhibition Break 12:00 to 1:00 pm

SESSION 3

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 1:00 to 3:05 pm

FLIM/FRET/FCS II

Session Chair: **Richard N. Day**, Univ. of Virginia Health System

1:00 pm: **SLIM: multispectral FLIM with wide applications in cell biology (Invited Paper)**, Angelika C. Rueck, Univ. Ulm (Germany) [7183-09]
1:25 pm: **Multi-spectral multiphoton NDD FLIM**, Klaus Weisshart, Carl Zeiss Jena GmbH (Germany); Wolfgang Becker, Becker & Hickl GmbH (Germany) [7183-10]
1:45 pm: **New multichannel photon timing instrumentation with independent, synchronized channels and high count rate for FLIM and correlation analysis**, Michael Wahl, Rainer Erdmann, PicoQuant GmbH (Germany); Gerald Kell, Fachhochschule Brandenburg (Germany); Christian Nock, Hans-Juergen Rahn, Tino Roehlicke, PicoQuant GmbH (Germany) [7183-11]
2:05 pm: **Filtered FCS and species cross correlation function**, Suren Felekyan, Stanislav Kalinin, Alessandro Valeri, Claus A. M. Seidel, Heinrich-Heine-Univ. Düsseldorf (Germany) [7183-12]
2:25 pm: **Luminescent blinking of gold nanoparticles studied by fluorescence correlation spectroscopy**, Gereon Hüttmann, Univ. zu Lübeck (Germany); Jing Wang, Zhenxi Zhang, Zheng Li, Xiaochao Qu, Xi'an Jiaotong Univ. (China) [7183-13]
2:45 pm: **Advances of time resolved fluorescence techniques for confocal laser scanning microscopes**, Benedikt Kraemer, Rainer Erdmann, Felix Koberling, Volker Buschmann, Marcelle Koenig, Uwe Ortmann, Michael Wahl, Matthias Patting, Peter Kapusta, PicoQuant GmbH (Germany) [7183-14]
Coffee Break 3:05 to 3:30 pm

SESSION 4

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 3:30 to 5:40 pm

FLIM/FRET/FCS III

Session Chair: **Fu-Jen Kao**, National Yang-Ming Univ. (Taiwan)

- 3:30 pm: **Quantification of protein clustering by one- and two-photon time resolved fluorescence anisotropy imaging** (*Invited Paper*), Hans C. Gerritsen, Arjen Bader, Erik Hofman, Paul van Bergen en Henegouwen, Sandra Hötzel, Gerrit van Meer, Utrecht Univ. (Netherlands) [7183-15]
- 3:50 pm: **Development of a FLIM-STED microscope for studying protein interactions at synapses of hippocampal neurons**, Kim Dore, Paul De Koninck, Daniel Côté, Univ. Laval Robert-Giffard (Canada) [7183-16]
- 4:10 pm: **Angular domain fluorescent lifetime imaging (ADFLIM) in turbid media**, Fartash Vasefi, Simon Fraser Univ. (Canada); Eldon Ng, The Univ. of Western Ontario (Canada); Bozena Kaminska, Glenn H. Chapman, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada) [7183-17]
- 4:30 pm: **Voltage sensitive dyes used for FLIM studied by two-photon-microscopy**, Thomas Gensch, Forschungszentrum Jülich GmbH (Germany) [7183-18]
- 4:50 pm: **Analysis of NAD(P)H fluorescence components in cardiac myocytes from human biopsies: a new tool to improve diagnostics of rejection of transplanted patients**, Ying Cheng, Univ. de Montréal (Canada); Anton Mateasik, International Laser Ctr. (Slovakia); Nagib Dahdah, Nancy Poirier, Joaquim Miró, Univ. de Montréal (Canada); Dusan Chorvat, Jr., International Laser Ctr. (Slovakia); Alzbeta Chorvatova, Univ. de Montréal (Canada) [7183-19]
- 5:05 pm: **The relationship of NADH fluorescence lifetime, mitochondrial membrane potential and the intracellular ATP level in the early stage of staurosporine-induced apoptosis**, Jia-Sin Yu, Han-Wen Guo, Chien-Tsun Chen, Yau-Huei Wei, Hsing-Wen Wang, National Yang-Ming Univ. (Taiwan) [7183-20]
- 5:20 pm: **Fluorescence standards for time-resolved fluorescence spectroscopy and microscopy** (*Invited Paper*), Ignacy Gryczynski, Rafal Luchowski, S. Bahril, P. Sarkar, M. Szabelski, Julian Borejdo, The Univ. of North Texas Health Science Ctr. (United States); Peter Kapusta, Rainer Erdmann, PicoQuant GmbH (Germany); Evgenia G. Matveeva, Zygmunt K. Gryczynski, The Univ. of North Texas Health Science Ctr. (United States) [7183-21]

STUDENT POSTER COMPETITION

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 6:00 to 7:30 pm

Session Chairs: **Holly L. Aron**, Univ. of California, Berkeley;
Steven S. Vogel, National Institutes of Health;
Klaus Schuling, King's College of London (United Kingdom);
Hans C. Gerritsen, Univ. Utrecht (Netherlands)

- Stimulated Raman scattering microscopy***, Wei Min, Christian W. Freudiger, Sijia Lu, Sunney Xie, Harvard Univ. (United States) [7183-43]
- Fluorescence lifetime imaging using stroboscopic excitation***, Mark D. Holton, Swansea Univ. (United Kingdom); Oscar F. Silvestre, Cardiff Univ. (United Kingdom); Huw D. Summers, Paul Rees, Swansea Univ. (United Kingdom); Rachel J. Errington, Cardiff Univ. (United Kingdom) [7183-71]
- Estimation of membrane lateral pressure in living cells by means of multidimensional confocal fluorescence microscopy***, Anca Margineanu, Ali Salehi-Reyhani, Hugh B. Manning, Oscar Ces, Christopher W. Dunsby, Richard Templer, Paul M. W. French, David R. Klug, Imperial College London (United Kingdom) [7183-72]
- Improving image formation from the illumination side: linear and non-linear excitation case***, Emiliano Ronzitti, Francesca Cella, Alberto Diaspro, Univ. degli Studi di Genova (Italy) [7183-73]
- Non-linear effects and role of scattering in multiphoton imaging of thick biological samples***, Francesca Cella, Zeno Lavagnino, Alberto Diaspro, Univ. degli Studi di Genova (Italy) [7183-74]
- Mechanical properties of tissue determined by multiphoton microscopy***, Magnus B. Lilledahl, Catharina de Lange Davies, Norwegian Univ. of Science and Technology (Norway) [7183-75]
- STED microscopy made simple***, Andreas Schönle, Lars Kastrop, Katrin Willig, Dominik Wildanger, Benjamin Harke, Brian Rankin, Christian Eggeling, Alexander Egner, Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7183-77]

Fluorescence lifetime dynamics of eGFP in protein aggregates with expanded polyQ*, Vladimir Ghukasyan, Chih-Chun Hsu, Chia-Rung Liu, Fu-Jen Kao, Tzhu-Hao Cheng, National Yang-Ming Univ. (Taiwan) [7183-78]

Lipids distribution imaging of lipid vesicles by multi-focus excitation CARS microscope*, Takeo Minamikawa, Tsutomu Araki, Mamoru Hashimoto, Osaka Univ. (Japan) [7183-79]

Multispectral autofluorescence lifetime imaging of retinal pigment epithelium cells using two-photon excitation*, Lingling Zhao, Junle Qu D.D.S., Shenzhen Univ. (China) [7183-80]

Optical detection of concentrations for mixed acid: HF and HNO₃*, Gumin Kang, Kyoungsik Kim, Yonsei Univ. (Korea, Republic of) [7183-82]

Coherent control in multiphoton fluorescence imaging*, Arijit Kumar De, Debabrata Goswami, Indian Institute of Technology Kanpur (India) [7183-83]

High-resolution adaptive wavefront correction in multiphoton microscopy*, Gunnsteinn Hall, Min Ren, Kevin Eliceiri, John G. White, Univ. of Wisconsin, Madison (United States) [7183-84]

Comparison of two-photon imaging depths with 775 nm excitation and 1300 nm excitation*, Demirhan Kobat, Angela W. Wong, Christopher B. Schaffer, Chris Xu, Cornell Univ. (United States) [7183-86]

Localization of protein-protein interactions between one donor and two acceptors in a single living cell: three-color FRET microscopy*, Yuansheng Sun, Univ. of Virginia (United States) [7183-87]

Endocytic pH modulates receptor cluster organization using FRET-FLIM microscopy*, Horst K. Wallrabe, Ammasi Periasamy, Univ. of Virginia (United States); Margarida Barroso, Albany Medical College (United States) [7183-88]

The change of fluorescence lifetime of GFP tagged AT1R confirms its degradation in lysosomes at the stimulation of Ang II*, Hewang Li, Peiyong Yu, Georgetown Univ. Medical Ctr. (United States); Robin A. Felder, Ammasi Periasamy, Univ. of Virginia (United States); Pedro A. Jose M.D., Georgetown Univ. Medical Ctr. (United States) [7183-89]

Study of exo/endocytic events in PC12 cells by two-photon microscopy*, Jie Zhang, Ammasi Periasamy, J. David Castle, Univ. of Virginia (United States) [7183-90]

Optimization of fluorescence collection in multiphoton microscopy*, Joseph Zinter, Michael J. Levene, Yale Univ. (United States) [7183-91]

In vivo multiphoton microscopy of neuronal networks in deep cortical layers using a microprism probe*, Thomas H. Chia, Michael J. Levene, Yale Univ. (United States) [7183-92]

Optical, non-invasive monitoring of engineered tissues*, William Rice, David L. Kaplan, Irene Georgakoudi, Tufts Univ. (United States) [7183-93]

POSTERS-SUNDAY

Room: Marriott Hotel,
San Jose Ballroom Salon IV Sun. 6:00 to 7:30 pm

Poster presenters may put up their posters Sunday afternoon beginning at 5:30 pm and will need to remove their posters immediately following the poster session. Any papers left on the boards following the poster session will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session. Poster authors should be at their posters from 6:00 to 7:30 Sunday evening to discuss their work with session attendees. Attendees are requested to wear their conferences badges.

Imaging of remodeling of collagen matrix in three dimensional space using second harmonic generation and two photon excitation fluorescence, Thomas Abraham, John Carthy, Bruce McManus, St. Paul's Hospital (Canada) [7183-67]

Fluorescent nanodiamonds for FRET-based monitoring of a single biological nanomotor FoF1-ATP synthase, Michael Borsch, Rolf Reuter, Univ. Stuttgart (Germany); Rainer Erdmann, PicoQuant GmbH (Germany); Fedor Jelezko, Joerg Wrachtrup, Univ. Stuttgart (Germany) [7183-94]

Proteome-wide fluctuation analysis of S. cerevisiae, Christopher J. Wood, Joseph Huff, Kasthuri Kannan, Winfried Wiegand, Stowers Institute for Medical Research (United States) [7183-95]

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Depth enhancement and optimization of multi-photon excitation microscopy by total emission detection (TED) using a parabolic light reflector, Christian A. Combs, Aleksandr V. Smirnov, Jason A. Riley, Amir H. Gandjbakhche, Jay R. Knutson, Robert S. Balaban, National Institutes of Health (United States)[7183-96]

A setup for combined multi photon laser scanning microscopic and multi electrode patch clamp experiments on brain slices, P. Johannes Helm, Trond Reppen, Paul Heggelund, Univ. of Oslo (Norway)[7183-97]

Transient state microscopy: a new tool for biomolecular imaging, Tor Sandén, Gustav Persson, Jerker Widengren, Kungliga Tekniska Högskolan (Sweden)[7183-98]

Picosecond time-resolved multiphoton microscopy, R. E. de Araujo, D. J. Rativa, A. S. L. Gomes, Univ. Federal de Pernambuco (Brazil)[7183-99]

In-vivo and in-vitro investigations of retinal fluorophores in age-related macular degeneration (AMD) by fluorescence lifetime imaging (FLIM), Martin Hammer, Silvio Quick, Friedrich-Schiller-Univ. Jena (Germany); Matthias Klemm, Technische Univ. Ilmenau (Germany); Stefan Schenke, Friedrich-Schiller-Univ. Jena (Germany); Nathan Mata, Sirion Therapeutics (United States); Anett Eitner, Dietrich Schweitzer, Friedrich-Schiller-Univ. Jena (Germany)[7183-100]

Scan head for combined 2-photon and OCT imaging for medical diagnosis, Gerson Hüttmann, Björn Martensen, Regina Orzekowsky, Norbert Koop, Univ. zu Lübeck (Germany)[7183-101]

Two-photon luminescence imaging of molecularly-targeted gold nanoparticles using a miniaturized imaging and microsurgery probe, Christopher L. Hoy, Nicholas J. Durr, The Univ. of Texas at Austin (United States); Wibool Piyawattanametha, Hyejun Ra, Olav D. Solgaard, Stanford Univ. (United States); Adela Ben-Yakar, The Univ. of Texas at Austin (United States)[7183-102]

Dispersion control considerations for multiphoton and non-linear laser microscopy applications, Craig Brideau, Hotchkiss Brain Institute (Canada); Sangeeta Murugkar, Univ. of Ottawa (Canada)[7183-103]

Nonlinear optical readout for rapid screening of protein crystallization microchips, Garth J. Simpson, Purdue Univ. (United States)[7183-104]

High throughput imaging based on non-descanning multifocal multiphoton microscopy using a large field of view objective, Jae Won Cha, Peter T. C. So, Massachusetts Institute of Technology (United States)[7183-105]

Multiharmonic generation microscopy of collagen in Hydra nematocysts, Jonathan A. Palero, Dave J. van den Heuvel, Univ. Utrecht (Netherlands); Ulrike Engel, Thomas Holstein, Ruprecht-Karls-Univ. Heidelberg (Germany); Hans C. Gerritsen, Univ. Utrecht (Netherlands)[7183-64]

Selective microscopy of fluorescent species in vivo with phase-shaped broadband pulses, Caroline Boudoux, Rajesh S. Pillai, Guillaume Labroille, Israel Veilleux, Nicolas Olivier, Manuel Joffre, Emmanuel Beaufrepaire, Ecole Polytechnique (France)[7183-107]

Multiphoton autofluorescence for assessing therapeutic effects of a cox-2 inhibitor in oral carcinogenesis, Ki K. Ho M.D., Tuya Shilagard, Suimin Qiu, Susan McCammon M.D., Massoud Motamedi, Vicente Resto M.D., Gracie Vargas, The Univ. of Texas Medical Branch at Galveston (United States)[7183-108]

Multiphoton microscopy as a diagnostic tool for anatomopathological studies of sentinel lymph nodes, Joel Lemièrre, Jean-Claude A. Vial, Julien Douady, François Estève, Sylvie Lantuejoul, Philippe Lorimier, Clément Ricard, Dimitri Salameire, Boudewijn P. J. van der Sanden, Univ. Joseph Fourier (France)[7183-109]

Multiphoton microscopy of near infrared dyes, Siavash Yazdanfar, Chun Zhan, Chulmin Joo, GE Global Research (United States); Mikhail Berezin, Samuel Achilefu, Washington Univ. in St. Louis School of Medicine (United States)[7183-110]

Probing molecule dynamics and interactions by raster scanning image correlation spectroscopy and TCSPC, Bertram Su, Wolfgang Becker, Becker & Hickl GmbH (Germany)[7183-112]

New integration of FLIM and FLCS for confocal laser scanning microscopes, Matthias Weiss, German Cancer Research Ctr. (Germany); Rainer Erdmann, Benedikt Kraemer, PicoQuant GmbH (Germany); Jedrzej Szymanski, Nina Malchus, German Cancer Research Ctr. (Germany); Felix Koberling, PicoQuant GmbH (Germany)[7183-113]

Ultra-compact (palm-top size), low-cost, maintenance-free (>3000 h), 1.5-kW-peak-power diode-pumped femtosecond solid-state laser source for multiphoton microscopy, Shogo Yamazoe, Tadashi Kasamatsu, FUJIFILM Advanced Research Labs. (Japan)[7183-114]

SHIM and TPEM: getting more information from non linear excitation, Paolo Bianchini, Benedetta Pollarolo, Alberto Diaspro, Univ. degli Studi di Genova (Italy)[7183-116]

Deep-tissue multiphoton FLIM for intravital FRET imaging, G. Fruhwirth, Simon M. Ameer-Beg, Melanie D. Keppler, A. Brock, King's College London (United Kingdom); Boris Vojnovic, Gray Cancer Institute (United Kingdom); T. Ng, King's College London (United Kingdom)[7183-117]

Monday 26 January

SESSION 5

**Room: Marriott Hotel,
San Jose Ballroom Salon IV Mon. 8:30 to 10:00 am**

CARS Microscopy I

Session Chair: Sunney X. Xie, Harvard Univ.

8:30 am: **Live cell CARS microscopy (Invited Paper)**, Martin Winterhalder, Romedi Selm, Ming Lei, Andreas Zumbusch, Univ. Konstanz (Germany)[7183-124]

8:55 am: **Coherent anti-Stokes Raman scattering microscopy: chemical imaging for biology and medicine (Invited Paper)**, Sunney X. Xie, Harvard Univ. (United States)[7183-22]

9:20 am: **Evaluation of diseases in vivo with coherent Raman and multiphoton microscopy (Invited Paper)**, Erik Bélanger, Steve Begin, Sophie Laffray, Stephane Pages, Univ. Laval Robert-Giffard (Canada); Réal Vallée, Univ. Laval (Canada); Yves De Koninck, Daniel Côté, Univ. Laval Robert-Giffard (Canada)[7183-23]

9:45 am: **Optimizing CARS signal using coherent control methods**, Vladimir S. Malinovsky, MagiQ Technologies, Inc. (United States)[7183-25]

Coffee Break 10:00 to 10:30 am

SESSION 6

**Room: Marriott Hotel,
San Jose Ballroom Salon IV Mon. 10:30 to 11:50 am**

CARS Microscopy II

Session Chair: Eric O. Potma, Univ. of California, Irvine

10:30 am: **Multi-focus CARS microscopy using microlens array scanner for realtime molecular spectral-imaging**, Mamoru Hashimoto, Takeo Minamikawa, Tsutomu Araki, Katsumasa Fujita, Satoshi Kawata, Osaka Univ. (Japan)[7183-27]

10:45 am: **CARS microspectroscopy: exploring the chemical and physical structure of individual biopolymers, living cells, and tissue (Invited Paper)**, Alexander Kovalev, Andreas Volkmer, Univ. Stuttgart (Germany)[7183-28]

11:10 am: **CARS microscopy using linearly-chirped ultrafast laser pulses**, Israel Rocha-Mendoza, Wolfgang W. Langbein, Paola Borri, Cardiff Univ. (United Kingdom)[7183-29]

11:25 am: **CARS and SHG microscopy for the characterization of bacterial cellulose (Invited Paper)**, Annika M. Enejder, Christian Brackmann, Aase Bodin, Madeleine Åkeson, Paul Gatenholm, Chalmers Tekniska Högskola (Sweden)[7183-30]

Lunch Break 11:50 am to 1:00 pm

SESSION 7

Room: Marriott Hotel,
San Jose Ballroom Salon IV Mon. 1:00 to 3:05 pm

CARS Microscopy III

Session Chair: Ji-Xin Cheng, Purdue Univ.

1:00 pm: **Enhancing two-color absorption, self-phase modulation, and Raman microscopy signatures in tissue with femtosecond laser pulse shaping** (*Invited Paper*), Warren S. Warren, Sr., Martin C. Fischer, Duke Univ. (United States); Ivan Piletic, Stanford Univ. (United States); Dan Fu, Thomas E. Matthews, Prathyush Samenini, Duke Univ. (United States)[7183-31]

1:25 pm: **Ultrashort phase-shaped pulses for biomedical imaging** (*Invited Paper*), Marcos M. Dantus, Michigan State Univ. (United States) and BioPhotonic Solutions, Inc. (United States)[7183-32]

1:50 pm: **Spectral phase shaping for high resolution CARS spectroscopy around 3000 cm⁻¹**, Alexander C. W. van Rhijn, Sytse Postma, Jeroen P. Kortkerik, Jennifer L. Herek, Herman L. Offerhaus, Univ. Twente (Netherlands)[7183-33]

2:05 pm: **Single-shot interferometric approach to background free broadband CARS microscopy**, Young Jong Lee, Marcus T. Cicerone, National Institute of Standards and Technology (United States)[7183-34]

2:20 pm: **High performance multi-modal CARS microscopy using a single femtosecond source**, Adrian F. Pegoraro, National Research Council Canada (Canada) and Queen's Univ. (Canada); Andrew Ridsdale, Douglas J. Moffatt, John P. Pezacki, National Research Council Canada (Canada); Albert Stollow, National Research Council Canada (Canada) and Queen's Univ. (Canada)[7183-35]

2:35 pm: **Background free CARS imaging by local phase detection**, Martin Jurna, Jeroen P. Kortkerik, Cornelis Otto, Herman L. Offerhaus, Jennifer L. Herek, Univ. Twente (Netherlands)[7183-36]

2:50 pm: **Optical pulse shaping for selective excitation of coherent molecular vibrations by stimulated Raman scattering**, Joseph B. Geddes III, Daniel L. Marks, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (United States)[7183-37]

Coffee Break3:05 to 3:30 pm

SESSION 8

Room: Marriott Hotel,
San Jose Ballroom Salon IV Mon. 3:30 to 5:45 pm

CARS Microscopy IV

Session Chair: Annika M. Enejder,
Chalmers Tekniska Högskola (Sweden)

3:30 pm: **Anti-Stokes generation in nonlinear plasmonics** (*Invited Paper*), Eric O. Potma, Hyunmin Kim, Reginald M. Penner, Chengxiang Xiang, Univ. of California, Irvine (United States)[7183-38]

3:55 pm: **New advances of CARS microscopy and applications to obesity-related health risks** (*Invited Paper*), Ji-Xin Cheng D.V.M., Purdue Univ. (United States)[7183-26]

4:20 pm: **A new light source for multimodal multi photon microscopy including CARS**, Ingo Rimke, APE GmbH (Germany); Raluca Niesner, Max-Delbrück-Ctr. für Molekulare Medizin Berlin-Buch (Germany); Edlef Büttner, Gero Stibenz, APE GmbH (Germany)[7183-39]

4:35 pm: **Coupling CARS with multiphoton fluorescence and harmonic generation on the same platform**, Hongtao Chen, Haifeng Wang, Jiabin Zhu, Kimberly Buhman, Ji-Xin Cheng D.V.M., Purdue Univ. (United States)[7183-40]

4:50 pm: **Analytical capabilities of nonlinear Raman microspectroscopic imaging**, Vladislav V. Yakovlev, Univ. of Wisconsin, Milwaukee (United States)[7183-41]

5:05 pm: **Imaging of diseases of the central nervous system: a comparison of CARS and histology**, Christian W. Freudiger, Brian G. Saar, Harvard Univ. (United States); Xiaoyin Xu, Brigham and Women's Hospital (United States); Qing Zeng, Santosh Kesari, Anita J. Hüttner, Brigham and Women's Hospital (United States); Sunney X. Xie, Harvard Univ. (United States); Geoffrey S. Young, Brigham and Women's Hospital (United States)[7183-42]

5:20 pm: **Fiber lasers for CARS microscopy** (*Invited Paper*), Frank W. Wise, Cornell Univ. (United States)[7183-24]

Tuesday 27 January

SESSION 9

Room: Marriott Hotel,
San Jose Ballroom Salon IV Tues. 8:00 to 11:45 am

Technology Development and Applications

Session Chair: Peter T. C. So, Massachusetts Institute of Technology

8:00 am: **In vivo multiphoton tomography using a high NA GRIN microendoscope** (*Invited Paper*), Karsten König, JenLab GmbH (Germany)[7183-44]

8:25 am: **Two-photon imaging and nanoprocessing of stem cells with sub-20 fs laser pulses**, Aisada A. Uchugonova, Fraunhofer-Institut für Biomedizinische Technik (Germany) and Saarland Univ. (Germany); Andreas Isemann, Femtolasers Produktions GmbH (Austria); Rainer Bückle, JenLab GmbH (Germany); Wataru Watanabe, National Institute of Advanced Industrial Science and Technology (Japan); Karsten König, Saarland Univ. (Germany) and JenLab GmbH (Germany)[7183-45]

8:40 am: **Three dimensional (3D) lithographic microfabrication based on ultrafast optical pulse manipulation**, Daekeun Kim, Peter T. C. So, Massachusetts Institute of Technology (United States)[7183-46]

8:55 am: **Optical sectioning in 3D far-field fluorescence nanoscopy based on single molecule switching**, Alexander Egner, Claudia Geisler, Claas von Middendorff, Mariano Bossi, Andreas Schönle, Stefan W. Hell, Max-Planck-Institute for Biophysical Chemistry (Germany)[7183-47]

9:10 am: **Imaging skin tissue in vivo with video-rate two-photon autofluorescence microscopy**, Chunqiang Li, Massachusetts General Hospital (United States); Costas M. Pitsillides, Boston Univ. (United States) and Massachusetts General Hospital (United States); Judith M. Runnels, Dana-Farber Cancer Institute (United States) and Massachusetts General Hospital (United States); Mehron Puoris'haag M.D., Massachusetts General Hospital (United States); Daniel Côté, Univ. Laval Robert-Giffard (Canada); Charles P. Lin, Massachusetts General Hospital (United States)[7183-48]

9:25 am: **Adaptive optics for multiphoton microscopy**, Martin J. Booth, Delphine Debarre, Kate Grieve, Tony Wilson, Univ. of Oxford (United Kingdom)[7183-49]

9:40 am: **Multiphoton microscopy by multiexcitonic ladder climbing in colloidal quantum dots**, Dan Oron, Nir R. Ben Haim, Weizmann Institute of Science (Israel)[7183-50]

9:55 am: **A novel time-resolved fluorescence microscope system extended from the deep UV-visible to NIR (240nm - 1700nm)** (*Invited Paper*), Lin L. Chandler, HORIBA Jobin Yvon Inc. (United States)[7183-51]

Coffee Break10:10 to 10:30 am

10:30 am: **Surface plasmon-enhanced two-photon fluorescence microscopy for live cell membrane imaging**, Shean-Jen Chen, Ruei-Yu He, National Cheng Kung Univ. (Taiwan)[7183-111]

10:45 am: **Latest advances in ultra-fast laser sources for multi photon microscopy**, Philip G. Smith, Newport Spectra-Physics (United States)[7183-53]

11:00 am: **New developments in ultrafast lasers for non-linear imaging**, Marco F. Arrigoni, Coherent, Inc. (United States)[7183-54]

11:15 am: **New developments of systems for multiphoton microscopy**, Eva Simbuerger, Carl Zeiss Jena GmbH (Germany)[7183-55]

11:30 am: **Investigating new sources of femtosecond fiber lasers in multiphoton microscopy**, Shuo Tang, Univ. of British Columbia (Canada) and Univ. of California, Irvine (United States); Jian Liu, PolarOnyx, Inc. (United States); Zhongping Chen, Bruce J. Tromberg, Univ. of California, Irvine (United States)[7183-56]

Lunch/Exhibition Break11:45 am to 1:30 pm

Conference 7183

SESSION 10

Room: Marriott Hotel,
San Jose Ballroom Salon IV Tues. 1:30 to 3:10 pm

Harmonic Generation Microscopy I

Session Chair: **Paul Capagnola**, Univ. of Connecticut Health Ctr.

- 1:30 pm: **Non linear manipulation and imaging of neural networks** (*Invited Paper*), Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [7183-57]
- 1:50 pm: **Imaging dental sections with polarization-resolved SHG and time-resolved autofluorescence** (*Invited Paper*), Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) [7183-58]
- 2:10 pm: **Third-harmonic generation microscopy: phase-matching, epidetection, and biological applications**, Nicolas Olivier, Delphine Debarre, Emmanuel Beaufrepaire, Ecole Polytechnique (France) [7183-59]
- 2:25 pm: **SHG nanoprobes: a new imaging tool for biomedical imaging**, Periklis Pantazis, Ye Pu, California Institute of Technology (United States); Demetri Psaltis, California Institute of Technology (United States) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Scott E. Fraser, California Institute of Technology (United States) [7183-60]
- 2:40 pm: **1230nm-based least-invasive third and second harmonic generation imaging of ocular tissues**, Szu-Yu Chen, Chi-Kuang Sun, National Taiwan Univ. (Taiwan); Han-Chieh Yu, I-Jong Wang, National Taiwan Univ. Hospital (Taiwan) [7183-61]
- 2:55 pm: **Nonlinear microscopic properties of starch granules**, Richard Cisek, Nicole Prent, Univ. of Toronto at Mississauga (Canada); Arkady Major, Univ. of Manitoba (Canada); Virginijus Barzda, Univ. of Toronto at Mississauga (Canada) [7183-62]
- Coffee Break 3:10 to 3:30 pm

SESSION 11

Room: Marriott Hotel,
San Jose Ballroom Salon IV Tues. 3:30 to 5:25 pm

Harmonic Generation Microscopy II

Session Chair: **Karsten König**, JenLab GmbH (Germany)

- 3:30 pm: **Second harmonic generation imaging microscopy of ovarian cancer** (*Invited Paper*), Paul J. Campagnola, Oleg Nadiarnykh, Ronald LaComb, Molly A. Brewer, Univ. of Connecticut Health Ctr. (United States) [7183-63]
- 3:50 pm: **In vivo nonlinear spectral imaging microscopy of visible and ultraviolet irradiated hairless mouse skin tissues**, Jonathan A. Palero, Univ. Utrecht (Netherlands); Henriette S. de Bruijn, Angélique van der Ploeg-van den Heuvel, Univ. Medisch Ctr. Rotterdam (Netherlands); Huib van Weelden, Univ. Medisch Ctr. Utrecht (Netherlands); Henricus J. C. M. Sterenberg, Univ. Medisch Ctr. Rotterdam (Netherlands); Hans C. Gerritsen, Univ. Utrecht (Netherlands) [7183-106]
- 4:10 pm: **Multimodal multiphoton microscopy**, François Légaré, Institut National de la Recherche Scientifique (Canada); Christian P. Pfeffer M.D., Harvard Medical School (United States); Feruz S. Ganikhanov, West Virginia Univ. (United States) [7183-65]
- 4:25 pm: **Chondrocyte and collagen matrix in sectioned human articular cartilage revealed by third and second harmonic generation microscopy**, Ming-Rung Tsai, National Taiwan Univ. (Taiwan); Chih-Hwa Chen, Chang-Gung Memorial Hospital (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) [7183-66]
- 4:40 pm: **Structural and molecular conformation of myosin in intact muscle fibers by second harmonic generation**, Valentina Nucciotti, Chiara Stringari, Leonardo Sacconi, Francesco Vanzi, Univ. degli Studi di Firenze (Italy) [7183-68]
- 4:55 pm: **Polarization-resolved second-harmonic-generation imaging of photoaged dermal collagen fiber**, Takeshi Yasui, Yu Takahashi, Tsutomu Araki, Osaka Univ. (Japan) [7183-69]
- 5:10 pm: **Miniature compound lens and multimode fiber collector for improving the performance of a scanning fiber-optic nonlinear optical endomicroscopy system**, Yicong Wu, Jiefeng Xi, Michael J. Cobb, Univ. of Washington (United States); Alice F. Meng, Washington Univ. in St. Louis (United States); Xingde Li, Univ. of Washington (United States) [7183-70]

Conference 7184 · Room: Marriott Hotel, San Jose Ballroom Salon III

Monday-Thursday 26-29 January 2009 • Proceedings of SPIE Vol. 7184

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVI

Conference Chairs: **Jose-Angel Conchello**, Oklahoma Medical Research Foundation; **Carol J. Cogswell**, Univ. of Colorado at Boulder; **Tony Wilson**, Univ. of Oxford (United Kingdom)

Conference Co-Chair: **Thomas G. Brown**, Univ. of Rochester

Program Committee: **G. J. Brakenhoff**, Univ. van Amsterdam (Netherlands); **Charles A. DiMarzio**, Northeastern Univ.; **Mats G. Gustafsson**, Univ. of California/San Francisco; **Gordon S. Kino**, Stanford Univ.; **Raimund J. Ober**, The Univ. of Texas at Dallas; **Rudolf Oldenbourg**, Marine Biological Lab.; **Chrysanthe Preza**, The Univ. of Memphis

BIOS

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

High-speed fluorescence excitation and emission spectroscopy, Jing Yuan, Massachusetts General Hospital (United States) and Huazhong Univ. of Science and Technology (China); Leilei L. Peng, Brett E. Bouma, Guillermo J. Tearney, Massachusetts General Hospital (United States) [7184-43]

Quantifying colocalization of a cellular protein FOXP3 in three-dimensional cellular space, Thomas Abraham, St. Paul's Hospital (Canada); Sarah E. Allan, Megan K. Levings, The Univ. of British Columbia (Canada) [7184-44]

X-ray micro-tomography imaging of crack propagation in biological samples, Holly D. Barth, Univ. of California, Berkeley (United States); Alastair A. MacDowell, Lawrence Berkeley National Lab. (United States); Robert O. Ritchie, Univ. of California, Berkeley (United States) and Lawrence Berkeley National Lab. (United States) [7184-45]

Thickness and index measurements of a transparent specimen by full-field optical coherence microscopy, Jihoon Na, Woo Jun Choi, Hae Young Choi, Gwangju Institute of Science and Technology (Korea, Republic of); Eun Seo Choi, Chosun Univ. (Korea, Republic of); Byeong-Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [7184-47]

Multi-spectral multi-scale optical image reconstruction based on genetic algorithm optimization, Xiaolei Fu, Atam P. Dhawan, New Jersey Institute of Technology (United States) [7184-52]

A novel global fitting algorithm for decay-associated imaging from FLIM data, Aleksandr V. Smirnov, Christian A. Combs, Jay R. Knutson, National Heart Lung and Blood Institute (United States) [7184-53]

Accurate models for differential interference contrast (DIC) imaging with large illumination aperture, Shalin B. Mehta, National Univ. of Singapore (Singapore) and National Cancer Ctr. Singapore (Singapore); Colin J. R. Sheppard, National Univ. of Singapore (Singapore) and Yong Loo Lin School of Medicine, National Univ. of Singapore (Singapore) [7184-54]

Wednesday 28 January

SESSION 1

Room: Marriott Hotel,
San Jose Ballroom Salon III Wed. 8:00 to 10:20 am

Fluorescence Depletion Microscopy

Session Chair: **Charles A. DiMarzio**, Northeastern Univ.

8:00 am: **Lithography well below the diffraction limit inspired by STED microscopy** (*Invited Paper*), Timothy F. Scott, Benjamin A. Kowalski, Amy C. Sullivan, Christopher N. Bowman, Robert R. McLeod, Univ. of Colorado at Boulder (United States) [7184-01]

8:30 am: **STED microscopy of nanoparticle distributions** (*Invited Paper*), Eva Rittweger, Univ. of California, Berkeley (United States); Scott E. Irvine, Univ. of Alberta (Canada); Kyu Young Han, ; Christian Eggeling, Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7184-60]

9:00 am: **FLIM beyond the diffraction limit using STED microscopy with a supercontinuum excitation source and holographic PSF control**, Egidijus Auksorius, Bosanta R. Boruah, Peter M. P. Lanigan, Gordon T. Kennedy, Christopher W. Dunsby, Mark A. A. Neil, Paul M. W. French, Imperial College London (United Kingdom) [7184-02]

9:20 am: **IsoSTED microscopy provides <50 nm 3D-resolution**, Alexander Egner, Roman Schmidt, Christian A. Wurm, Stefan Jakobs, Max-Planck-Institut für Biophysikalische Chemie (Germany); Johann Engelhardt, German Cancer Research Ctr. (Germany); Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7184-04]

9:40 am: **Bleach abated (ba) STED microscopy**, Andreas Engler, German Cancer Research Ctr. (Germany); Thorsten M. Staudt, Max-Planck-Institut für Biophysikalische Chemie (Germany) and German Cancer Research Ctr. (Germany); Benjamin Harke, Max-Planck-Institut für Biophysikalische Chemie (Germany); Johann Engelhardt, German Cancer Research Ctr. (Germany); Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) and German Cancer Research Ctr. (Germany) [7184-05]

10:00 am: **Triplet state imaging**, Matthias Geissbuehler, Thiemo Spielmann, Iwan Märki, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Dimitri Van De Ville, Univ. Hospital Geneva (Switzerland); Boris Hinz, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7184-06]

Coffee Break 10:20 to 10:40 am

Conference 7184

SESSION 2

**Room: Marriott Hotel,
San Jose Ballroom Salon III Wed. 10:40 am to 12:00 pm**

Microtomography, Polarized Light, and Other Microscopy Methods

Session Chair: Raimund J. Ober, The Univ. of Texas at Dallas

10:40 am: **Polarized light field microscopy: the simultaneous capture of both conoscopic and orthoscopic views using a microlens array and the LC-PolScope**, Rudolf Oldenbourg, Marine Biological Lab. (United States) [7184-07]

11:00 am: **Investigation of peristaltic behavior of the embryonic heart tube using spectral domain optical coherence tomography and spectral Doppler velocimetry**, Anjul M. Davis, Duke Univ. (United States); Neal Shepherd, Duke Univ. Medical Ctr. (United States); Yuankai K. Tao, Duke Univ. (United States); Florence G. Rothenberg, Univ. of Cincinnati (United States) and Cincinnati VA Medical Ctr. (United States); Joseph A. Izatt, Duke Univ. (United States) [7184-08]

11:20 am: **FPGA-based electronics for confocal line-scanners with linear detector arrays**, Sanjee Abeytunge, Milind Rajadhyaksha, Ricardo Toledo-Crow, Memorial Sloan-Kettering Cancer Ctr. (United States) [7184-10]

11:40 am: **Coherence measurements applied to critical and Kohler vortex illumination**, Dean P. Brown, Thomas G. Brown, Univ. of Rochester Medical Ctr. (United States) [7184-51]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

**Room: Marriott Hotel,
San Jose Ballroom Salon III Wed. 1:30 to 3:10 pm**

Visualization of Unstained Transparent Specimens

Session Chair: Chrysanthe Preza, The Univ. of Memphis

1:30 pm: **3D effects in DIC images of extended objects**, Heidi Sierra, Dana H. Brooks, Charles A. DiMarzio, Northeastern Univ. (United States) [7184-11]

1:50 pm: **White light sectioning through live cells**, Gabriel Popescu, Zhuo Wang, Univ. of Illinois at Urbana-Champaign (United States) [7184-12]

2:10 pm: **Comparison of optical quadrature microscopy and Shack-Hartmann wavefront sensor**, Yogesh G. Patel, Charles A. DiMarzio, Northeastern Univ. (United States) [7184-13]

2:30 pm: **Accurate phase measurements for thick spherical objects using optical quadrature microscopy**, William C. Warger II, Charles A. DiMarzio, Northeastern Univ. (United States) [7184-14]

2:50 pm: **High dynamic range quantitative phase imaging with spectral domain low coherence interferometry**, Jun Zhang, Bin Rao, Zhongping Chen, Univ. of California, Irvine (United States) [7184-15]

Coffee Break 3:10 to 3:40 pm

SESSION 4

**Room: Marriott Hotel,
San Jose Ballroom Salon III Wed. 3:40 to 6:10 pm**

New Methods in Fluorescence Microscopy

Session Chair: Thomas G. Brown, Univ. of Rochester Medical Ctr.

3:40 pm: **3D microscopy with double-helix point spread functions (Invited Paper)**, Sri Rama Prasanna Pavani, Rafael Piestun, Univ. of Colorado at Boulder (United States) [7184-16]

4:10 pm: **Hyperspectral image correlation of fluorescence from living cells**, Ryan W. Davis, Howland D. T. Jones, Mark H. Van Benthem, Michael B. Sinclair, Sandia National Labs. (United States) [7184-17]

4:50 pm: **Quantitative image calibration in confocal fluorescence microscopy with thin reference layers and SIPchart based calibration procedures**, G. J. Brakenhoff, Univ. van Amsterdam (Netherlands) [7184-19]

5:10 pm: **Multifocal multimodal multiphoton photon counting imaging**, Ramon Carriles, Jeffrey Field, Erich E. Hoover, Kraig E. Sheetz, Jeffrey A. Squier, Colorado School of Mines (United States) [7184-20]

5:30 pm: **Efficient confocal microscopy with a dual-wedge scanner**, William C. Warger II, Stephen A. Guerrero, Northeastern Univ. (United States); Zachary M. Eastman, Lucid, Inc. (United States); Charles A. DiMarzio, Northeastern Univ. (United States) [7184-21]

5:50 pm: **Fluorescence lifetime optical projection tomography**, James A. McGinty, Khadija B. Tahir, Romain Laine, Clifford B. Talbot, Christopher W. Dunsby, Mark A. A. Neil, Imperial College London (United Kingdom); Laura Q. Rio, James H. Swoger, James Sharpe, Ctr. for Genomic Regulation (Spain); Paul M. W. French, Imperial College London (United Kingdom) [7184-03]

Thursday 29 January

SESSION 5

**Room: Marriott Hotel,
San Jose Ballroom Salon III Thurs. 8:00 to 10:30 am**

Holographic Methods in Microscopy

Session Chair: G. J. Brakenhoff, Univ. van Amsterdam (Netherlands)

8:00 am: **To be announced (Invited Paper)**, [7184-22]

8:30 am: **Multi-wavelength digital holographic tomography based on spectral interferometry**, Lingfeng Yu, Zhongping Chen, Univ. of California, Irvine (United States) [7184-23]

8:50 am: **Interest of digital holographic microscopy in biological imaging**, Christian D. Depeursinge, Pascal Jourdain, Benjamin Rappaz, Pierre P. Marquet, Pierre J. Magistretti, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Tristan Colomb, Yves Emery, Lyncée Tec SA (Switzerland) [7184-24]

9:10 am: **Application of 3D tracking, LED illumination and multi-wavelength techniques for quantitative cell analysis in digital holographic microscopy**, Björn Kemper, Patrik Langehanenberg, Sebastian Kosmeyer, Stephan Stuerwald, Christian Remmersmann, Gert von Bally, Westfälische Wilhelms- Univ. Münster (Germany) [7184-25]

9:30 am: **Arbitrary two-dimensional multiphoton excitation patterns with temporally focused digital holograms**, Dan Oron, Weizmann Institute of Science (Israel); Valentina Emiliani, Eirini I. Papagiakoumou, Vincent de-Sars, René Descartes Univ. (France) [7184-26]

9:50 am: **Development of a digital holographic microscopy system for morphological analysis of cells**, Oi Choo Chee, Vijay Raj Singh, Ngee Ann Polytechnic (Singapore); Hao Yan, Nanyang Technological Univ. (Singapore); Eddy Sim, Ngee Ann Polytechnic (Singapore); Anand K. Asundi, Nanyang Technological Univ. (Singapore) [7184-27]

10:10 am: **Stress-induced focal splitting in confocal microscopy**, Amber M. Beckley, Thomas G. Brown, Univ. of Rochester Medical Ctr. (United States) [7184-50]

Coffee Break 10:30 to 11:00 am

SESSION 6

**Room: Marriott Hotel,
San Jose Ballroom Salon III Thurs. 11:00 am to 12:20 pm**

Computational Microscopy

Session Chair: Gordon S. Kino, Stanford Univ.

11:00 am: **Unsupervised 3D deconvolution method for retinal imaging: principle and preliminary validation on experimental data**, Guillaume Chenegros, Laurent M. Mugnier, ONERA (France); Marie Glanc, Observatoire de Paris à Meudon (France); Francois Lacombe, Mauna Kea Technologies (France) [7184-29]

11:20 am: **Image reconstruction and interpretation in fluorescence nanoscopy**, Andreas Schönle, Claas von Middendorff, Jan Keller, Marcel Lauterbach, Guiseppa Vicidomini, Alexander Egner, Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7184-30]

11:40 am: **Testing for nonrandom shape similarity between sister cells using automated shape comparison**, Wallace F. Marshall, Monica Guo, Univ. of California, San Francisco (United States) [7184-31]

12:00 pm: **Automated analysis of intracellular motion using kymographs in 1, 2, and 3 dimensions**, Will Ludington, Wallace F. Marshall, Univ. of California, San Francisco (United States) [7184-32]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 7

**Room: Marriott Hotel,
San Jose Ballroom Salon III Thurs. 1:50 to 3:10 pm**

Synthetic Illumination and Synthetic Apertures I

Session Chair: Mats G. Gustafsson, Univ. of California/San Francisco

1:50 pm: **Fluorescence microscopy with a coded aperture snapshot spectral imager**, Christy A. Fernandez, Ashwin A. Wagadarikar, Duke Univ. (United States); Scott C. McCain, Blue Angel Optics (United States); David J. Brady, Duke Univ. (United States). [7184-33]

2:10 pm: **Binary-phase spatial filters for superresolution along extended focal depth**, Linbo Liu, National Univ. of Singapore (Singapore); Frédéric Diaz, Brigitte Loiseaux, Jean-Pierre Huignard, Thales Research & Technology (France); Colin J. R. Sheppard, Nanguang Chen, National Univ. of Singapore (Singapore) [7184-34]

2:30 pm: **Quantitative and artifact-free differential interference contrast microscope using structured-aperture wavefront sensor**, Xiquan Cui, Matthew Lew, Changhui Yang, California Institute of Technology (United States). [7184-35]

2:50 pm: **Phase bias control in focal modulation microscopy**, Nanguang Chen, Chee Howe Wong, Shau Poh Chong, Colin J. R. Sheppard, National Univ. of Singapore (Singapore). [7184-36]

Coffee Break 3:10 to 3:40 pm

SESSION 8

**Room: Marriott Hotel,
San Jose Ballroom Salon III Thurs. 3:40 to 5:40 pm**

Synthetic Illumination and Synthetic Apertures II

Session Chair: Rudolf Oldenbourg, Marine Biological Lab.

3:40 pm: **Two-dimensional resolution improvement in standing wave microscopy using fast acousto-optic laser scanning**, Olga Gliko, William E. Brownell, Peter Saggau, Baylor College of Medicine (United States). . . [7184-37]

4:00 pm: **Biological imaging beyond the diffraction limit by saturated excitation (SAX) microscopy**, Masahito Yamanaka, Shogo Kawano, Katsumasa Fujita, Nicholas I. Smith, Satoshi Kawata, Osaka Univ. (Japan). [7184-38]

4:20 pm: **Imaging properties of saturated excitation (SAX) microscopy**, Shogo Kawano, Masahito Yamanaka, Katsumasa Fujita, Nicholas I. Smith, Satoshi Kawata, Osaka Univ. (Japan) [7184-39]

4:40 pm: **Modulation confocal microscope with large penetration depth**, Ke Si, Wei Gong, Colin J. R. Sheppard, National Univ. of Singapore (Singapore) [7184-40]

5:00 pm: **Live TIRF microscopy at 100nm resolution through structured illumination**, Peter A. Kner, Bryant Chhun, Eric Griffis, Lukman Winoto, Lin Shao, Univ. of California, San Francisco (United States); Mats G. Gustafsson, Univ. of California, San Francisco (United States) and Howard Hughes Medical Institute (United States). [7184-41]

5:20 pm: **Dual objective fluorescence microscopy for single molecule imaging applications**, Sripad Ram, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Prashant Prabhat, The Univ. of Texas at Dallas (United States) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); E. Sally Ward, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Raimund J. Ober, The Univ. of Texas at Dallas (United States) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States). [7184-42]

Single Molecule Spectroscopy and Imaging II

Conference Chairs: **Jörg Enderlein**, Eberhard Karls Univ. Tübingen (Germany); **Zygmunt K. Gryczynski**, The Univ. of North Texas Health Science Ctr.; **Rainer Erdmann**, PicoQuant GmbH (Germany)

Program Committee: **Sabato D'Auria**, Consiglio Nazionale delle Ricerche (Italy); **Paul M. W. French**, Imperial College London (United Kingdom); **Ewa M. Goldys**, Macquarie Univ. (Australia); **Johan Hofkens**, Katholieke Univ. Leuven (Belgium); **Thomas R. Huser**, UC Davis, NSF Center for Biophotonics; **Gabor Laczko**, Univ. of Szeged (Hungary); **Maria Teresa Neves-Petersen**, Aalborg Univ. (Denmark); **Markus Sauer**, Univ. Bielefeld (Germany); **Benjamin Schuler**, University of Zuerich; **Andong Xia**, Institute of Chemistry (China)

SPIE and the organizers gratefully acknowledge PicoQuant GmbH Berlin, Germany, for their generous sponsorship of the Young Investigator Award given as part of the conference on Single Molecule Spectroscopy and Imaging.



Saturday 24 January

WELCOME AND INTRODUCTION

Room: Conv. Ctr. Room K Sat. 8:00 to 8:05 am

SESSION 1

Room: Conv. Ctr. Room K Sat. 8:05 to 9:55 am

FRET and Energy Transfer

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

8:05 am: **Homo-FRET and FRET at the single molecule level: applications to single antibody immunoassay** (*Invited Paper*), Zygmunt K. Gryczynski, Ignacy Gryczynski, Rafal Luchowski, Evgenia G. Matveeva, The Univ. of North Texas Health Science Ctr. (United States); Ewald Terpetschnig, SETA BioMedicals (Afghanistan); Julian Borejdo, The Univ. of North Texas Health Science Ctr. (United States). [7185-01]

8:30 am: **Photoinduced electron transfer probes for the observation of enzyme activities**, Sigrun Henkenjohann, Markus Sauer, Univ. Bielefeld (Germany) [7185-02]

8:50 am: **Quantitative control of the energy transfer of a rigidly coupled FRET system by the photonic mode of a sub-wavelength microresonator**, Frank Schleifenbaum, Kirstin Elgass, Sébastien Peter, Jörg Enderlein, Alfred J. Meixner, Eberhard Karls Univ. Tübingen (Germany) [7185-03]

9:10 am: **Simultaneous monitoring of the two coupled motors of a single FoF1-ATP synthase by three-color FRET using duty cycle-optimized triple-ALEX** (*Invited Paper*), Nawid Zarrabi, Stefan Ernst, Monika G. Dueser, Anastasiya Golovina-Leiker, Univ. Stuttgart (Germany); Wolfgang Becker, Becker & Hickl GmbH (Germany); Rainer Erdmann, PicoQuant GmbH (Germany); Stanley D. Dunn, The Univ. of Western Ontario (Canada); Michael Borsch, Univ. Stuttgart (Germany) [7185-04]

9:35 am: **Protein dynamics-induced modulation of excitation energy transfer**, Marc Brecht, Volker Radics, Jana B. Nieder, Robert Bittl, Freie Univ. Berlin (Germany) [7185-05]

Coffee Break 9:55 to 10:20 am

SESSION 2

Room: Conv. Ctr. Room K Sat. 10:20 am to 12:50 pm

Fluorescence Correlation Spectroscopy

Session Chair: **Zygmunt K. Gryczynski**, The Univ. of North Texas Health Science Ctr.

10:20 am: **Comparative measurement of rotational and translational diffusion of proteins in aqueous solution** (*Invited Paper*), Jörg Enderlein, Anastasia Loman, Markus Mund, Eberhard Karls Univ. Tübingen (Germany); Felix Koberling, PicoQuant GmbH (Germany) [7185-06]

10:45 am: **On the resolution of fluorescence lifetime correlation spectroscopy (FLCS) measurements**, Steffen Ruettinger, Physikalisch-Technische Bundesanstalt (Germany); Peter Kapusta, Matthias Patting, Michael Wahl, PicoQuant GmbH (Germany); Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany) [7185-07]

11:05 am: **Modulated or alternating excitation in fluorescence correlation spectroscopy**, Gustav Persson, Tor Sandén, Per Thyberg, Jerker Widengren, Royal Institute of Technology (Sweden) [7185-08]

11:25 am: **Determining the hydrodynamic size and shape of biomolecules by probing single-molecule Brownian motion** (*Invited Paper*), Sandeep Pallikkuth, Andreas Volkmer, Univ. of Stuttgart (Germany) [7185-09]

11:50 am: **Polarization modulation FCS an easy way to realize dual-focus FCS**, Thomas Dertinger, You Korlann, Xavier Michalet, Shimon Weiss, Univ. of California, Los Angeles (United States); Jörg Enderlein, Eberhard Karls Univ. Tübingen (Germany) [7185-10]

12:10 pm: **Fluorophore conjugated silver nanoparticles: a time-resolved fluorescence correlation spectroscopic study**, Krishanu Ray, Jian Zhang, Joseph R. Lakowicz, Univ. of Maryland School of Medicine (United States) [7185-11]

12:30 pm: **High volume confinement in two-photon fluorescence correlation spectroscopy with radially polarized light**, Denis A. Ivanov, Vladislav I. Shcheslavskiy, Iwan Märki, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Marcel Leutenegger, Max-Planck-Institute for Biophysical Chemistry (Germany); Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7185-12]

Lunch/Exhibition Break 12:50 to 1:35 pm

SESSION 3

Room: Conv. Ctr. Room K Sat. 1:35 to 2:15 pm

Keynote Presentation

1:35 pm: **Nanoscopy with focused light**, Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7185-49]

SESSION 4

Room: Conv. Ctr. Room K Sat. 2:15 to 3:40 pm

High Resolution Microscopy I

Session Chair: **Felix Koberling**, PicoQuant GmbH (Germany)

2:15 pm: **Subdiffraction-resolution fluorescence imaging of cellular structures**, Sebastian van de Linde, Mark Schuettpeiz, Robert Kasper, Britta Seefeldt, Mike Heilemann, Markus Sauer, Univ. Bielefeld (Germany) [7185-14]

2:35 pm: **Non-invasive recording of biomolecular dynamics on the nanoscale** (*Invited Paper*), Andreas Schönle, Christian Ringemann, Claas von Middendorff, Birka Hein, Rebecca Medda, Christian Eggeling, Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7185-13]

2:55 pm: **Quantitative subdiffraction-resolution fluorescence microscopy** (*Invited Paper*), Mike Heilemann, Sebastian van de Linde, Simon Hennig, Markus Sauer, Univ. Bielefeld (Germany). [7185-15]

3:20 pm: **Superresolution imaging in live caulobacter crescentus cells using photoswitchable enhanced yellow fluorescent protein**, Julie S. Biteen, Michael A. Thompson, Nicole K. Tselentis, Lucy Shapiro, William E. Moerner, Stanford Univ. (United States). [7185-16]

Coffee Break 3:40 to 4:00 pm

SESSION 5

Room: Conv. Ctr. Room K Sat. 4:00 to 6:05 pm

High Resolution Microscopy II and Samples

Session Chair: Mike Heilemann, Univ. Bielefeld (Germany)

4:00 pm: **SPDM-Single molecule superresolution of cellular nanostructures** (*Invited Paper*), Christoph M. Cremer, Ruprecht-Karls-Univ. Heidelberg (Germany) [7185-17]

4:25 pm: **Confined motion of a toxin receptor: mapping forces inside lipidic microdomains**, Silvan C. Türkcan, Didier Casanova, Ecole Polytechnique (France); Jean-Baptiste Masson, Guillaume Voisinne, Michel Popoff, Massimo Vergassola, Institut Pasteur (France); Antigoni Alexandrou, Ecole Polytechnique (France) [7185-18]

4:45 pm: **Optically switchable molecules from the spiroprane- and diarylethene-families and their applicability for high-resolution fluorescence microscopy**, Britta Seefeldt, Robert Kasper, Mirco Beining, Kai Altenhöner, Oliver Tosic, Jochen Mattay, Univ. Bielefeld (Germany); Karl-Heinz Drexhage, Univ. Siegen (Germany); Mike Heilemann, Markus Sauer, Univ. Bielefeld (Germany). [7185-19]

5:05 pm: **Multi-parameter far-field fluorescence nanoscopy based on photoswitching single molecules**, Andreas Schönle, Iliaria Testa, Jonas Fölling, Claas von Middendorff, Claudia Geisler, Max-Planck-Institut für Biophysikalische Chemie (Germany); Mariano Bossi, Univ. de Buenos Aires (Argentina); Vladimir N. Belov, Christian Eggeling, Alexander Egner, Stefan W. Hell, Max-Planck-Institut für Biophysikalische Chemie (Germany). [7185-20]

5:25 pm: **Designing probes for single-molecule fluorescence spectroscopy**, Manoj Kumbhakar, Bhabha Atomic Research Ctr. (India); Alexander Kiel, Ruprecht-Karls-Univ. Heidelberg (Germany); Haridas Pal, Bhabha Atomic Research Ctr. (India); Dirk-Peter Herten, Ruprecht-Karls-Univ. Heidelberg (Germany) [7185-21]

5:45 pm: **Specificity and reproducibility of molecular probes for intracellular imaging**, Veronika V. Sapozhnikova, The Univ. of Texas at Austin (United States); Sonia Kumar, T2 Biosystems (United States); Nathan Harrison, Konstantin V. Sokolov, The Univ. of Texas at Austin (United States). [7185-22]

BIOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 6

Room: Marriott Hotel, San Jose Ballrooms Salons V/VI Sun. 8:15 to 9:00 am

Keynote Presentation

Session Chair: Rainer Erdmann, PicoQuant GmbH (Germany)

8:15 am: **Imaging information in DNA with single molecule spectroscopy**, Stephen R. Quake, Stanford Univ. (United States). [7185-23]

SESSION 7

Room: Marriott Hotel, San Jose Ballrooms Salons V/VI Sun. 9:00 to 10:25 am

New Developments in Methods and Systems I

Session Chair: Rainer Erdmann, PicoQuant GmbH (Germany)

9:00 am: **Recent advances in photon coincidence measurements for photon antibunching and full correlation analysis** (*Invited Paper*), Felix Koberling, Rainer Erdmann, Benedikt Kraemer, Volker Buschmann, PicoQuant GmbH (Germany); Steffen Ruettinger, Physikalisch-Technische Bundesanstalt (Germany); Peter Kapusta, Matthias Patting, Michael Wahl, PicoQuant GmbH (Germany) [7185-24]

9:25 am: **High-speed low-cost correlator for single molecule fluorescence correlation spectroscopy**, Hsu-Yang Lee, Institute of Atomic and Molecular Sciences (Taiwan); Hsin-Yu Lin, Jonathon D. White, Yuan Ze Univ. (Taiwan); Wunshain Fann, Institute of Atomic and Molecular Sciences (Taiwan). [7185-25]

9:45 am: **Femtosecond pulse shaping for single molecule measurements**, Fernando F. Stefani, Institut de Ciències Fotòniques (Spain) and Ludwig-Maximilians-Univ. München (Germany); Daan Brinks, Niek F. van Hulst, Institut de Ciències Fotòniques (Spain). [7185-26]

10:05 am: **Phasor-based single-molecule fluorescence lifetime imaging using a wide-field photon-counting detector**, Ryan A. Colyer, Univ. of California, Los Angeles (United States); Oswald H. W. Siegmund, Anton S. Tremsin, John V. Vallerga, Univ. of California, Berkeley (United States); Shimon Weiss, Xavier Michalet, Univ. of California, Los Angeles (United States). [7185-27]

Coffee Break 10:25 to 10:55 am

SESSION 8

Room: Marriott Hotel, San Jose Ballrooms Salons V/VI Sun. 10:55 am to 1:05 pm

New Developments in Methods and Systems II

Session Chair: Jörg Enderlein, Eberhard Karls Univ. Tübingen (Germany)

10:55 am: **Plasmonic-controlled single molecule fluorescence near defined metallic nanostructures** (*Invited Paper*), Joseph R. Lakowicz, Yi Fu, Jian Zhang, Univ. of Maryland School of Medicine (United States). [7185-28]

11:20 am: **Photothermal correlation spectroscopy**, Romy Radünz, Daniel Rings, Klaus Kroy, Frank Cichos, Univ. Leipzig (Germany). [7185-46]

11:40 am: **Optofluidic single molecule flow proteometry**, Jun Kameoka, Texas A&M Univ. (United States) [7185-30]

12:00 pm: **Optical nano-antennas control single-molecule excitation and emission** (*Invited Paper*), Fernando D. Stefani, Institut de Ciències Fotòniques (Spain) and Ludwig-Maximilians-Univ. München (Germany); Tim H. Taminiau III, Niek F. van Hulst, Institut de Ciències Fotòniques (Spain) [7185-31]

12:25 pm: **Electro-magnetic free energy transduction by molecular motors**, Vladislav V. Yakovlev, Univ. of Wisconsin, Milwaukee (United States). [7185-32]

12:45 pm: **Going beyond 2D: following membrane diffusion and topography in the IgE-Fc[epsilon]RI system using 3 dimensional tracking microscopy**, Nathan P. Wells, Guillaume A. Lessard, Mary E. Phipps, Peter M. Goodwin, Los Alamos National Lab. (United States); Diane S. Lidke, The Univ. of New Mexico (United States); Bridget S. Wilson, Univ. of New Mexico (United States); James H. Werner, Los Alamos National Lab. (United States) [7185-33]

Lunch/Exhibition Break 1:05 to 2:05 pm

Conference 7185

SESSION 9

**Room: Marriott Hotel,
San Jose Ballrooms Salons V/VI Sun. 2:05 to 3:15 pm**

Single Molecule Spectroscopy in Biology I

*Session Chair: Fernando F. Stefani,
Ludwig-Maximilians-Univ. München (Germany)*

2:05 pm: **Single-molecule approach to molecular biology in living bacterial cells** (*Invited Paper*), Sunney X. Xie, Harvard Univ. (United States) [7185-34]

2:30 pm: **Single molecule spectroscopy of protein-protein interactions at physiologically relevant concentrations** (*Invited Paper*), Samantha Fore, Victoria Lee, Univ. of California, Davis (United States); Yin Yuen, Lambertus Hesselink, Stanford Univ. (United States); J. Clark Lagarias, Thomas R. Huser, Univ. of California, Davis (United States) [7185-35]

2:55 pm: **Unraveling interactions between lipid nanodiscs and apolipoproteins at the single molecule level**, Sonny S. Ly, Samantha Fore, Jitka Petrova, John Voss, Thomas R. Huser, Univ. of California, Davis (United States). [7185-36]

Coffee Break :3:15 to 4:05 pm

SESSION 10

**Room: Marriott Hotel,
San Jose Ballrooms Salons V/VI Sun. 4:05 to 5:45 pm**

Single Molecule Spectroscopy in Biology II

*Session Chair: Zygmunt K. Gryczynski,
The Univ. of North Texas Health Science Ctr.*

4:05 pm: **Single molecule spectroscopy studies of CYP 3A4 in lipid nanodiscs**, Peter Koo, Yale Univ. (United States); Abhinav Nath, William M. Atkins, Univ. of Washington (United States); Elizabeth Rhoades, Yale Univ. (United States). [7185-38]

4:25 pm: **Single-molecule fluorescence spectroscopy in living cells**, Daniel J. Barzan, Tanja Erhard, Pia I. Heinlein, Daniel Sieberg, Dirk-Peter Herten, Ruprecht-Karls-Univ. Heidelberg (Germany). [7185-39]

4:45 pm: **Molecular immobilization at the diffraction limit opens a new road in ultra-sensitive microarray sensing and drug carriers**, Antonietta Parracino, Gnana Prakash, Maria T. Neves-Petersen, Manuel Correia, Ane Kold, Esben Skovsen, Steffen Petersen, Aalborg Univ. (Denmark). [7185-40]

5:05 pm: **Effect of spontaneous diffusion in micro/nanoporous chemically crosslinked poly (N-vinyl imidazole) gel on the conformational changes of acetylcholine**, Evgenia Vaganova, The Hebrew Univ. of Jerusalem (Israel); Haim Ovadia, Hadassah Univ. Hospital (Israel); Shlomo Yitzchaik, The Hebrew Univ. of Jerusalem (Israel); Sergey E. Lychevski, Rochester Institute of Technology (United States); Ines F. Pierola, Univ. Nacional de Educación a Distancia (Spain) [7185-41]

5:25 pm: **Single molecule force and fluorescence spectroscopy of the SuperFolder Green Fluorescent Protein**, Mircea Cotlet, Thomas J. Ippolito, Brookhaven National Lab. (United States); Peter M. Goodwin, Geoffrey S. Waldo, Stephanie Cabantous, Los Alamos National Lab. (United States). [7185-29]

AWARD PRESENTATION

**Room: Marriott Hotel,
San Jose Ballrooms Salons V/VI Sun. 5:45 to 5:55 pm**

*Session Chair: Zygmunt K. Gryczynski,
The Univ. of North Texas Health Science Ctr.*

PicoQuant Young Investigator Award

We are pleased to announce that a prize in the amount of \$750.00 US will be awarded to the best oral presentation by a presenter under the age of 35. The prize money has been donated by PicoQuant GmbH Berlin, Germany. To be considered for this award, manuscripts and nominations must be received by the manuscript due date of 17 December 2008. Nominations must be submitted by email to Rainer Erdmann (erdmann@pq.fta-berlin.de).

Prize donated by

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POSTERS-SUNDAY

**Room: Conv. Ctr. Rm. K (Sat.);
Marriott, SJB V-VI (Sun.) Sun. 6:00 to 7:30 pm**

Poster presenters may put up their posters Sunday afternoon beginning at 5:30 pm and will need to remove their posters immediately following the poster session. Any papers left on the boards following the poster session will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session. Poster authors should be at their posters from 6:00 to 7:30 Sunday evening to discuss their work with session attendees. Attendees are requested to wear their conferences badges.

Mirror-based broadband scanner with minimized aberration, Jiun-Yann Yu, Chen-Han Huang, Yu-Yi Tzeng, Shi-Wei Chu, National Taiwan Univ. (Taiwan) [7185-43]

Three-dimensional single molecular orientation measurement by built-in type compact polarization-mode-selector, Keisuke Yoshiki, Tsutomu Araki, Osaka Univ. (Japan); Nobuyuki Hashimoto, Makoto Kurihara, Citizen Technology Ctr. Co., Ltd. (Japan); Mamoru Hashimoto, Osaka Univ. (Japan). [7185-44]

Time-resolved confocal fluorescence microscopy: a generalized approach enables new directions for FLIM, FRET and FCS, Felix Koberling, Rainer Erdmann, Peter Kapusta, Benedikt Kraemer, PicoQuant GmbH (Germany); Steffen Ruettinger, Physikalisch-Technische Bundesanstalt (Germany); Benjamin Ewers, PicoQuant GmbH (Germany); Julie L. Fiore, David Nesbitt, JILA (United States). [7185-45]

Optical Diagnostics and Sensing IX

Conference Chair: **Gerard L. Coté**, Texas A&M Univ.

Program Committee: **Rafat R. Ansari**, The Univ. of Texas School of Health Information Sciences at Houston; **Werner Gellermann**, The Univ. of Utah; **Yuri I. Gurfinkel**, Central Clinical Hospital (Russia); **Jürgen M. Lademann**, Humboldt-Univ. zu Berlin (Germany); **Michael J. McShane**, Texas A&M Univ.; **Kenith E. Meissner**, Texas A&M Univ.; **Risto A. Myllylä**, Univ. of Oulu (Finland); **Gert E. Nilsson**, Univ. Hospital Linköping (Sweden); **Jeffery S. Reynolds**, Bayer Healthcare; **Wiendelt Steenbergen**, Univ. Twente (Netherlands); **Kexin Xu**, Tianjin Univ. (China); **Shaoqun Zeng**, Huazhong Univ. of Science and Technology (China); **Dmitry A. Zimnyakov**, Saratov State Univ. (Russia)

Tuesday 27 January

SESSION 1

Room: Conv. Ctr. Room L Tues. 8:30 to 10:10 am

Optical Glucose Monitoring

Session Chair: **Gerard L. Coté**, Texas A&M Univ.

- 8:30 am: **Improvement of dendrimer stability in a glucose-sensitive fluorescent assay**, Hope T. Beier, Jong Doo Lim, Eric E. Simanek, Michael V. Pishko, Gerard L. Coté, Texas A&M Univ. (United States) [7186-01]
- 8:50 am: **Glucose detection in Fabry-Perot etalons**, Joerg Martini, Peter Kiesel, Jeffrey N. Roe, Richard Bruce, Palo Alto Research Center, Inc. (United States) [7186-02]
- 9:10 am: **Real-time dual wavelength polarimetry for glucose sensing**, Bilal H. Malik, Gerard L. Coté, Texas A&M Univ. (United States) [7186-03]
- 9:30 am: **Relationship of skin microperfusion with OCT-based blood glucose monitoring**, Kevin C. Baker, Walter J. Shakespeare, Matthew J. Schurman, GlucoLight Corp. (United States) [7186-04]
- 9:50 am: **Photonic noninvasive glucose sensor based on its relative absorbance at multiple wavelengths**, Ki-Do Kim, Geun-Sik Son, Sang-Shin Lee, Kwangwoon Univ. (Korea, Republic of) [7186-05]
- Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room L Tues. 10:40 am to 12:00 pm

Optic and Fiber Optic Blood Flow Measurements

Session Chair: **Gert E. Nilsson**, Univ. Hospital Linköping (Sweden)

- 10:40 am: **Flow of blood-saline mixtures studied by optical coherence tomography**, Dan P. Popescu, Michael G. Sowa, National Research Council Canada (Canada) [7186-06]
- 11:00 am: **Time domain algorithm for whole field laser Doppler perfusion imaging**, Wiendelt Steenbergen, Matthijs J. Draijer, Erwin Hondebrink, Ton G. van Leeuwen, Univ. Twente (Netherlands) [7186-07]
- 11:20 am: **A new miniaturized wireless fiber-optic sensor for distal fingertip injuries in astronauts**, Rafat R. Ansari, The Univ. of Texas School of Health Information Sciences at Houston (United States); Luca Pollonini, The Univ. of Texas Health Science Ctr. at Houston (United States); Mikael Rodriguez, The Univ. of Texas School of Health Information Sciences at Houston (United States); Jeffrey A. Jones M.D., NASA Johnson Space Ctr. (United States) [7186-08]
- 11:40 am: **Measuring microvascular blood supply using polarization-gated spectroscopy to detect colonic neoplasia**, Andrew J. Gomes, Vladimir M. Turzhitzsky, Northwestern Univ. (United States); Young Kim, Purdue Univ. (United States); Jeremy D. Rogers, Sarah Ruderman, Northwestern Univ. (United States); Hemant K. Roy, Evanston Hospital (United States) [7186-09]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room L Tues. 1:30 to 3:10 pm

Optical Tissue Measurements and Dermal Clearing

Session Chair: **Rafat R. Ansari**, The Univ. of Texas School of Health Information Sciences at Houston

- 1:30 pm: **Quantifying the effect of milli-molar glucose concentration on thickness of rabbit cornea with optical coherence tomography**, Mohamad G. Ghosn, Astha Vijayananda, Michael Leba, Univ. of Houston (United States); Rafat R. Ansari, The Univ. of Texas School of Health Information Sciences at Houston (United States); Kirill V. Larin, Univ. of Houston (United States) [7186-10]
- 1:50 pm: **In vivo OCT study of optical clearing and its recovery dynamics: implications for molecular imaging**, Alexander I. Kholodnykh, Tuya Shilagard, Massoud Motamedi, Gracie Vargas, The Univ. of Texas Medical Branch at Galveston (United States) [7186-11]
- 2:10 pm: **Combined laser and glycerol enhancing skin optical clearing**, Caihua Liu, Shaoqun Zeng, Qingming Luo, Dan Zhu, Huazhong Univ. of Science and Technology (China) [7186-12]
- 2:30 pm: **Noninvasive NIR monitoring of interstitial ethanol concentration**, Trent Ridder, Benjamin Ver Steeg, TruTouch Technologies Inc. (United States); Stephen J. Vanslyke, Jeff Way, InLight Solutions, Inc. (United States) [7186-13]
- 2:50 pm: **Validating the cancer diagnosis potential of mid-infrared spectroscopic imaging**, Rohit Bhargava, Frances N. Pounder, Rohith Reddy, Univ. of Illinois at Urbana-Champaign (United States) [7186-14]
- Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room L Tues. 3:40 to 4:40 pm

Optical Biosensors

Session Chair: **Shaoqun Zeng**, Huazhong Univ. of Science and Technology (China)

- 3:40 pm: **Clinical multimer analysis of vWF by fluctuation spectroscopy**, Richard Torres, Michael J. Levene, Yale Univ. (United States) [7186-15]
- 4:00 pm: **Computational study on cortical spreading depression based on a generalized cellular automaton model**, Lele Hu, Bing Li, Changcheng Xu, Qian Liu, Shangbin Chen, Huazhong Univ. of Science and Technology (China) [7186-16]
- 4:20 pm: **Ultra high phase-sensitive surface plasmon resonance biosensor**, Ying-Chang Li, National Central Univ. (Taiwan); Chien Chou, National Yang-Ming Univ. (Taiwan) [7186-17]

Conference 7186

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Diagnosis of colon cancer by fluorescence and Raman spectroscopy, Deli Wang, Xiaozhou Li, Shenyang Ligong Univ. (China)[7186-19]

Physical and thermal properties of human teeth determined by photomechanical, photothermal images to rapidly diagnose, Yasser H. El-Sharkawy M.D., Cairo Univ. (Egypt)[7186-20]

Spectral analysis of stomach cancer and atrophic gastritis using fluorescence and Raman spectroscopy, Xingwei Wang, Xiaozhou Li, Deli Wang, Shenyang Ligong Univ. (China); Tianyue Yang, Shenyang Institute of Technology (China)[7186-21]

Detection of abnormal liver tissue using auto-fluorescence and Raman spectroscopy, Tianyue Yang, Xiaozhou Li, Xingwei Wang, Shenyang Institute of Technology (China)[7186-22]

Influence of skin tissue properties on the radial reference point for glucose measurement, Yue Yang, Zhenzhi Shi, Wenliang Chen, Kexin Xu, Tianjin Univ. (China)[7186-23]

The data correction method based on the floating reference point for the noninvasive glucose sensing, Rong Liu, Bin He, Wenliang Chen, Kexin Xu, Tianjin Univ. (China)[7186-24]

Cross-talking analysis in evaluation of oxygen saturation, Camille Vazquez-Jaccaud, Gonzalo Paez, Marija Strojnik, Ctr. de Investigaciones en Óptica, A.C. (Mexico)[7186-25]

Imaging neuronal population activity with random access two-photon microscope, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China)[7186-26]

Temperature influence on non-invasive blood glucose measurement, Xiqin Zhang, GlucoStats System Pte Ltd. (Singapore); Joon Hock Yeo, Nanyang Technological Univ. (Singapore)[7186-27]

Time-of-flight application for fluid flow measurement, Brian G. Markey, Hospira, Inc. (United States); Yizhong Yu, Tamas Ban, Gagan Johal, Hospira Inc. (United States)[7186-34]

Biomedical Applications of Light Scattering III

Conference Chairs: **Adam P. Wax**, Duke Univ.; **Vadim Backman**, Northwestern Univ.

Program Committee: **Irving J. Bigio**, Boston Univ.; **Stephen A. Boppart**, Univ. of Illinois at Urbana-Champaign; **Bernard Choi**, Beckman Laser Institute, Univ. of California/Irvine; **Steven L. Jacques**, Oregon Health & Science Univ.; **Lev T. Perelman**, Harvard Medical School; **Brian W. Pogue**, Dartmouth College; **Bruce Jason Tromberg**, Beckman Laser Institute and Medical Clinic

BIOS

Saturday 24 January

SESSION 1

Room: Conv. Ctr. Room N Sat. 8:00 to 9:30 am

Tissue Phantom Studies

Session Chair: **Adam P. Wax**, Duke Univ.

8:00 am: **Diffuse optical spectroscopy of melanoma-simulating silicone phantoms**, Alexander M. Grant, Kelly Sry, Rolf B. Saager, David Hsiang M.D., Kristen M. Kelly, James Jakowatz, Anthony J. Durkin, Univ. of California, Irvine (United States) [7187-01]

8:20 am: **Multispectral absorption and scattering mapping in layered phantoms and in vivo**, Jessie R. Weber, Univ. of California, Irvine (United States); David J. Cuccia, Modulated Imaging, Inc. (United States); Frederick R. Ayers, Anthony J. Durkin, Bruce J. Tromberg, Univ. of California, Irvine (United States) [7187-02]

8:40 am: **Experimental observation of polarization, angular and azimuth properties of low coherence enhanced backscattering spectroscopy**, Vladimir M. Turzhitzsky, Andrew Radosevich, Jeremy D. Rogers, Vadim Backman, Northwestern Univ. (United States) [7187-03]

9:00 am: **Relationship of low-coherence enhanced backscattering spectroscopy measurements to optical properties of scattering media** (Invited Paper), Jeremy D. Rogers, Hariharan Subramanian, Vladimir M. Turzhitzsky, Vadim Backman, Northwestern Univ. (United States) [7187-04]

SESSION 2

Room: Conv. Ctr. Room N Sat. 9:30 to 10:10 am

Turbidity Suppression

Session Chair: **Adam P. Wax**, Duke Univ.

9:30 am: **Turbidity suppression through optical phase conjugation in living tissues**, Emily J. McDowell, Changhui Yang, California Institute of Technology (United States) [7187-05]

9:50 am: **Revisiting optical clearing with topically-applied dimethyl sulfoxide (DMSO)**, Bernard Choi, Univ. of California, Irvine (United States) [7187-06]

Coffee Break 10:10 to 10:40 am

SESSION 3

Room: Conv. Ctr. Room N Sat. 10:40 to 11:50 am

Dynamic Scattering

Session Chair: **Bernard Choi**, Univ. of California, Irvine

10:40 am: **Quantitative cortical hemodynamics in animal models using combined modulated imaging and laser speckle imaging**, David J. Cuccia, Modulated Imaging, Inc. (United States); Stefan A. Carp, David A. Boas, Massachusetts General Hospital (United States) [7187-07]

11:00 am: **Cerebral blood flow of very-low birthweight preterm infants using diffuse correlation spectroscopy**, Erin M. Buckley, Univ. of Pennsylvania (United States); Noah M. Cook, Hospital of the Univ. of Pennsylvania (United States); Turgut Durduran, Meeri N. Kim, Univ. of Pennsylvania (United States); Susan M. Schultz, Hospital of the Univ. of Pennsylvania (United States); Chao Zhou, Guoqiang Yu, Massachusetts Institute of Technology (United States); Chandra M. Sehgal, Hospital of the Univ. of Pennsylvania (United States); Regine Choe, Univ. of Pennsylvania (United States); Daniel J. Licht, The Children's Hospital of Philadelphia (United States); Peter H. Arger, Hallam H. Hurt, Hospital of the Univ. of Pennsylvania (United States); Arjun G. Yodh, Univ. of Pennsylvania (United States) [7187-08]

11:20 am: **Path length resolved optical Doppler flowmetry** (Invited Paper), Wiendelt Steenbergen, Babu Varghese, Vinayakrishnan Rajan, Ton G. van Leeuwen, Univ. Twente (Netherlands) [7187-09]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 4

Room: Conv. Ctr. Room N Sat. 1:20 to 3:10 pm

Laser Speckle Imaging

Session Chair: **Bernard Choi**, Univ. of California, Irvine

1:20 pm: **Laser speckle contrast imaging of cerebral vascular physiology and pathophysiology** (Invited Paper), David A. Boas, Massachusetts General Hospital (United States) [7187-10]

1:50 pm: **Laser speckle imaging with spatially modulated illumination**, Amaan Mazhar, Univ. of California, Irvine (United States); David J. Cuccia, Modulated Imaging, Inc. (United States); Bernard Choi, Anthony J. Durkin, Univ. of California, Irvine (United States); David A. Boas, Massachusetts General Hospital (United States); Bruce J. Tromberg, Univ. of California, Irvine (United States) [7187-11]

2:10 pm: **Influence of spatial sampling on laser speckle contrast imaging**, Sean J. Kirkpatrick, Donald D. Duncan, Elaine M. Wells-Gray, Oregon Health & Science Univ. (United States) [7187-12]

2:30 pm: **Microvascular therapy monitoring with laser speckle imaging**, Bernard Choi, Univ. of California, Irvine (United States) [7187-13]

2:50 pm: **Estimation of anisotropy coefficient of a homogeneous optically turbid medium by decomposition of laser-Doppler spectrum**, Stanislaw Wojtkiewicz, Institute of Biocybernetics and Biomedical Engineering (Poland); Hervé Rix, Univ. de Nice Sophia Antipolis (France); Norbert S. Zolek, Roman Maniewski, Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland) [7187-14]

Coffee Break 3:10 to 3:40 pm

SESSION 5

Room: Conv. Ctr. Room N Sat. 3:40 to 5:30 pm

Numerical Simulation Studies

Session Chair: **Vadim Backman**, Northwestern Univ.

3:40 pm: **Monte Carlo propagation of spatial coherence** (Invited Paper), Scott Pahl, Providence St. Vincent Medical Ctr. (United States); David G. Fischer, NASA Glenn Research Ctr. (United States); Donald D. Duncan, Oregon Health & Science Univ. (United States) [7187-15]

4:10 pm: **Mathematical modeling of reflectance and intrinsic fluorescence for early cancer detection in human pancreatic tissue**, Robert H. Wilson, Malavika Chandra, Univ. of Michigan (United States); James Scheiman, Diane Simeone, Barbara McKenna, Julianne Purdy, Univ. of Michigan Medical School (United States); Mary-Ann Mycek, Univ. of Michigan (United States) [7187-16]

4:30 pm: **Three-dimensional computation of focused beam propagation through multiple biological cells**, Matthew S. Starosta, Andrew K. Dunn, The Univ. of Texas at Austin (United States) [7187-17]

4:50 pm: **Computational analysis of mitochondria placement and aggregation effects on wide-angle cell scattering patterns**, Patrick M. Pilarski, Xuan-Tao Su, D. Moira Glerum, Christopher J. Backhouse, Univ. of Alberta (Canada) [7187-18]

5:10 pm: **A Monte Carlo study of Mueller matrix decomposition in complex tissue-like turbid media**, Nirmalya Ghosh, Univ. of Toronto (Canada) and Ontario Cancer Institute (Canada); Michael F. G. Wood, Univ. of Toronto (Canada); I. Alex Vitkin, Univ. of Toronto (Canada) and Ontario Cancer Institute (Canada) [7187-19]

BiOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Conference 7187

Sunday 25 January

SESSION 6

Room: Conv. Ctr. Room N Sun. 8:20 to 10:30 am

In Vitro

Session Chair: **Vadim Backman**, Northwestern Univ.

8:20 am: **Application of T-matrix method to inverse light scattering measurement of nuclear volume and shape**, Michael G. Giacomelli, Adam P. Wax, Kevin J. Chalut, Duke Univ. (United States) [7187-20]

8:40 am: **Wavelength-dependent backscattering measurements for quantitative real-time detection of apoptosis in living cells**, Christine S. Mulvey, Carly A. Sherwood, Irving J. Bigio, Boston Univ. (United States) [7187-21]

9:00 am: **Optical methodology for detecting sub-wavelength refractive index variations in cells present in the field of carcinogenesis**, Hariharan Subramanian, Northwestern Univ. (United States); Hemant K. Roy, Evanston Hospital (United States); Prabhakar Pradhan, Dhwanil Dhamania, Northwestern Univ. (United States); Mohammad Jameel, Zvezdana Bogajevic, Evanston Hospital (United States); Vadim Backman, Northwestern Univ. (United States) [7187-22]

9:20 am: **Investigation of single human immune cells by integrated Raman and angular-scattering microscopy**, Zachary J. Smith, Andrew J. Berger, Univ. of Rochester (United States) [7187-23]

9:40 am: **Light scattering spectroscopy for tissue engineering applications (Invited Paper)**, Irene Georgakoudi, Sharad Gupta, Martin Hunter, David L. Kaplan, Tufts Univ. (United States) [7187-24]

10:10 am: **Diffuse reflectance spectroscopy for monitoring ageing blood stains**, Rolf H. Bremmer, Martin J. van Gemert, Maurice C. Aalders, Jr., Academic Medical Ctr. (Netherlands) [7187-25]

Coffee Break 10:30 to 10:50 am

SESSION 7

Room: Conv. Ctr. Room N Sun. 10:50 am to 12:20 pm

Animal Studies

Session Chair: **Adam P. Wax**, Duke Univ.

10:50 am: **Optical pharmacokinetics measures in-vivo drug concentration and compartmentalisation for AIS2Pc**, Martin R. Austwick, Josephine Woodhams, Charles A. Mosse, Caroline Elliot-Laize, Vadzim Chalau, Alexander J. MacRobert, Univ. College London (United Kingdom); Irving J. Bigio, Boston Univ. (United States); Stephen G. Bown, Univ. College London (United Kingdom) [7187-26]

11:10 am: **In vivo measurements of epidermal thickness by reflectance-mode confocal microscopy to assess cellular proliferation induced by topical agents**, Kevin G. Phillips, Ravikant V. Samatham, Philippe Thuillier, Steven L. Jacques, Oregon Health & Science Univ. (United States) ... [7187-27]

11:30 am: **Detecting neoplastic development in the hamster cheek pouch using Fourier domain low coherence interferometry (Invited Paper)**, Robert N. Graf, Francisco E. Robles, Duke Univ. (United States); Xiaoxin Chen, North Carolina Central Univ. (United States); Adam P. Wax, Duke Univ. (United States) [7187-28]

12:00 pm: **In vivo transcranial measurement of light scattering in rat brains during hypoxia**, Satoko Kawauchi, Shunichi Sato, Hidetoshi Ooigawa, Hiroshi Nawashiro, Miya Ishihara M.D., Makoto Kikuchi M.D., National Defense Medical College (Japan) [7187-29]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 8

Room: Conv. Ctr. Room N Sun. 1:30 to 3:10 pm

Clinical and Preclinical Studies

Session Chair: **Irving J. Bigio**, Boston Univ.

1:30 pm: **In vivo polarized light scattering spectroscopic imaging of epithelial tissues (Invited Paper)**, Lev T. Perelman, Le Qiu, Edward Vitkin, Saira Salahuddin, Mark Modell, Eugene B. Hanlon, Irving Itzkan, Harvard Medical School (United States) [7187-30]

2:00 pm: **Optimizing Fourier-domain angle resolved low coherence interferometry for clinical use**, Neil G. Terry, Yizheng Zhu, Matthew T. Rinehart, Adam P. Wax, Duke Univ. (United States) [7187-31]

2:20 pm: **Scanning elastic scattering spectroscopy (ESS) for the detection of cancer and pre-cancer: sentinel node biopsy in breast cancer and novel applications in Barrett's oesophagus (BE)**, Martin R. Austwick, Wayne Chicken, Santosh K. Somasundaram, Jason M. Dunn, Josephine Woodhams, Charles A. Mosse, Benjamin R. Clark, Univ. College London (United Kingdom); Mary Falzon, Gabriella Kocjan, Royal Free and Univ. College Medical School (United Kingdom); Irving J. Bigio, Boston Univ. (United States); Laurence B. Lovat, Stephen G. Bown, Mohammed R. Keshtgar, Univ. College London (United Kingdom) [7187-32]

2:40 pm: **Quantitative optical imaging of early cervical cancer: mechanisms, methods, and clinical study (Invited Paper)**, Jianan Y. Qu, The Hong Kong Univ. of Science and Technology (Hong Kong, China) [7187-33]

Coffee Break 3:10 to 3:30 pm

SESSION 9

Room: Conv. Ctr. Room N Sun. 3:30 to 5:50 pm

Novel Microscopy

Session Chair: **Lev T. Perelman**, Harvard Medical School

3:30 pm: **Fourier transform light scattering (FTLS) of cells and tissues**, Gabriel Popescu, Huafeng Ding, Univ. of Illinois at Urbana-Champaign (United States) [7187-34]

3:50 pm: **A multispectral dark-field microsampling reflectance microscope for tumor margin delineation during breast lumpectomy**, Venkataramanan Krishnaswamy, Dartmouth College (United States); Wendy A. Wells, Dartmouth Hitchcock Medical Ctr. (United States); Ashley M. Laughney, Kimberley S. Samkoe, Brian W. Pogue, Dartmouth College (United States) [7187-35]

4:10 pm: **Determine scattering coefficient and anisotropy of scattering of tissue phantoms using reflectance-mode confocal microscopy**, Ravikant V. Samatham, Steven L. Jacques, Oregon Health & Science Univ. (United States) [7187-36]

4:30 pm: **An efficient method for diffuse light spectroscopy**, Martin B. van der Mark, Adrien E. Desjardins, Philips Research (Netherlands) [7187-37]

4:50 pm: **Studying gold nanorod biomedical labels with confocal light absorption and scattering spectroscopy**, Le Qiu, Harvard Medical School (United States); Timothy A. Larson, Danielle K. Smith, The Univ. of Texas at Austin (United States); Edward Vitkin, Saira Salahuddin, Irving Itzkan, Eugene B. Hanlon, Harvard Medical School (United States); Brian A. Korgel, Konstantin V. Sokolov, The Univ. of Texas at Austin (United States); Lev T. Perelman, Harvard Medical School (United States) [7187-38]

5:10 pm: **Measuring tissue optical properties with needle probes using optical coherence tomography**, Loretta Scolaro, Tobias Wienhold, Robert A. McLaughlin, Blake R. Klyen, Christobel Saunders, The Univ. of Western Australia (Australia); Saud Hamza, Sir Charles Gairdner Hospital (Australia); Peter Robbins, PathWest Lab. Medicine WA (Australia); Steven L. Jacques, Oregon Health & Science Univ. (United States); David D. Sampson, The Univ. of Western Australia (Australia) [7187-39]

5:30 pm: **Confocal spectroscopy of turbid media with a variable-focus liquid lens**, Adrien E. Desjardins, Stein Kuiper, Martin B. van der Mark, Benno H. W. Hendriks, Philips Research (Netherlands) [7187-40]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Next generation heterodyne multi-spectral breast imager, Han Y. Ban, Soren D. Konecky, Univ. of Pennsylvania (United States); Kijoon Lee, Nanyang Technological Univ. (Singapore); Regine Choe, Arjun G. Yodh, Univ. of Pennsylvania (United States). [7187-41]

Automated segmentation based upon remitted scatter spectra from pathologically distinct tumor regions, Pilar Beatriz Garcia-Allende, Univ. de Cantabria (Spain); Venkataramanan Krishnaswamy, Kimberley S. Samkoe, Dartmouth College (United States); P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (United States); Brian W. Pogue, Dartmouth College (United States); Olga M. Conde, Jose M. Lopez-Higuera, Univ. de Cantabria (Spain) [7187-42]

Identification of the optimal wavelengths in optical topography using photon density measurement functions, Teresa M. Correia, Adam P. Gibson, Jeremy C. Hebden, Univ. College London (United Kingdom). [7187-43]

Light scattering by ellipsoidal particles and Fourier analysis of mixed scatterers, Kaloyan A. Popov, Timothy P. Kurzweg, Drexel Univ. (United States). [7187-45]

Polarimetric scattering by a bio-medium with anisotropic bio-molecules, Tsu-Wei Nee, National Yang-Ming Univ. (United States) [7187-46]

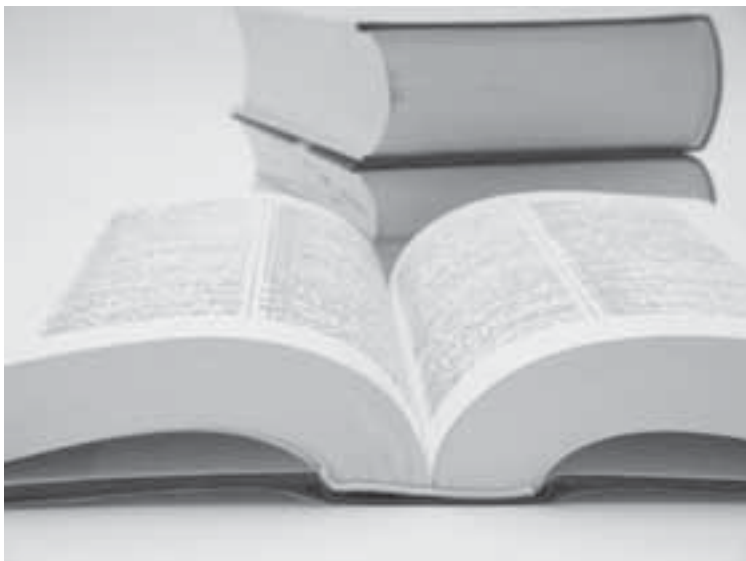
Wavelength-dependent penetration depth of near-infrared light in biological tissues, Vitali M. Kodach, Daniel Martijn M. de Bruin, Jeroen Kalkman, Dirk J. Faber, Academic Medical Ctr. (Netherlands); Ton G. van Leeuwen, Academic Medical Ctr. (Netherlands) and Univ. Twente (Netherlands) [7187-47]

Comparison and validation of models for diffuse optical spectroscopy, Rami Nachabe, Benno H. W. Hendriks, Rik Harbers, Adrien E. Desjardins, Marjolein van der Voort, Guus A. L. Braun, Philips Research (Netherlands) [7187-48]

First derivative of NIR light diffuse reflectance spectra as an approach to analyze muscle tissue chromophores and light pathlength, Eugene Gussakovsky, National Research Council Canada (Canada) [7187-49]

Measurement of subcellular morphology by light scatter filtering with a digital micromirror device, Robert M. Pasternack, Jing-Yi Zheng, Nada N. Boustany, Rutgers Univ. (United States). [7187-55]

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Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications VI

Conference Chairs: **Alexander N. Cartwright**, Univ. at Buffalo; **Dan V. Nicolau**, The Univ. of Liverpool (United Kingdom)

Program Committee: **Igal Brener**, Sandia National Labs.; **Philippe M. Fauchet**, Univ. of Rochester; **Paul Lee Gourley**, Sandia National Labs.; **Piotr Grodzinski**, National Cancer Institute; **Brian McGraith**, Dublin City Univ. (Ireland); **Igor L. Medintz**, Naval Research Lab.; **Ammasi Periasamy**, Univ. of Virginia; **Paras N. Prasad**, Univ. at Buffalo; **Weihong Tan**, Univ. of Florida

Tuesday 27 January

SESSION 1

Room: Conv. Ctr. Room B4 Tues. 8:10 to 10:00 am

Nanophotonics for Nanomedicine

Session Chair: **Dan V. Nicolau**,
The Univ. of Liverpool (United Kingdom)

8:10 am: **Crossing biological barriers: promise and status of nanomedicine**, Paras N. Prasad, Univ. at Buffalo (United States) [7188-01]

8:50 am: **Controlling uptake and intracellular fate of functionalised gold nanoparticles**, Mathias Brust, The Univ. of Liverpool (United Kingdom) [7188-02]

9:30 am: **Biodetection of DNA and proteins using enhanced UV absorption by structuration of the chip surface** (*Invited Paper*), Kristelle K. Robin, Jean-Luc Reverchon, Thales Research & Technology (France); Laurent Mugerli, Michel Fromant, Ecole Polytechnique (France); Henri Benisty, Institut d'Optique (France) [7188-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room B4 Tues. 10:30 am to 12:10 pm

Biomolecular Recognition Elements

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo

10:30 am: **Brain machine interfaces combining microelectrode arrays with nanostructured optical biochemical sensors**, Mohamad Hajj-Hassan, Sam Musallam, Timothy Gonzalez, Ebrahim Ghafer-Zadeh, Vamsy P. Chodavarapu, Mark Andrews, McGill Univ. (Canada); Daniel Theriault, Ecole Polytechnique de Montréal (Canada) [7188-04]

10:50 am: **Preparing and grouping of monofunctionalized nanoparticle using biotin-avidin system**, Chih-Hsien P. Lee, Cheng-An J. Lin, Chung Yuan Christian Univ. (Taiwan); Ralph A. Sperling, Philipps-Univ. Marburg (Germany); Jimmy K. Li, National Cheng Kung Univ. (Taiwan); Ting-Ya Yang, Chung Yuan Christian Univ. (Taiwan); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany); Walter H. Chang, Chung Yuan Christian Univ. (Taiwan) [7188-05]

11:10 am: **Intrinsic fluorescent recognition ligand scaffolds based on chaperonins and water soluble semiconductor quantum dots**, Mircea Cotlet, Mudalige T. Kumara, Brookhaven National Lab. (United States); Hongzhi Xie, Basil I. Swanson, Los Alamos National Lab. (United States); Jonathan D. Trent, Hiromi K. Kawaga, NASA Ames Research Ctr. (United States) [7188-06]

11:30 am: **Thin-layer infrared spectroscopic study on thermal behavior of non-phospholipid lipids and nanovesicles**, Rajan K. Bista, Reinhard F. Bruch, Aaron M. Covington, Univ. of Nevada, Reno (United States) [7188-07]

11:50 am: **Vibrational spectroscopic studies of self-forming lipids and nanovesicles**, Reinhard F. Bruch, Rajan K. Bista, Emilie A. Steinhoff, Univ. of Nevada, Reno (United States); Thomas R. Huser, Univ. of California, Davis (United States) [7188-08]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room B4 Tues. 1:30 to 3:00 pm

Nanophotonic Sensors I

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo

1:30 pm: **Efficient capture and detection of nanoscale biomolecules** (*Invited Paper*), Sharon M. Weiss, Vanderbilt Univ. (United States) [7188-09]

2:00 pm: **Label-free biosensing using a photonic crystal structure in a total-internal-reflection geometry**, Yunbo Guo, Jing-Yong Ye, Andrzej Myc, Charles Divin, Tommaso F. Bersano-Begey, James R. Baker, Jr., Theodore B. Norris, Univ. of Michigan (United States) [7188-10]

2:20 pm: **An optical leaky waveguide chemical sensor using molecularly imprinted sol-gel polymer**, Paul Taylor, The Univ. of Manchester (United Kingdom) and Millipore S.A.S (France); Telis Dimitrakopoulos, Stephane Mabic, Millipore S.A.S (France); Nicholas J. Goddard, The Univ. of Manchester (United Kingdom) [7188-11]

2:40 pm: **Optical resonances in polystyrene microspheres for sensing applications**, Julie Lutti, Wolfgang W. Langbein, Paola Borri, Cardiff Univ. (United Kingdom) [7188-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room B4 Tues. 3:30 to 5:00 pm

Nanophotonic Sensors II

Session Chair: **Sharon M. Weiss**, Vanderbilt Univ.

3:30 pm: **Enabling intelligent readout of optical signals from nanoscale sensors** (*Invited Paper*), Lei Yao, McGill Univ. (Canada); Vijay S. Tripathi, Ka Yi Yung, Univ. at Buffalo (United States); Vamsy P. Chodavarapu, McGill Univ. (Canada); Alexander N. Cartwright, Frank V. Bright, Univ. at Buffalo (United States) [7188-13]

4:00 pm: **Synthesis, characterization and biosensing application of photon upconverting nanoparticles**, Manoj Kumar, Peng Zhang, New Mexico Institute of Mining and Technology (United States) [7188-15]

4:20 pm: **Modelling the response of whispering-gallery-mode optical resonators for biosensing applications**, Wolfgang W. Langbein, Laura Chantada, Cardiff Univ. (United Kingdom); Nikolay Nikolaev, Loughborough Univ. (United Kingdom); Alex Ivanov, Paola Borri, Cardiff Univ. (United Kingdom) [7188-16]

4:40 pm: **Gold nanorod bioconjugates as enhancers of therapeutic action on cancer cells**, Tahere Tohidi, Univ. of Pune (India); Sonia R. Gawande, National Ctr. for Cell Science (India); Anup A. Kale, National Chemical Lab. (India); Anjali A. Athavale, Univ. of Pune (India); Padma R. Shastri, National Ctr. for Cell Science (India); Satishchandra B. Ogale, National Chemical Lab. (India) [7188-17]

Wednesday 28 January

SESSION 5

Room: Conv. Ctr. Room B4 Wed. 8:20 to 10:10 am

Nanoimaging with Nanoparticles

Session Chair: Dan V. Nicolau,
The Univ. of Liverpool (United Kingdom)

8:20 am: **Chemical nanoscopy of cell-like membranes** (*Invited Paper*),
Erik Bründermann, Ruhr-Univ. Bochum (Germany) [7188-18]

8:50 am: **Enhanced optical coherence tomography by efficient permeation and distribution of gold nanoparticles in premalignant in vivo tissue**, Chang Soo Kim, Yeh-Chan Ahn, Lih-Huei L. Liaw, Hilari Kawakami-Wong, Petra B. B. Wilder-Smith D.D.S., Matthew Brenner, Beckman Laser Institute and Medical Clinic (United States); Young Jik Kwon, Univ. of California, Irvine (United States) [7188-19]

9:10 am: **High lateral resolution spectral self-interference fluorescence microscopy using annular apertures**, Ayca Yalcin, Emre Ozkumur, Bennett B. Goldberg, M. Selim Unlu, Boston Univ. (United States) [7188-21]

9:30 am: **Detection of nanoparticles accumulation in biological tissues by optical coherence tomography in vivo**, Marina A. Sirotkina, Elena V. Zagaynova, Marina V. Shirmanova, Nizhny Novgorod State Medical Academy (Russian Federation); Pavel A. Agrba, Vladislav A. Kamensky, Institute of Applied Physics (Russian Federation) [7188-22]

9:50 am: **An optical system for in vivo nanoparticle circulation-time estimation**, Gregory J. Michalak, Louisiana Tech Univ. (United States); Jon A. Schwartz, Nanospectra Biosciences, Inc. (United States); Patrick D. O'Neal, Louisiana Tech Univ. (United States) [7188-23]

Coffee Break 10:10 to 10:30 am

SESSION 6

Room: Conv. Ctr. Room B4 Wed. 10:30 am to 12:30 pm

Imaging

Session Chair: Vamsy P. Chodavarapu, McGill Univ. (Canada)

10:30 am: **Low-level light interferometry: principles and applications in the life sciences**, Alberto Bilenca, Wellman Ctr. for Photomedicine (United States); Iwan Märki, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Brett E. Bouma, Wellman Ctr. for Photomedicine (United States); Rainer A. Leitgeb, Medical Univ. of Vienna (Austria); Guillermo J. Tearney, Wellman Ctr. for Photomedicine (United States); Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7188-24]

10:50 am: **Probing mass-transport and binding inhomogeneity in macromolecular interactions by molecular interferometric imaging**, Ming Zhao, Xuefeng Wang, David D. Nolte, Purdue Univ. (United States) . . . [7188-25]

11:10 am: **Patterning of fibronectin using laser writer for force measurement in cells**, Barbara Codan, Tiziano Gaiotto, Univ. degli Studi di Trieste (Italy); Roberto Di Niro, Univ. of Oslo (Norway); Roberto Marzari, Valter Sergo, Univ. degli Studi di Trieste (Italy) [7188-26]

11:30 am: **Atomic force microscopy study of F-actin on unstructured and nanostructured surfaces**, Marina Naldi, Vincenza Andrisano, Univ. of Bologna (Italy); Dan V. Nicolau, The Univ. of Liverpool (United Kingdom) [7188-34]

11:50 am: **The single molecule study of microarray DNA probe by TIRFM**, Ian C. Hsu, Shiue-Hua Chen, Chien-Ming Wu, National Tsing Hua Univ. (Taiwan) [7188-27]

12:10 pm: **Optical and thermophysical characteristics of gold nanoparticles for the purposes of combined laser diagnostics and thermal treatment of tissues**, Victor K. Pustovalov, Belarusian National Technical Univ. (Belarus); Liudmila G. Astafyeva, B.I. Stepanov Institute of Physics (Belarus); Benedikt Jean, Univ. Tübingen (Germany) [7188-28]

Colloidal Quantum Dots for Biomedical Applications IV

Conference Chairs: **Marek Osirski**, The Univ. of New Mexico; **Kenji Yamamoto**, International Medical Ctr. of Japan (Japan); **Thomas M. Jovin**, Max-Planck-Institut für Biophysikalische Chemie (Germany)

Program Committee: **Antigoni Alexandrou**, Ecole Polytechnique (France); **Moungi G. Bawendi**, Massachusetts Institute of Technology; **Maxime Dahan**, Ecole Normale Supérieure (France); **Alexander Eychmüller**, Technische Univ. Dresden (Germany); **Jennifer A. Hollingsworth**, Los Alamos National Lab.; **Hedi Mattoussi**, Naval Research Lab.; **Paul Mulvaney**, The Univ. of Melbourne (Australia); **Jay L. Nadeau**, McGill Univ. (Canada); **Shuming Nie**, Emory Univ.; **Wolfgang J. Parak**, Philipps-Univ. Marburg (Germany); **Sandra J. Rosenthal**, Vanderbilt Univ.; **Tania Q. Vu**, Oregon Health & Science Univ.; **Michael S. Wong**, Rice Univ.

SPIE and the organizers gratefully acknowledge the following award sponsor:



Saturday 24 January

Opening Remarks

Room: Conv. Ctr. Room M Sat. 8:15 to 8:20 am

Marek Osirski, The Univ. of New Mexico

SESSION 1

Room: Conv. Ctr. Room M Sat. 8:20 to 10:20 am

Synthesis and Characterization of Colloidal Nanocrystals for Biomedical Applications I

Session Chair: **Wolfgang J. Parak**, Philipps-Univ. Marburg (Germany)

8:20 am: **Synthesis and exploitation of InP/ZnS quantum dots for bioimaging** (*Invited Paper*), Thomas Nann, S. Massadeh, S. Xu, A. L. Merkulov, Univ. of East Anglia (United Kingdom) [7189-01]

8:50 am: **Towards non-blinking quantum dots**, Benoit Mahler, Ecole Supérieure de Physique et de Chimie Industrielles (France); Piernicola Spinicelli, Ecole Normale Supérieure (France); Stephanie Buil, Xavier Quelin, Univ. de Versailles Saint-Quentin-en Yvelines (France); Jean-Pierre Hermier, Ecole Normale Supérieure (France); Benoit Dubertret, Ecole Supérieure de Physique et de Chimie Industrielles (France) [7189-02]

9:10 am: **'Giant' multishell CdSe nanocrystal quantum dots with suppressed blinking: novel fluorescent probes for real-time detection of single-molecule events** (*Invited Paper*), Jennifer A. Hollingsworth, Yongfen Chen, Javier Vela, Han Htoon, Victor I. Klimov, Los Alamos National Lab. (United States) [7189-03]

9:40 am: **Photoenhancement of quantum dots and conjugates measured by steady-state and time-resolved spectroscopy**, Daniel Cooper, Lina Carlini, McGill Univ. (Canada); Diana M. Suffern, Rupesh Parbhoo, Stephen Bradforth, Univ. of Southern California (United States); Jay L. Nadeau, McGill Univ. (Canada) [7189-04]

10:00 am: **Broad tunability of the nonlinear properties of doped quantum dots and of core-doped quantum dot heterostructures**, Dan Oron, Assaf Avidan, Weizmann Institute of Science (Israel) [7189-05]

Coffee Break 10:20 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room M Sat. 10:40 am to 12:10 pm

Synthesis and Characterization of Colloidal Nanocrystals for Biomedical Applications II

Session Chair: **Hedi Mattoussi**, Naval Research Lab.

10:40 am: **Doped nanocrystals** (*Invited Paper*), David J. Norris, Univ. of Minnesota (United States) [7189-06]

11:10 am: **Mn²⁺ as a radial pressure gauge in colloidal core/shell nanocrystals**, Sandrine Ithurria, Ecole Supérieure de Physique et de Chimie Industrielles (France); Philippe Guyot-Sionnest, James Franck Institute (United States); Benoit Mahler, Benoit Dubertret, Ecole Supérieure de Physique et de Chimie Industrielles (France) [7189-07]

11:30 am: **Synthesis and characterization of scintillating cerium-doped lanthanum fluoride nanocrystals**, Krishnaprasad Sankar, Brian A. Akins, T. A. Memon, Nathan J. Withers, Gennady A. Smolyakov, Marek Osinski, The Univ. of New Mexico (United States) [7189-08]

11:50 am: **Fe₃O₄/CdTe metal/semiconductor fluorescent-magnetic bifunctional nanocomposites**, Haribhau M. Gholap, Fergusson College (India) and National Chemical Lab. (India); Anup A. Kale, Satishchandra B. Ogale, National Chemical Lab. (India) [7189-09]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room M Sat. 1:30 to 3:20 pm

Synthesis and Characterization of Colloidal Nanocrystals for Biomedical Applications III

Session Chair: **Jennifer A. Hollingsworth**, Los Alamos National Lab.

1:30 pm: **Nanoprobes with near-infrared persistent luminescence for *in vivo* imaging** (*Invited Paper*), Quentin le Masne de Chermont, Institut National de la Santé et de la Recherche Médicale (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris Descartes (France) and Ecole Nationale Supérieure de Chimie de Paris (France); Corinne Chaneac, Univ. Pierre et Marie Curie (France); Johanne Seguin, Institut National de la Santé et de la Recherche Médicale (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris Descartes (France) and Ecole Nationale Supérieure de Chimie de Paris (France); Fabienne Pelle, Ctr. National de la Recherche Scientifique (France); Serge Maitrejean, Biospace Lab. (France); Jean-Pierre Jolivet, Didier Gourier, Univ. Pierre et Marie Curie (France); Michel Bessodes, Daniel Scherman, Institut National de la Santé et de la Recherche Médicale (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paris Descartes (France) and Ecole Nationale Supérieure de Chimie de Paris (France) [7189-49]

2:00 pm: **Synthesis, characterization, and bio-conjugation of fluorescent gold nanoclusters towards biological labeling applications**, Cheng-An J. Lin, Ting-Ya Yang, Chih-Hsien P. Lee, Sherry H. Huang, Chung Yuan Christian Univ. (Taiwan); Ralph A. Sperling, Marco Zanello, Philipps-Univ. Marburg (Germany); Hsueh-Hsiao Wang, Mackay Memorial Hospital (Taiwan); Jimmy K. Li, National Cheng Kung Univ. (Taiwan); Ji-Lin Shen, Chung Yuan Christian Univ. (Taiwan); Hung-I Yeh, Mackay Memorial Hospital (Taiwan); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany); Walter H. Chang, Chung Yuan Christian Univ. (Taiwan) [7189-10]

2:20 pm: **One step synthesis of an array of different size gold nanoparticles using bidentate poly(ethylene glycol) ligands**, Eunkeu Oh, Kimihiro Susumu, Hedi Mattoussi, Naval Research Lab. (United States) [7189-11]

2:40 pm: **Aqueous synthesis of highly luminescent quantum dots and their bioapplications**, Jicun Ren, Shanghai Jiao Tong Univ. (China) [7189-12]

3:00 pm: **Formation of highly stable water-soluble CdSeZnS nanocrystals for bioassay**, Marina S. Khanef, Svetlana V. Sizova, Alla N. Generalova, Konstantin E. Mochalov, Vladimir A. Oleinikov, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation)[7189-13]
Coffee Break3:20 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room MSat. 3:40 to 4:40 pm

Biofunctionalization of Colloidal Nanocrystals

Session Chair: **Jay L. Nadeau**, McGill Univ. (Canada)

3:40 pm: **Designer peptidyl linkers for facilitated assembly of semiconductor quantum dot bioconjugates**, Kelly L. Boeneman, Igor L. Medintz, James B. Delehanty III, Kimihiro Susumu, Jeffrey R. Deschamps, Dorothy Farrell, Hedi Mattoussi, Naval Research Lab. (United States)[7189-14]

4:00 pm: **Quantum dot-dopamine conjugates: assembly, characterization, and potential use for biosensing**, Michael H. Stewart, Igor L. Medintz, Scott A. Trammell, Joseph S. Melinger, Hedi Mattoussi, Naval Research Lab. (United States)[7189-15]

4:20 pm: **Multivalent display of biomolecules on semiconductor quantum dots utilizing chemoselective ligation**, Duane E. Prasuhn, Igor L. Medintz, Naval Research Lab. (United States); Juan Bautista, Philip E. Dawson, The Scripps Research Institute (United States); Hedi Mattoussi, Naval Research Lab. (United States)[7189-16]

BIOS Hot Topics Sat. 7:00 to 9:30 pm

See p. 20 for details.

Sunday 25 January

SESSION 5

Room: Conv. Ctr. Room MSun. 8:00 to 10:00 am

Resonant-Energy-Transfer-Based Nanosensing

Session Chair: **Thomas M. Jovin**, Max-Planck-Institut für Biophysikalische Chemie (Germany)

8:00 am: **Chemiluminescent resonance energy transfer of luminescent quantum dots and their potential bioapplications** (*Invited Paper*), Jicun Ren, Shanghai Jiao Tong Univ. (China)[7189-17]

8:30 am: **Optimizing single-pair FRET in FRET-based nanobiosensors** (*Invited Paper*), M. Oheim, Ecole Supérieure de Physique et de Chimie Industrielles (France) and Univ. Paris Descartes (France); F. Zhang, Philipps-Universität Marburg (Germany); Camilla Luccardini, INSERM (France) and Ecole Normale Supérieure (France); J. M. Mallet, Ecole Normale Supérieure (France); P. Tauc, Jean-Claude Brochon, Ecole Normale Supérieure de Cachan (France); Wolfgang J. Parak, Philipps-Universität Marburg (Germany); A. Feltz, Ecole Normale Supérieure (France); Alexey V. Yakovlev, INSERM (France)[7189-18]

9:00 am: **Quantum dots as FRET acceptors for highly sensitive multiplexing immunoassays**, Daniel Geissler, Univ. Potsdam (Germany); Niko Hildebrandt, Fraunhofer Institut für Angewandte Polymerforschung (Germany); Loïc J. Charbonnière, Univ. Louis Pasteur (France); Hans-Gerd Löhmannsröben, Univ. Potsdam (Germany)[7189-19]

9:20 am: **Understanding the interactions between quantum dots and redox-active groups coupled via bridging peptide**, Igor L. Medintz, Thomas Pons, Scott A. Trammell, Hedi Mattoussi, Naval Research Lab. (United States)[7189-20]

9:40 am: **Monitoring protease activity using QD-fluorescent protein FRET probes**, Allison M. Dennis, Georgia Institute of Technology (United States); Gang Bao, Georgia Institute of Technology (United States) and Emory Univ. (United States)[7189-21]

Coffee Break10:00 to 10:30 pm

SESSION 6

Room: Conv. Ctr. Room MSun. 10:30 am to 12:10 pm

Novel Quantum-Dot-Based Sensors and Actuators

Session Chair: **Tania Q. Vu**, Oregon Health & Science Univ.

10:30 am: **Quantum leap in nanocrystal applications: voltage sensing and activation of cells** (*Invited Paper*), Alex Savtchenko, Joseph A. Bartel, Weiwien Zhao, Michael J. Ignatius, Joseph A. Treadway, Elena Molokanova, Invitrogen Corp. (United States)[7189-22]

11:00 am: **Multiple functionality of quantum dots as actuators and sensors in living cells** (*Invited Paper*), Elizabeth A. Jares-Erijman, Univ. de Buenos Aires (Argentina); M. J. Roberti, Univ. de Buenos Aires (Argentina) and Max-Planck-Institut für biophysikalische Chemie (Germany); Guillermo Menendez, Univ. de Buenos Aires (Argentina); J. Fauerbach, Univ. of Buenos Aires (Argentina); L. Pietrasanta, Univ. de Buenos Aires (Argentina); Thomas M. Jovin M.D., Max-Planck-Institut für Biophysikalische Chemie (Germany)[7189-23]

11:30 am: **Quantum dot based electrochemical sensor**, Wolfgang J. Parak, Zhao Yue, Waqas Khalid, Philipps-Universität Marburg (Germany); Kirsten Schubert, Univ. of Applied Sciences Wildau (Germany); Marco Zanella, Philipps-Universität Marburg (Germany); Fred Lisdat, Univ. of Applied Sciences Wildau (Germany)[7189-24]

11:50 am: **Improved molecular barcodes by lifetime discrimination**, Daniel B. Hall, William G. Lawrence, Radiation Monitoring Devices, Inc. (United States)[7189-25]

Lunch/Exhibition Break12:10 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Room MSun. 1:30 to 3:40 pm

Applications of Colloidal Nanocrystals in Cell Biology I

Session Chair: **Antigoni Alexandrou**, Ecole Polytechnique (France)

1:30 pm: **Fundamental principles of nanoparticle uptake in cells and tissue** (*Invited Paper*), Kenneth Dawson, Anna Salvati, Iseult Lynch, National Univ. of Ireland, Dublin (Ireland)[7189-26]

2:00 pm: **Quantum dot bioconjugates: uptake into cells and induction of changes of normal cellular transport** (*Invited Paper*), Tore-Geir Iversen, Christina Tekle, The Norwegian Radium Hospital (Norway); Bo van Deurs, Univ. of Copenhagen (Denmark); Kirsten Sandvig, The Norwegian Radium Hospital (Norway)[7189-27]

2:30 pm: **Tat-peptide as an efficient molecule to translocate gold nanoparticles and CdS quantum dots into cell nucleus** (*Invited Paper*), Jesus M. de la Fuente, Univ. de Zaragoza (Spain); Catherine C. Berry, Univ. of Glasgow (United Kingdom)[7189-28]

3:00 pm: **Intracellular delivery of gene-expressing fragments using quantum dot**, Akiyoshi Hoshino, International Medical Ctr. of Japan (Japan) and Tokyo Medical and Dental Univ. (Japan); Noriyoshi Manabe, Sanshiro Hanada, Kouki Fujioaka, International Medical Ctr. of Japan (Japan); Masato Yasuhara M.D., Tokyo Medical and Dental Univ. (Japan); Akihiko Kondo, Kobe Univ. (Japan); Kenji Yamamoto M.D., International Medical Ctr. of Japan (Japan)[7189-29]

3:20 pm: **Intracellular delivery of and sensing with quantum dot bioconjugates**, James B. Delehanty III, Christopher E. Bradburne, Igor L. Medintz, Dorothy Farrell, Thomas Pons, Jeffrey R. Deschamps, Naval Research Lab. (United States); Florence M. Brunel, Philip E. Dawson, The Scripps Research Institute (United States); Hedi Mattoussi, Naval Research Lab. (United States)[7189-30]

Coffee Break3:40 to 4:00 pm

Conference 7189

SESSION 8

Room: Conv. Ctr. Room M Sun. 4:00 to 6:00 pm

Applications of Colloidal Nanocrystals in Cell Biology II

Session Chair: Sandra J. Rosenthal, Vanderbilt Univ.

4:00 pm: **Quantum dots as a dual mode spatiotemporal microscopy probe for understanding cellular responses** (*Invited Paper*), Philip R. LeDuc, Yangang Zhang, Carnegie Mellon Univ. (United States) [7189-31]

4:30 pm: **High-resolution diffusion tracking of quantum-dot-labeled aquaporin water channels and CFTR chloride channels** (*Invited Paper*), Alan S. Verkman, Peter M. Haggie, J. Crane, Univ. of California, San Francisco (United States) [7189-32]

5:00 pm: **Multi-photon microscopy based on resonant four-wave mixing of colloidal quantum dots**, Francesco Masia, Wolfgang W. Langbein, Paola Borri, Cardiff Univ. (United Kingdom) [7189-33]

5:20 pm: **Single toxin receptor tracking using luminescent lanthanide-ion doped nanoparticles**, Silvan C. Türkcan, Didier Casanova, Geneviève Mialon, Thierry Gacoin, Jean-Pierre Boilot, Ecole Polytechnique (France); Jean-Baptiste Masson, Guillaume Voisinne, Massimo Vergassola, Michel Popoff, Institut Pasteur (France); Antignoni Alexandrou, Ecole Polytechnique (France) [7189-34]

5:40 pm: **Interactions of nanoparticles with cells: extremely rapid kinetics of nanoparticle uptake by live cells, end points, and mechanisms of entry**, Anna Salvati, Iseult Lynch, Kenneth Dawson, National Univ. of Ireland, Dublin (Ireland) [7189-35]

Monday 26 January

SESSION 9

Room: Conv. Ctr. Room M Mon. 8:00 to 10:20 am

Applications of Colloidal Quantum Dots in Cancer Diagnostics and Therapy

Session Chair: Kenji Yamamoto, International Medical Ctr. of Japan (Japan)

8:00 am: **Nanoparticle delivery into tumors using tissue-penetrating vascular homing peptides** (*Invited Paper*), Erkki Ruoslahti, Burnham Institute for Medical Research (United States) and Univ. of California, Santa Barbara (United States) [7189-36]

8:30 am: **Identification of multiple cellular targets in formalin-fixed paraffin embedded human tissue using streptavidin-conjugated quantum dots** (*Invited Paper*), S. Pittaluga, Stephen M. Wincovitch, Sr., National Institutes of Health (United States) [7189-37]

9:00 am: **EGFR-quantum dot staining of living glioma cells: a novel imaging approach for nanoneurosurgical guidance (glioma tumor treatment)**, Thomas M. Jovin M.D., Max-Planck-Institut für Biophysikalische Chemie (Germany); Sven Rainer Kantelhardt, Alf Giese, Georg-August-Univ. Göttingen (Germany); Donna J. Arndt-Jovin, Max-Planck-Institut für Biophysikalische Chemie (Germany) [7189-38]

9:20 am: **Real-time visualization of RGD-quantum dot binding in tumor neovasculature using intravital microscopy in living mice**, Bryan R. Smith, Zhen Cheng, Abhijit De, Sanjiv S. Gambhir, Stanford Univ. (United States) [7189-39]

9:40 am: **Comparative cytotoxicity of quantum dot and gold conjugates to doxorubicin**, Jay L. Nadeau, Anil Kumar, Daniel Cooper, Eve-Marie Dumas, McGill Univ. (Canada) [7189-40]

10:00 am: **Scintillating-nanoparticle-induced enhancement of radiation damage in living cells**, Nathan J. Withers, Nicole D. Trino, Krishnaprasad Sankar, Brian A. Akins, Antonio C. Rivera, Gennady A. Smolyakov, Graham S. Timmins, Marek Osinski, The Univ. of New Mexico (United States) [7189-41]

Coffee Break 10:20 to 10:50 pm

SESSION 10

Room: Conv. Ctr. Room M Mon. 10:50 to 11:50 am

Biocompatibility and Applications of Colloidal Quantum Dots in Drug Delivery

Session Chair: Erkki Ruoslahti, Burnham Institute for Medical Research

10:50 am: **Enhanced drug transport through alginate biofilms using magnetic nanoparticles**, Shayna L. McGill, Carla Cuyler, Hugh Smyth, Marek Osinski, The Univ. of New Mexico (United States) [7189-42]

11:10 am: **In vivo skin penetration of quantum dot nanoparticles: the effect of ultraviolet radiation**, Luke J. Mortensen, Lisa A. DeLouise, Univ. of Rochester (United States) [7189-43]

11:30 am: **Toxicity of carbon group quantum dots**, Sanshiro Hanada, International Medical Ctr. of Japan (Japan); Kouki Fujioka, Jikei Univ. School of Medicine (Japan) and International Medical Ctr. of Japan (Japan); Akiyoshi Hoshino, Noriyoshi Manabe, International Medical Ctr. of Japan (Japan); Kenji Hirakuri, Tokyo Denki Univ. (Japan); Kenji Yamamoto M.D., International Medical Ctr. of Japan (Japan) [7189-44]

OCEAN OPTICS YOUNG INVESTIGATOR AWARD

Room: Conv. Ctr. Room M Mon. 11:50 am to 12:00 pm

Session Chair: Marek Osirski, The Univ. of New Mexico

Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a \$1,000 cash prize to the Young Investigator and \$1,000 Ocean Optics equipment credit to the laboratory where the work was performed.

Award Sponsor:



Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Studies on the interaction between quantum dots and different proteins and flavonoids by spectroscopic methods, Anup A. Kale, National Chemical Lab. (India); Haribhau M. Gholap, Fergusson College (India); Satishchandra B. Ogale, National Chemical Lab. (India) [7189-45]

Photo-dependent fluorescence dynamics of CdSe/ZnS core-shell colloidal quantum dots in cylindrical waveguides, David I. Cunnah, Huw D. Summers, Peter Blood, John D. Thomson, Cardiff Univ. (United Kingdom) [7189-46]

Distribution and micro-region photoluminescence spectra of quantum dots in single breast cancer cell MCF-7, Yan Liu, Feng Zhang, Ping Chen, Lie Lin, Jining Li, Shengjiang Chang, Guoqing Tang, Guoguang Mu, Nankai Univ. (China) [7189-47]

Raman nanotags for fast multiplexed detection of biomolecules, Nic Cade, David R. Richards, King's College London (United Kingdom) [7189-48]

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Conference Chairs: **Samuel Achilefu**, Washington Univ. in St. Louis School of Medicine; **Ramesh Raghavachari**, U.S. Food and Drug Administration

Program Committee: **Mikhail Berezin**, Washington Univ. in St. Louis School of Medicine; **Richard B. Dorshow**, Covidien; **Paul M. W. French**, Imperial College London (United Kingdom); **Yueqing Gu**, China Pharmaceutical Univ. (China); **Hisataka Kobayashi**, National Institutes of Health; **Lyle R. Middendorf**, LI-COR Biosciences; **Gabor Patonay**, Georgia State Univ.; **Yasuteru Urano**, The Univ. of Tokyo (Japan)

Monday 26 January

Posters-Monday

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

Spontaneous transition and concomitant self-assembly of CdTe nanoparticles into CdS nanosheets induced by L-cysteine, Dawei Deng, Yueqing Gu, China Pharmaceutical Univ. (China) [7190-43]

Design and synthesis of highly sensitive fluorogenic substrates for glutathione S-transferase (GST) and application for activity imaging in living cells, Yuuta Fujikawa, Yasuteru Urano, The Univ. of Tokyo (Japan); Hideshi Inoue, Tokyo Univ. of Pharmacy and Life Science (Japan); Tetsuo Nagano, The Univ. of Tokyo (Japan) [7190-44]

Detection of disseminated peritoneal tumors by fluorescein diacrylate in mice, Yoshinori Harada, Hirokazu Furuta, Yasutoshi Murayama, Ping Dai, Kyoto Prefectural Univ. of Medicine (Japan); Yuuta Fujikawa, Yasuteru Urano, Tetsuo Nagano, The Univ. of Tokyo (Japan); Koki Morishita, Akira Hasegawa, Olympus Corp. (Japan); Tetsuro Takamatsyu, Kyoto Prefectural Univ. of Medicine (Japan) [7190-45]

Fluorescence in vivo imaging of live tumor cells with pH-activatable targeted probes via receptor-mediated endocytosis, Daisuke Asanuma, Yasuteru Urano, Tetsuo Nagano, The Univ. of Tokyo (Japan); Yukihiko Hama, Yoshinori Koyama, Hisataka Kobayashi, National Institutes of Health (United States) [7190-46]

Developing transglutaminase-specific NIR fluorescent imaging agents for monitoring wound healing and tumorigenesis, Chia-Pin Pan, Yihui Shi, Brad A. Hartl, Sanhita Dixit, Zishan Haroon, Gregory W. Faris, SRI International (United States) [7190-47]

Tuesday 27 January

SESSION 1

Room: Conv. Ctr. Room B3 Tues. 8:10 to 10:00 am

Molecular Imaging and Therapy Strategies I

Session Chair: **Samuel Achilefu**, Washington Univ. in St. Louis, School of Medicine

8:10 am: **Rational development of small molecule-based fluorescence probes for visualizing various cellular responses and in vivo tiny tumors** (*Invited Paper*), Yasuteru Urano, The Univ. of Tokyo (Japan) [7190-55]

8:30 am: **C dots: core-shell silica nanoparticles as fluorescent bioimaging probes**, Erik Herz, Andrew A. Burns, Ulrich Wiesner, Cornell Univ. (United States) [7190-02]

8:50 am: **Molecular imaging and therapy strategies (Keynote Presentation)** (*Invited Paper*), Tayyaba Hasan, Wellman Ctr. for Photomedicine (United States) [7190-01]

9:20 am: **Approaches to a broad range of high-performance PDT sensitizers**, Antonio A. Rocha Gonsalves, Arménio C. Serra, Marta Pineiro, Maria F. Botelho, Univ. de Coimbra (Portugal) [7190-03]

9:40 am: **A combined OCT-nanotechnology approach for epithelial cancer screening and therapy**, Nicusor V. Iftimia, Daniel X. Hammer, Amy Stevens, R. Daniel Ferguson, Physical Sciences Inc. (United States); Mansoor M. Amiji, Northeastern Univ. (United States); Samuel Achilefu, Washington Univ. in St. Louis School of Medicine (United States) [7190-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room B3 Tues. 10:30 am to 12:00 pm

Molecular Imaging and Therapy Strategies II

Session Chair: **Hisataka Kobayashi**, National Institutes of Health

10:30 am: **Feasibility of intra-operative molecular imaging to identify infiltrating cancer cells in human glioblastoma brain tumors** (*Invited Paper, Presentation Only*), James P. P. Basilion, Case Western Reserve Univ. (United States) [7190-05]

11:00 am: **Characterization of CdHgTe/CdS QDs for near-infrared fluorescence imaging of spinal cord in mouse model**, Haiyan Chen, China Pharmaceutical Univ. (China) [7190-07]

11:20 am: **Quantitative analysis of HER2 expression in vivo by near-infrared optical imaging**, Victor V. Chernomordik, Moinuddin Hassan, Sang-Bong Lee, Jacek Capala, Amir H. Gandjbakhche, National Institutes of Health (United States) [7190-08]

11:40 am: **Activatable antibody-based NIR fluorescence molecular imaging using various NIR fluorophores** (*Invited Paper*), Hisataka Kobayashi, National Cancer Institute (United States) [7190-56]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room B3 Tues. 1:30 to 3:00 pm

Nanoparticles in Imaging and Therapy I

Session Chair: **Mikhail Berezin**, Washington Univ. in St. Louis School of Medicine

1:30 pm: **Gold nanoparticles, properties, and some application in medicine and biology** (*Invited Paper*), Mostafa A. El-Sayed, Georgia Institute of Technology (United States) [7190-09]

2:00 pm: **Controlled release from optically responsive lipid nanocarriers**, Guohui Wu, Alexander A. Mikhailovsky, Univ. of California, Santa Barbara (United States); Htet Khant, Wah Chiu, Baylor College of Medicine (United States); Joseph A. Zasadzinski, Univ. of California, Santa Barbara (United States) [7190-10]

2:20 pm: **Plasmon resonant gold-coated liposomes for spectrally coded content release**, Sarah J. Leung, Timothy Troutman, Marek Romanowski, The Univ. of Arizona (United States) [7190-11]

2:40 pm: **Minimal detectable dose of nanoparticle contrast agents in NAOMI**, Dirk J. Faber, Daniel Martijn M. de Bruin, Ton G. C. van Leeuwen, Univ. van Amsterdam (Netherlands) [7190-12]

Coffee Break 3:00 to 3:30 pm

Conference 7190

SESSION 4

Room: Conv. Ctr. Room B3 Tues. 3:30 to 5:10 pm

Nanoparticles in Imaging and Therapy II

Session Chair: **Mikhail Berezin**,
Washington Univ. in St. Louis School of Medicine

3:30 pm: **Dynamic properties of different kinds of nanoparticles in mouse model after intravenous administration**, Yueqing Gu, Jian Zhang, Haiyan Chen, China Pharmaceutical Univ. (China); Zhiyu Qian, Nanjing Univ. of Aeronautics and Astronautics (China) [7190-13]

3:50 pm: **NIR optical molecular tomography with gold nanoshell enhanced fluorescence probes**, Amit Joshi, Baylor College of Medicine (United States); Rizia Bardhan, Rice Univ. (United States); Marc Bartels, Anshul Haldipur, Shi Ke, Baylor College of Medicine (United States); Naomi J. Halas, Rice Univ. (United States) [7190-14]

4:10 pm: **Cellular imaging and single particle tracking using gold nanoparticles as optical probes**, Jicun Ren, Shanghai Jiao Tong Univ. (China) [7190-15]

4:30 pm: **Design and development of multifunctional contrast agents for photoacoustic imaging**, Kimberly A. Homan, Sobeyda Gomez, Heidi Gensler, Jignesh Shah, Lisa Brannon-Peppas, Stanislav Y. Emelianov, The Univ. of Texas at Austin (United States) [7190-16]

4:50 pm: **Whole-body imaging of small animal tumors with specific quantum dot labeling**, Irina V. Balalaeva, Nizhny Novgorod State Univ. (Russian Federation) and Institute of Applied Physics (Russian Federation); Tatiana A. Zdobnova, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation) and Institute of Applied Physics (Russian Federation); Anna A. Brilkina, Nizhny Novgorod State Univ. (Russian Federation) and Institute of Applied Physics (Russian Federation); Marina V. Shirmanova, Irina M. Krutova, Nizhny Novgorod State Univ. (Russian Federation); Oleg A. Stremovsky, E. N. Lebedenko, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation); Ilya V. Turchin, Institute of Applied Physics (Russian Federation); Sergey M. Deyev, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation) [7190-17]

Wednesday 28 January

SESSION 5

Room: Conv. Ctr. Room B3 Wed. 8:30 to 10:00 am

Near-Infrared Fluorescent Molecular Probes Design and Synthesis

Session Chair: **Ramesh Raghavachari**,
U.S. Food and Drug Administration

8:30 am: **Near-infrared dyes for molecular probes and imaging** (*Invited Paper*), Gabor Patonay, Garfield Beckford, Lucjan Strekowski, Maged Henary, Sang Hoon Kim, Sidney Crow, Georgia State Univ. (United States) [7190-18]

9:00 am: **Indocyanine green-encapsulating pluronic micelles for near-infrared imaging**, Tae-Hee Kim, Yong-Ping Chen, Suzie H. Pun, Xingde Li, Univ. of Washington (United States) [7190-19]

9:20 am: **A novel indocyanine green nanoparticle probe for noninvasive fluorescence imaging in vivo**, Fabrice P. Navarro, Michel Berger, Mathieu Goutayer, Stéphanie Guillermet, Commissariat à l'Énergie Atomique (France); Véronique Josserand, Institut Albert Bonniot (France); Isabelle F. Texier Nogues, Commissariat à l'Énergie Atomique (France) [7190-20]

9:40 am: **VEGF-based near-infrared fluorescent probe for early cancer diagnosis in the AOM-treated mouse model**, Amy M. Winkler, Photini F. S. Rice, Jan Weichsel, The Univ. of Arizona (United States); Marina V. Backer, Joseph M. Backer, SibTech, Inc. (United States); Jennifer K. Barton, The Univ. of Arizona (United States) [7190-21]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: Conv. Ctr. Room B3 Wed. 10:30 am to 12:00 pm

Optical Molecular Probes and Industry

Session Chair: **Richard B. Dorshow**, Covidien

10:30 am: **Near-infrared probes for cellular pathway analysis and optical imaging** (*Invited Paper*), D. Michael Olive, Joy Kovar, Haibao Gong, LI-COR, Inc. (United States) [7190-22]

11:00 am: **Homogenous single-target assay using Brownian motion**, Marissa E. Yanez, Angelo L. Chandler, Gregory W. Faris, SRI International (United States) [7190-23]

11:20 am: **N-alkylated aminopyrazines for use as hydrophilic optical agents**, Amruta R. Poreddy, Richard B. Dorshow, Bethel Asmelash, Covidien (United States); Martin P. Debreczeny, Martin Debreczeny Consulting (United States); Rick M. Fitch, John N. Freskos, Karen P. Galen, Kimberly R. Gaston, William L. Neumann, Raghavan Rajagopalan, Tasha M. Schoenstein, Jeng-Jong Shieh, James M. Wilcox, Jolette K. Wojdya, Covidien (United States) [7190-24]

11:40 am: **Phosphorescent nanoparticles and their applications for time-resolved luminescent biological assays**, Xuedong Song, Lei Huang, Kimberly Clark Corp. (United States); Michael E. Knotts, Georgia Tech Research Institute (United States); Bin Wu, Phosphorex, Inc. (United States) [7190-25]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 7

Room: Conv. Ctr. Room B3 Wed. 1:30 to 3:00 pm

Fluorescence Lifetime Probes and Methods I

Session Chair: **Gabor Patonay**, Georgia State Univ.

1:30 pm: **Fluorescence lifetime imaging study of a single cell: stress-induced environmental change and electric field effects on fluorescence** (*Invited Paper*), Nobuhiro Ohta, Takakazu Nakabayashi, Issei Nagao, Masataka Kinjo, Hokkaido Univ. (Japan); Yumiko Aoki, Minoru Tanaka, National Institute for Basic Biology (Japan) [7190-26]

2:00 pm: **Relative concentration of fluorophores in a scattering medium using fluorescence lifetime contrast**, David J. Hall, Sung-Ho Han, Univ. of California, San Diego (United States) [7190-27]

2:20 pm: **In vivo imaging with near-infrared fluorescence lifetime contrast**, Walter J. Akers, Mikhail Berezin, Hyeran Lee, Samuel Achilefu, Washington Univ. in St. Louis School of Medicine (United States) [7190-28]

2:40 pm: **Multiparameter single molecule spectroscopy gives insight into the complex photophysics of Förster energy transfer coupled biosystems**, Frank Schleifenbaum, Univ. Tübingen (Germany); Christian Blum, Univ. Twente (Netherlands); Kirstin Elgass, Univ. Tübingen (Germany); Vinod Subramaniam, Univ. Twente (Netherlands); Alfred J. Meixner, Univ. Tübingen (Germany) [7190-29]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: Conv. Ctr. Room B3 Wed. 3:30 to 4:50 pm

Fluorescence Lifetime Probes and Methods II

Session Chair: **Yasuteru Urano**, The Univ. of Tokyo (Japan)

3:30 pm: **Imaging yield and lifetime of a targeted fluorescent probe in a living mouse via diffuse optical tomography**, Ralph Nothdurft, Sachin V. Patwardhan, Walter J. Akers, Yunpeng Ye, Samuel Achilefu, Joseph P. Culver, Washington Univ. in St. Louis School of Medicine (United States) [7190-30]

3:50 pm: **In vivo optical imaging of dihydroethidium oxidation in the mouse brain employing fluorescence intensity and lifetime contrast**, David J. Hall, Laura Dugan, Sung-Ho Han, Univ. of California, San Diego (United States) [7190-31]

4:10 pm: **In vivo phosphorescence imaging of cancer using iridium complexes**, Seiji Tobita, Toshitada Yoshihara, Yasuhiro Iida, Keigo Endo, Masahiro Hosaka, Toshiyuki Takeuchi, Gunma Univ. (Japan) [7190-32]

4:30 pm: **Magnetic field effects on spectrally resolved fluorescence lifetime: toward online oxygen monitoring using magneto-optic probes**, Ozzy Mermut, INO (Canada); Kevin R. Diamond, Juravinski Cancer Ctr. (Canada); Jean-François Cormier, Pascal Gallant, Nicolas Hô, Nolwenn Le Bouch, Sébastien Leclair, Isabelle Noiseux, Marcia L. Vernon, INO (Canada); Jean-François Morin, Univ. Laval (Canada); Michael S. Patterson, Juravinski Cancer Ctr. (Canada) [7190-34]

Thursday 29 January

SESSION 9

Room: Conv. Ctr. Room B3Thurs. 8:30 to 9:50 am

Activatable Probes and Molecular Detection Methods I

Session Chair: **Yueqing Gu**, China Pharmaceutical Univ. (China)

8:30 am: **Activatable optical imaging probes with various fluorophore- quencher combinations**, Mikako Ogawa, Nobuyuki Kosaka, National Institutes of Health (United States); Yasuteru Urano, The Univ. of Tokyo (Japan); Peter L. Choyke, Hisataka Kobayashi, National Institutes of Health (United States).....[7190-35]

8:50 am: **A new near-infrared absorption and fluorescent probe based on Bombesin for molecular imaging**, Naresh G. Kujala, Huifang Zhai, Charles J. Smith, Gary Sieckman, Timothy Hoffman, Wynn A. Volkert, Lixin Ma, Ping Yu, Univ. of Missouri, Columbia (United States)[7190-36]

9:10 am: **Characterization of quenched fluorescent triple helical peptides for MMP-2 and MMP-9 optical imaging**, Philip P. Cheney, Washington Univ. in St. Louis School of Medicine (United States); Gregg B. Fields, The Univ. of Texas Health Science Ctr. at San Antonio (United States); Samuel Achilefu, W. Barry Edwards, Washington Univ. in St. Louis School of Medicine (United States).....[7190-37]

9:30 am: **Using a fluorescently labeled glucose analog as an optical biomarker for the early detection of cancer in Barrett's esophagus**, Nadhi Thekkekk, Rice Univ. (United States); Dipen Maru, Sharmila Anandasabapathy, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Rebecca R. Richards-Kortum, Rice Univ. (United States)[7190-38]

Coffee Break9:50 to 10:20 am

SESSION 10

Room: Conv. Ctr. Room B3Thurs. 10:20 to 11:40 am

Activatable Probes and Molecular Detection Methods II

Session Chair: **Samuel Achilefu**, Washington Univ. in St. Louis School of Medicine

10:20 am: **Photoactivatable DCDHF fluorophores for single-molecule imaging**, Samuel J. Lord, Nicholas R. Conley, Hsiaolu D. Lee, Stanford Univ. (United States); Na Liu, Samuel Reichel, Robert J. Twieg, Kent State Univ. (United States); William E. Moerner, Stanford Univ. (United States).....[7190-39]

10:40 am: **Imaging probe for tumor malignancy**, Shinae Kizaka-Kondoh, Shotaro Tanaka, Masahiro Hiraoka, Kyoto Univ. (Japan)[7190-40]

11:00 am: **LIBS-based multi-element coded assay for ovarian cancer application**, Yuri Markushin, Nouredine Melikechi, Aristides Marcano, Steven Rock, Delaware State Univ. (United States); Denise Connolly, Fox Chase Cancer Ctr. (United States)[7190-41]

11:20 am: **A study of optical anisotropy for nearly spherical gold nanoparticles: toward a sensitive detection using polarization microscopy in biomolecular applications**, Bassam Al-Qadi, Saiki Toshiharu, Keio Univ. (Japan).....[7190-42]

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Fluorescence In Vivo Imaging Based on Genetically Engineered Probes: From Living Cells to Whole Body Imaging IV

Conference Chairs: **Alexander P. Savitsky**, A.N. Bach Institute of Biochemistry (Russia); **Yingxiao Wang**, Univ. of Illinois at Urbana-Champaign

Conference Co-Chairs: **Robert M. Hoffman**, AntiCancer, Inc.; **Robert E. Campbell**, Univ. of Alberta (Canada)

Program Committee: **Lubov Yu. Brovko**, Univ. of Guelph (Canada); **Eiji Kobayashi**, Jichi Medical Univ. (Japan); **Qingming Luo**, Huazhong Univ. of Science and Technology (China); **Nathan C. Shaner**, Salk Institute for Biological Studies

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room D Sun. 8:30 to 11:40 am

Photo Physical and Biochemical Properties of FPs

Session Chairs: **Alexander P. Savitsky**,

A.N. Bach Institute of Biochemistry (Russian Federation);

Yingxiao Wang, Univ. of Illinois at Urbana-Champaign

8:30 am: **Computational modeling structure and spectra of biological chromophores**, Jack Collins, Igor Topol, Advanced Biomedical Computing Ctr. (United States); Alexander V. Nemukhin, Lomonosov Moscow State Univ. (Russian Federation); Alexander P. Savitsky, A.N. Bach Institute of Biochemistry (Russian Federation) [7191-01]

8:50 am: **Simulations on the trans-cis isomerization of the GFP-like chromophores**, Alexander V. Nemukhin, Bella Grigorenko, Igor Polyakov, Lomonosov Moscow State Univ. (Russian Federation) [7191-02]

9:10 am: **Searching for the two-photon brightest red fluorescent protein and its optimum excitation wavelength**, Mikhail A. Drobizhev, Shane Tillo, Nikolay Makarov, Thomas E. Hughes, Aleksander K. Rebane, Montana State Univ., Bozeman (United States) [7191-03]

9:30 am: **Evaluating and improving the photostability of fluorescent proteins**, Nathan C. Shaner, Monterey Bay Aquarium Research Institute (United States); Michael Z. Lin, Michael R. McKeown, Paul A. Steinbach, Univ. of California, San Diego (United States); Kristin L. Hazelwood, Michael W. Davidson, Florida State Univ. (United States); Roger Y. Tsien, Univ. of California, San Diego (United States) [7191-04]

9:50 am: **Improving and adapting fluorescent proteins for sensing signaling pathways and visualizing protein synthesis**, Michael Z. Lin, Michael R. McKeown, Jin Yang, Margaret M. Timmers, Roger Y. Tsien, Univ. of California, San Diego (United States) [7191-05]

Coffee Break 10:10 to 10:40 am

10:40 am: **Endothelial cell mechanotransduction: using laser tweezers to differentiate between the transduction of ligand-coupled and fluid-coupled stresses**, Elliot L. Botvinick, Univ. of California, Irvine (United States) [7191-06]

11:00 am: **The development and application of FRET biosensors and computational analysis for live cell imaging**, Yingxiao Wang, Univ. of Illinois at Urbana-Champaign (United States) [7191-07]

11:20 am: **A noncytotoxic DsRed variant for whole-cell labeling**, Rita L. Strack, Daniel E. Strongin, Dibyendu Bhattacharyya, The Univ. of Chicago (United States); Wen Tao, Hal Broxmeyer, Indiana Univ. School of Medicine (United States); Robert Keenan M.D., Benjamin S. Glick, The Univ. of Chicago (United States) [7191-08]

Lunch/Exhibition Break 11:40 am to 1:00 pm

SESSION 2

Room: Conv. Ctr. Room D Sun. 1:00 to 3:10 pm

In vivo Imaging and Tomography

Session Chairs: **Robert M. Hoffman**, AntiCancer, Inc.;

Robert E. Campbell, Univ. of Alberta (Canada)

1:00 pm: **Selective GFP labeling of cancer metastasis in nude mice by the telomerase-specific replication-competent adenovirus expressing GFP (OBP-401)** (Invited Paper), Hiroyuki Kishimoto, Ming Zhao, AntiCancer, Inc. (United States); Katsuhiko Hayashi, Kanazawa Univ. School of Medicine (Japan); Yasuo Urata, Oncolys BioPharma Inc. (Japan); Noriaki Tanaka, Toshiyoshi Fujiwara, Okayama Univ. School of Medicine (Japan); Michael Bouvet, Univ. of California, San Diego (United States); Robert M. Hoffman, AntiCancer, Inc. (United States) [7191-09]

1:30 pm: **Real-time color-coded cellular imaging of interaction between lung metastasis and splenocytes**, Hiroaki Kimura, AntiCancer, Inc. (United States); Katsuhiko Hayashi, Kensuke Yamauchi, Hiroyuki Tsuchiya, Katsuro Tomita, Kanazawa Univ. School of Medicine (Japan); Robert M. Hoffman, AntiCancer, Inc. (United States) [7191-10]

1:50 pm: **Quantitative in-vivo imaging of the lung using time-domain fluorescence measurements**, Guobin Ma, Muriel Jean-Jacques, Lysanne Melanson-Drapeau, Mario Khayat, ART Advanced Research Technologies, Inc. (Canada) [7191-11]

2:10 pm: **Development of a noncontact 3-D fluorescence tomography system for small animal in vivo imaging**, Xiaofeng Zhang, Duke Univ. Medical Ctr. (United States); Cristian T. Badea, Duke Univ. (United States); Mathews Jacob, Univ. of Rochester (United States); G. Allan Johnson, Duke Univ. (United States) [7191-12]

2:30 pm: **Monitoring and quantification of the protein partition during cytokinesis with fluorescent spectral imaging**, I-Jen Hsu, Ja-Yun Lee, Tzong-Yuan Wu, Ying-Ju Chen, Chung Yuan Christian Univ. (Taiwan) [7191-13]

2:50 pm: **Imaging molecular imaging in vivo in real-time with a fusion system of digital radiography and whole-body fluorescent optical imaging**, Kun Bi, Zhihong Zhang, Qingming Luo, Shaoqun Zeng, Britton Chance Ctr. for Biomedical Photonics (China) [7191-14]

Monday 26 January

Posters-Monday

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Setup Instructions on p. 311.

A new red bimolecular fluorescence complementation based on TagRFP, Lingsong Qin, Jun Chu, Ying Zheng, Qingming Luo, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China) [7191-15]

Turquoise: a novel fluorescence protein mutant with optimal spectra, Jie Yang, Jinling Lu, Haiming Luo, Qingming Luo, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China) [7191-16]

Targeted therapy of primary bone cancer and lung metastasis of high-grade osteosarcoma in nude mice with a tumor-selective strain of Salmonella typhimurium, Katsuhiro Hayashi, Kanazawa Univ. School of Medicine (Japan); Ming Zhao, AntiCancer, Inc. (United States); Kensuke Yamauchi, Norio Yamamoto, Hiroyuki Tsuchiya, Katsuro Tomita, Kanazawa Univ. School of Medicine (Japan); Hiroyuki Kishimoto, AntiCancer, Inc. (United States); Michael Bouvet, Univ. of California, San Diego (United States); Robert M. Hoffman, AntiCancer, Inc. (United States) [7191-17]

Real-time imaging of cancer cell dynamics on the lung in the live mouse, Kensuke Yamauchi, Kanazawa Univ. School of Medicine (Japan); Hiroaki Kimura, AntiCancer, Inc. (United States); Katsuhiro Hayashi, Hiroyuki Tsuchiya, Katsuro Tomita, Kanazawa Univ. School of Medicine (Japan); Robert M. Hoffman, AntiCancer, Inc. (United States) [7191-18]

High- and low-passage variants of a human pancreatic cancer cell line yield two different in vivo models of pancreatic cancer progression, Michele McElroy, Sharmeela Kaushal, Mark A. Talamini M.D., Univ. of California, San Diego (United States); Robert M. Hoffman, AntiCancer, Inc. (United States); Michael Bouvet, Univ. of California, San Diego (United States) [7191-19]

Effect of chemotherapy on GFP-labeled murine mammalian tumor (MMT-GFP): subcellular image analysis using live mice, Kensuke Yamauchi, Hiroyuki Tsuchiya, Katsuhiro Hayashi, Hisaharu Shirai, Kanazawa Univ. School of Medicine (Japan); Hiroaki Kimura, AntiCancer, Inc. (United States); Akihiko Takeuchi, Yasunori Toumyo, Masanori Kono, Katsuro Tomita, Kanazawa Univ. School of Medicine (Japan); Robert M. Hoffman, AntiCancer, Inc. (United States) [7191-20]

Plasmonics in Biology and Medicine VI

Conference Chairs: **Tuan Vo-Dinh**, Duke Univ.; **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room B2 Mon. 8:00 to 10:00 am

Plasmonics and SERS

Session Chair: **Tuan Vo-Dinh**, Duke Univ.

8:00 am: **Functionalised nanoparticles and SERS for bioanalysis**, Duncan Graham, Karen Faulds, David Thompson, Fiona Mackenzie, Ross Stevenson, Andrew Ingram, Robert J. Stokes, Emma McFarlane, James Alexander, Paul Garside, Univ. of Strathclyde (United Kingdom); Axel Hueber, Iain McInnes, Univ. of Glasgow (United Kingdom)[7192-01]

8:20 am: **Detection of cardiac biomarkers in a nanofluidic channel-based biosensor using surface enhanced Raman scattering (SERS)**, Melodie E. Benford, Miao Wang, Jun Kameoka, Gerard L. Coté, Texas A&M Univ. (United States)[7192-02]

8:40 am: **Sensitive molecular diagnostics using SERS**, Karen Faulds, Duncan Graham, Fiona McKenzie, Douglas MacRae, Alastair Ricketts, Jennifer Dougan, Univ. of Strathclyde (United Kingdom)[7192-03]

9:00 am: **Towards PCR-free mutation detection based on surface-enhanced Raman scattering**, Mustafa Culha, Omer F. Karatas, Omer Aydin, Mehmet Kahraman, Kemal Kesero, Ismail Sayin, Omer F. Bayrak, Yeditepe Univ. (Turkey)[7192-04]

9:20 am: **Imaging EGFR distribution using surface enhanced Raman spectroscopy**, Kevin C. Hewitt, Dalhousie Univ. (Canada); Michael X. Chen, Simon Fraser Univ. (Canada); Leanne Lucas, Aaron Smith, Dalhousie Univ. (Canada); Mladen Korbelik, Haishan Zeng, British Columbia Cancer Agency (Canada); Patrick W. K. Lee, Dalhousie Univ. (Canada)[7192-05]

9:40 am: **Surface-enhanced Raman-scattering biosensor for DNA detection**, Wu Yuan, Ho-Pui Ho, Siu-kai Kong, Rebecca Lee, The Chinese Univ. of Hong Kong (Hong Kong, China)[7192-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room B2 Mon. 10:30 am to 12:50 pm

Plasmonic Biosensors

Session Chair: **Laura Maria Lechuga**, Ctr. d'Investigació en Nanociència i Nanotecnologia (Spain)

10:30 am: **Where are the sensitivity limits in plasmonics and nanoplasmonics biosensing?**, Borja Sepúlveda, Bert Otte, Ctr. d'Investigació en Nanociència i Nanotecnologia (Spain); Luis Liz Marzan, Univ. de Vigo (Spain); Laura Maria Lechuga, Ctr. d'Investigació en Nanociència i Nanotecnologia (Spain)[7192-07]

10:50 am: **Corrugated plasmonic structures for biomedical applications**, Ildar Salakhutdinov, Wayne State Univ. (United States)[7192-08]

11:10 am: **Direct imaging of surface plasmon excitation with radially polarized beam**, Weibin Chen, Qiwen Zhan, Univ. of Dayton (United States)[7192-09]

11:30 am: **Surface plasmon resonance biosensors with plasmonic nanostructures**, Shean-Jen Chen, L.-Y. Yu, National Cheng Kung Univ. (Taiwan)[7192-10]

11:50 am: **Optical biochip system using surface plasmon resonance imaging: genotyping and influence of temperature on DNA hybridization**, Julien Moreau, Jerome Hottin, Jolanda Spadavecchia, Alain Bellemain, Michael T. G. Canva, Institut d'Optique (France)[7192-11]

12:10 pm: **Ion sensing with plasmonic nanoparticles**, Thomas A. Klar, Ludwig-Maximilians-Univ. München (Germany); Rene Müller, Technische Univ. Ilmenau (Germany); Srujan K. Dondapati, Ludwig-Maximilians-Univ. München (Germany)[7192-12]

12:30 pm: **Multiplex detection using plasmonics molecular sentinels nanoprobes for biomedical diagnostics and high throughput screening**, Hsin-Neng Wang, Tuan Vo-Dinh, Duke Univ. (United States)[7192-41]

Lunch Break 12:50 to 2:00 pm

SESSION 3

Room: Conv. Ctr. Room B2 Mon. 2:00 to 4:30 pm

Plasmonics and Fluorescence

Session Chair: **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine

2:00 pm: **Finite-difference time domain (FDTD) studies of the interaction of fluorophores with various metallic nanoparticle systems**, Mustafa H. Chowdhury, Univ. of Maryland School of Medicine (United States); Stephen K. Gray, Argonne National Lab. (United States); James F. Pond, Lumerical Solutions, Inc. (Canada); Joseph R. Lakowicz, Univ. of Maryland School of Medicine (United States)[7192-13]

2:20 pm: **Fluorimetric detection of nucleic acids using silver-core dye-labeled silica shell nanoparticles**, Mathieu Lessard-Viger, Maxime Rioux, Luc Rainville, Denis Boudreau, Univ. Laval (Canada)[7192-14]

2:40 pm: **Optimization of surface-enhanced luminescence for bioassays**, Marissa E. Yanez, Chia-Pin Pan, Gregory W. Faris, SRI International (United States)[7192-15]

3:00 pm: **Light control in organic electroluminescence devices by plasmonic grating coupled emission for biochemical applications**, Nan-Fu Chiu, Jiun-Haw Lee, Chii-Wann Lin, National Taiwan Univ. (Taiwan)[7192-16]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Plasmonic engineering of metal nanoparticles and films for enhanced fluorescence and Raman scattering**, Nic Cade, Tom Ritman-Meer, David R. Richards, King's College London (United Kingdom)[7192-17]

4:10 pm: **Plasmonics-active substrates on a wafer scale for sensing of chemical and biological molecules**, Anuj Dhawan, Duke Univ. (United States); Yan Du, North Carolina State Univ. (United States); Hsin-Neng Wang, Duke Univ. (United States); Donovan Leonard, Appalachian State Univ. (United States); Veena Misra, North Carolina State Univ. (United States); Michael D. Gerhold, U.S. Army Research Office (United States); Tuan Vo-Dinh, Duke Univ. (United States)[7192-19]

Monday 26 January

POSTERS-MONDAY

Room: Civic Auditorium Mon. 5:30 to 7:00 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Monday.

View Poster Presentation Set up Instructions on p. 311

Optical neural signal detection using surface plasmon resonance (SPR) sensing system, ShinAe Kim, Seoul National Univ. (Korea, Republic of); Kyung-Min Byun, Kyung Hee Univ. (Korea, Republic of); Jonghwan Lee, Jung Hoon Kim, Seoul National Univ. (Korea, Republic of); Dong-Ghi A. Kim, Konkuk Univ. (Korea, Republic of); Michael L. Shuler, Cornell Univ. (United States); Sung June Kim, Seoul National Univ. (Korea, Republic of) and Nano-Bioelectronics & Systems Research Ctr. (Korea, Republic of)[7192-32]

Sensitivity enhancement by phase sensitive surface plasmon resonance biosensors using periodic nanowire structures, Kyungjae Ma, DongJun Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of); Tze-tat Yu, Ho-pui Ho, The Chinese Univ. of Hong Kong (Hong Kong, China)[7192-33]

Performance analysis of extinction-based localized surface plasmon resonance biosensors in the presence of surface roughness, Kyung-Min Byun, Kyung Hee Univ. (Korea, Republic of); Soon Joon Yoon, Donghyun Kim, Yonsei Univ. (Korea, Republic of)[7192-34]

A new parallel scan spectral SPR 2D sensing system, Le Liu, Yonghong He, Suihua Ma, Jihua Guo, Tsinghua Univ. (China)[7192-35]

Experimental study on the influence of the metal film thickness on surface plasmon resonance biosensors, Suihua Ma, Le Liu, Yonghong He, Jihua Guo, Tsinghua Univ. (China).....[7192-36]

High-performance compact multi-channel sensor based on spectroscopy of surface plasmons, Marek Piliarik, Milan Vala, Ivo Tichy, Jiri Homola, Institute of Photonics and Electronics (Czech Republic)[7192-37]

Detection of Avian influenza-DNA hybridization using surface plasmon resonance sensor, ShinAe Kim, Sang Hun Lee, Seoul National Univ. (Korea, Republic of) and Nano-Bioelectronics & Systems Research Ctr. (Korea, Republic of); Kyung-Min Byun, Kyung Hee Univ. (Korea, Republic of); Kyung Hun Yoon, Tai Hyun Park, Seoul National Univ. (Korea, Republic of); Michael L. Shuler, Cornell Univ. (United States); Sung June Kim, Seoul National Univ. (Korea, Republic of).....[7192-38]

Plasmonics enhancement of metal nanospheres and nanospheroid linear chain systems, Stephen J. Norton, Tuan Vo-Dinh, Duke Univ. (United States).....[7192-42]

Tuesday 27 January

SESSION 4

Room: Conv. Ctr. Room B2..... Tues. 8:00 to 10:00 am

Metal Nanoparticles

Session Chair: Michael D. Gerhold, U.S. Army Research Office

8:00 am: **Optimization and characterization of gold layered nanoparticles for multiplexed optical imaging**, Michael A. McDonald, Angela R. D. Hight Walker, National Institute of Standards and Technology (United States).....[7192-20]

8:20 am: **Controlled transport through phospholipid bilayers by plasmonic heating of gold nanoparticles**, Fernando D. Stefani, Alexander S. Urban, Michael Fedoruk, Jochen Feldmann, Margarete Horton, Joachim Rädler, Ludwig-Maximilians-Univ. München (Germany)[7192-21]

8:40 am: **Synthesis of size-tunable polymer protected metallic nano-alloys by femtosecond laser-based ablation and seed growth**, Sébastien Besner, Andrei V. Kabashin, Ecole Polytechnique de Montréal (Canada); Francoise M. Winnik, Univ. of Montréal (Canada); Michel Meunier, Ecole Polytechnique de Montréal (Canada).....[7192-22]

9:00 am: **The use of a colour camera for quantitative detection of protein-binding nanoparticles**, Felicia Ungureanu, Remco Verdoold, Jan Halamek, Rob P. H. Kooyman, Univ. Twente (Netherlands).....[7192-23]

9:20 am: **Simultaneous molecular imaging of EGFR and HER2 using hyperspectral darkfield microscopy and immunotargeted nanoparticles**, Matthew J. Crow, Adam P. Wax, Duke Univ. (United States).....[7192-24]

9:40 am: **Observation of living cells with gold nanoparticles by using surface-enhanced Raman scattering**, Katsumasa Fujita, Jun Ando, Sawako Ishitobi, Keisaku Hamada, Nicholas I. Smith, Yasushi Inouye, Satoshi Kawata, Osaka Univ. (Japan)[7192-25]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room B2..... Tues. 10:30 am to 12:30 pm

Metal Colloids and Cellular Applications

Session Chair: Duncan Graham, Univ. of Strathclyde (United Kingdom)

10:30 am: **Photothermal efficiency of nanoshells and rod-shaped nanoparticles of relevance for clinical therapeutic applications**, Joseph R. Cole, Naomi J. Halas, Nikolay A. Mirin, Rice Univ. (United States); Glenn P. Goodrich, J. Donald Payne, Nanospectra Biosciences, Inc. (United States).....[7192-26]

10:50 am: **Optical imaging of interactions between molecular-specific therapeutic nanoparticles and lung cancer cells: correlation between uptake, distribution, and therapy**, Justina O. Tam, The Univ. of Texas at Austin (United States); Tomohisa Yokoyama, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Timothy A. Larson, The Univ. of Texas at Austin (United States); Ailing W. Scott, Seiji Kondo, Jack A. Roth, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); Jesse Aaron, The Univ. of Texas at Austin (United States); Rajagopal Ramesh, Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States)[7192-27]

11:10 am: **Two-photon-induced photoluminescence imaging of gold nanoshell tumor biodistribution**, Jaesook Park, Arnold Estrada, The Univ. of Texas at Austin (United States); Kelly L. Gill-Sharp, Kristina L. Sang, Jon A. Schwartz, Nanospectra Biosciences, Inc. (United States); Danielle K. Smith, The Univ. of Texas at Austin (United States); Parameshwaran Diagaradjane, Sunil Krishnan, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); J. Donald Payne, Chris L. Coleman, Nanospectra Biosciences, Inc. (United States); Brian A. Korgel, Andrew K. Dunn, James W. Tunnell, The Univ. of Texas at Austin (United States)[7192-28]

11:30 am: **Plasmonic perforation of living cells using ultrashort laser pulses and gold nanoparticles**, Markus Schomaker, Judith Baumgart, Laser Zentrum Hannover e.V. (Germany); Hugo Murua Escobar, Univ. of Veterinary Medicine Hannover (Germany); Jörn Bullerdiek, Univ. Bremen (Germany); Ingo Nolte, Univ. of Veterinary Medicine Hannover (Germany); Anacllet Ngezahayo, Leibniz Univ. Hannover (Germany); Holger Lubatschowski, Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany)[7192-29]

11:50 am: **Plasmonic nanosensors for cell imaging and biosensing**, Li-Lin Tay, Jamshid Tanha, David Kennedy, John P. Pezacki, John Hulse, National Research Council Canada (Canada)[7192-30]

12:10 pm: **Gold nanocages for controlled drug release**, Yong-Ping Chen, Desheng Zheng, Univ. of Washington (United States); Younan Xia, Washington Univ. in St. Louis (United States); Xingde Li, Univ. of Washington (United States).....[7192-31]



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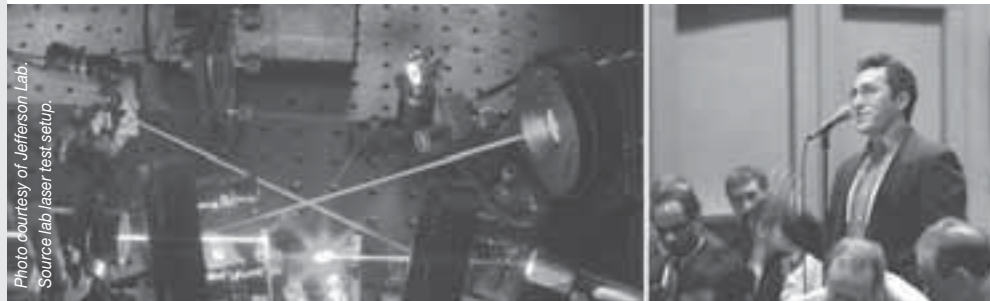
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Laser Communication and Propagation

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Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
24 January	25 January	26 January	27 January	28 January	29 January

Laser Source Engineering

Program Chair: **Gregory J. Quarles**, VLOC

7193	Solid State Lasers XVIII: Technology and Devices (Clarkson, Hodgson, Shori) p. 150
7194	Laser Resonators and Beam Control XII (Kudryashov, Paxton, Ilchenko) p. 155
7195	Fiber Lasers VI: Technology, Systems, and Applications (Gapontsev, Kliner) p. 157
7196	High Energy/Average Power Lasers and Intense Beam Applications IV (Davis, Heaven, Schriempf) p. 162
7203	Commercial and Biomedical Applications of Ultrafast Lasers IX (Neev, Nolte, Heisterkamp, Trebino) p. 180

Nonlinear Optics

Program Chair: **Peter E. Powers**, Univ. of Dayton

7197	Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications VIII (Powers) p. 164
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Semiconductor Lasers and LEDs

Program Chair: **E. Fred Schubert**, Rensselaer Polytechnic Institute

7198	High-Power Diode Laser Technology and Applications VII (Zediker) p. 167
7211	Physics and Simulation of Optoelectronic Devices XVII (Osinski, Witzigmann, Henneberger, Arakawa) p. 200
7216	Gallium Nitride Materials and Devices IV (Morkoç, Litton) p. 214
7217	Zinc Oxide Materials and Devices IV (Teherani, Litton, Rogers) p. 219
7229	Vertical-Cavity Surface-Emitting Lasers XIII (Choquette, Lei) p. 247
7230	Novel In-Plane Semiconductor Lasers VIII (Belyanin, Snowton) p. 249
7231	LEDs: Materials, Devices, and Applications for Solid State Lighting XIII (Streubel, Jeon) p. 253

Laser Communication and Propagation

7200	Atmospheric Propagation of Electromagnetic Waves III (Korotkova) p. 172	7199	Free-Space Laser Communication Technologies XXI (Hemmati) p. 170
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Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
24 January	25 January	26 January	27 January	28 January	29 January

Laser Micro-/Nanoengineering and Applications

Program Chairs: **Henry Helvajian**, The Aerospace Corp.; **James S. Horwitz**, U.S. Dept. of Energy

		7201 Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV (<i>Meunier, Holmes, Niino, Gu</i>) p. 174		7202 Laser-Based Micro- and Nano-Packaging and Assembly III (<i>Pfleging, Lu, Washio</i>) p. 178	
7203 Commercial and Biomedical Applications of Ultrafast Lasers IX (<i>Neev, Nolte, Heisterkamp, Trebino</i>) p. 180			7204 Micromachining and Microfabrication Process Technology XIII (<i>Maier, Chiao, Resnick</i>) p. 185		
		7205 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II (<i>Suleski, Schoenfeld, Wang</i>) p. 186		7206 Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices VIII (<i>Kullberg, Ramesham</i>) p. 189	
				7228 Laser Refrigeration of Solids II (<i>Epstein, Sheik-Bahae</i>) p. 246	

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See pages 35–40 for course daily schedule.

Conference 7193 · See Individual Sessions for Room Location

Sunday-Thursday 25-29 January 2009 • Proceedings of SPIE Vol. 7193

Solid State Lasers XVIII: Technology and Devices

Conference Chairs: **W. Andrew Clarkson**, Univ. of Southampton (United Kingdom); **Norman Hodgson**, Coherent, Inc.; **Ramesh K. Shori**, Naval Air Warfare Ctr.

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Sunday 25 January

INTRODUCTION

Room: Conv. Ctr. Room J4 Sun. 9:30 to 9:40 am

SESSION 1

Room: Conv. Ctr. Room J4 Sun. 9:40 to 11:50 am

Space-qualified Lasers

Session Chair: **Ramesh K. Shori**, Univ. of California, Los Angeles

9:40 am: **Beam combining of high-power fiber lasers arrays for airborne and space applications** (*Invited Paper*), Thomas M. Shay, Air Force Research Lab. (United States) [7193-01]

10:10 am: **Development of a compact-frequency quadrupled, passively Q-switched Nd:YAG laser system for harsh environments**, Jörg Neumann, Rajat Marwah, Sandra Mebben, Mathias Ernst, Christian Kolleck, Anas Moalem, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [7193-02]

10:30 am: **Some activities of MISSE 6 Mission**, Narasimha S. Prasad, NASA Langley Research Ctr. (United States) [7193-03]

10:50 am: **Overview of space qualified solid state lasers development at NASA Goddard Space Flight Center**, Anthony W. Yu, Steven X. Li, George B. Shaw, Antonios A. Seas, Mark A. Stephen, Aleksey A. Vasilyev, Luis A. Ramos-Izquierdo, Alan Lukemier, William Mamakos, A. Melak, Jeff Guzek, Alberto Rosanova, NASA Goddard Space Flight Ctr. (United States) [7193-04]

11:10 am: **Longevity validation of the LOLA laser design by extended vacuum testing of the LOLA engineering model laser**, George B. Shaw, Mark A. Stephen, Elisavet Troupaki, Aleksey A. Vasilyev, Anthony W. Yu, NASA Goddard Space Flight Ctr. (United States) [7193-05]

11:30 am: **Qualification of laser diode arrays for space applications**, Elisavet Troupaki, Aleksey A. Vasilyev, Mark A. Stephen, Antonios A. Seas, Nasir B. Kashem, NASA Goddard Space Flight Ctr. (United States) [7193-06]

Lunch Break 11:50 am to 1:20 pm

SESSION 2

Room: Conv. Ctr. Room J4 Sun. 1:20 to 3:00 pm

High Power Pulsed Lasers

Session Chair: **Narasimha S. Prasad**, NASA Langley Research Ctr.

1:20 pm: **Q-switched 1.7-kW average power laser with fiber beam delivery**, Hans-Dieter Hoffmann, Rudolf Meyer, Fraunhofer-Institut für Lasertechnik (Germany) [7193-08]

1:40 pm: **Q-switched Nd:YAG lasers for high average-power and high peak-power operation**, Michael Poultier, Ben Fulford, Paul Campton, Nick Hay, Mike Mason, Powerlase Ltd. (United Kingdom) [7193-09]

2:00 pm: **Power-scaling and prototyping of a gain switched Ti:Sapphire laser with a tuning range of 400 nm**, Bernd Jungbluth, Daniel Oberbeckmann, Fraunhofer-Institut für Lasertechnik (Germany) [7193-10]

2:20 pm: **Scaling the average power of 100-MW class INNOSLAB MOPA with ps and ns pulse duration**, Marco Hoefer, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7193-11]

2:40 pm: **Slab lasers with second-harmonic generation in the near field**, Daijun Li, Peng Zhu, Zhe Ma, Ruediger Haas, Alexander Schell, Peng Shi, Keming Du, EdgeWave GmbH (Germany) [7193-12]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: Conv. Ctr. Room J4 Sun. 3:30 to 5:20 pm

High Power Beam Delivery and Combining

Session Chair: **Helena Jelínková**, Czech Technical Univ. in Prague (Czech Republic)

3:30 pm: **Photothermal common-path interferometry (PCI): new developments** (*Invited Paper*), A. Alexandrovski, Martin M. Fejer, A. Markosian, Roger K. Route, Stanford Univ. (United States) [7193-13]

4:00 pm: **Characterizing high-power laser beams to detect the thermal load of optics and to identify other limitations within the design of the optical systems**, Harald K. Schwede, Otto W. Maerten, Reinhard Kramer, Stefan Wolf, Volker Brandl, Klaus G. Haensel, PRIMES GmbH (Germany) [7193-14]

4:20 pm: **Fundamental-mode fiber-to-fiber coupling at high power**, Ola Blomster, Mats Blomqvist, Magnus Palsson, Optoskand AB (Sweden) [7193-15]

4:40 pm: **Fiber delivery systems for high-brightness lasers**, Björn Wedel, Roman Niedrig, Highyag Lasertechnologie GmbH (Germany) [7193-16]

5:00 pm: **Optical characterization capabilities at Naval Air Warfare Center**, Robert Seavers, Joni M. Pentony, Ramesh K. Shori, Naval Air Warfare Ctr. (United States) [7193-19]

Monday 26 January

SESSION 4

Room: Conv. Ctr. Room J4 Mon. 8:30 to 9:50 am

Ytterbium Lasers

Session Chair: **Martin C. Richardson**, College of Optics & Photonics/Univ. of Central Florida

8:30 am: **High-power multocrystal cw and femtosecond mode-locked oscillators based on Yb:KYW**, Katrin S. Wentsch, Anne-Laure I. Calendron, Maximilian J. Lederer, High Q Laser Production GmbH (Austria) [7193-21]

8:50 am: **Diode-pumped Yb:KYW laser emitting at 981 nm by intracavity pumping**, Marc Castaing, Institut d'Optique (France) and Oxixus S.A. (France); François Balembois, Patrick M. Georges, Institut d'Optique (France); Thierry Georges, Oxixus S.A. (France) [7193-22]

9:10 am: **Power scaling of Yb INNOSLAB amplifiers beyond 100-W average power**, Peter Russbuedt, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany); Torsten G. Mans, Aachen Univ. (Germany) [7193-23]

9:30 am: **Diode-pumped laser with Yb:YAG single-crystal fiber grown by the micro-pulling down technique**, Damien Sangla, Institut d'Optique (France) and Univ. de Claude Bernard Lyon I (France); Nicolas Aubry, FiberCryst (France) and Univ. de Claude Bernard Lyon I (France); Julien Didierjean, Didier Perrodin, FiberCryst (France); François Balembois, Institut d'Optique (France); Kherredine Lebbou, Alain Brenier, Univ. de Claude Bernard I (France); Patrick M. Georges, Institut d'Optique (France); Olivier Tillement, Univ. de Claude Bernard I (France); Jean-Marie Fourmigué, FiberCryst (France) [7193-24]

Coffee Break 9:50 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room J4 Mon. 10:30 am to 12:10 pm

Vanadate Lasers

Session Chair: Alan B. Petersen, Newport Spectra-Physics

- 10:30 am: **Comparative studies of Nd:Y₂Gd_{1-x}VO₄ laser with direct and indirect pumping**, Nils C. Fernelius, Air Force Research Lab. (United States); X. Wang, Yuanji Tang, Suning Tang, Crystal Research, Inc. (United States). [7193-25]
- 10:50 am: **Three-level operation in a diode-pumped Nd:GdVO₄ laser and cw 440-nm generation**, Marc Castaing, Institut d'Optique (France) and Oxxius S.A. (France); François Balembois, Patrick M. Georges, Institut d'Optique (France) [7193-26]
- 11:10 am: **Optimization of a high-power fibre coupled diode-end-pumped Nd:YVO₄ solid state laser**, Ashraf F. El-Sherif, Military Technical College (Egypt) [7193-27]
- 11:30 am: **A mode-hop-free tunable single-longitudinal-mode Nd:YVO₄ laser with 25W of power at 1064 nm**, Keith M. Murdoch, Michael J. Snadden, David A. Clubleby, Coherent, Inc. (United States). [7193-28]
- 11:50 am: **Lasings of Yb in a mixed YGdVO₄ crystal with bistability and polarization switching**, Junhai Liu, Qingdao Univ. (China); Huaijin Zhang, Shandong Univ. (China); Xavier Mateos, Univ. Rovira i Virgili (Spain); Wenjuan Han, Qingdao Univ. (China); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany). [7193-29]
- Lunch Break 12:10 to 1:20 pm

SESSION 6

Room: Conv. Ctr. Room J4 Mon. 1:20 to 3:00 pm

Stabilized Lasers

Session Chair: Wolf R. Seelert, Coherent Lubeck GmbH (Germany)

- 1:20 pm: **Spectral narrowing and tunability of a high-power diffraction-limited ns-pulsed OPO/OPA system using transversely chirped and temperature-tuned volume Bragg gratings**, Andrew J. Merriam, Lumeras (United States); Vadim I. Smirnov, Leonid B. Glebov, OptiGrate (United States). [7193-30]
- 1:40 pm: **Injection-seeded single-frequency Nd:YAG MOPA Q-switched laser**, Frank F. Wu, Anatoliy Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (United States). [7193-31]
- 2:00 pm: **Single-frequency high-power waveguide lasers**, Stefano Taccheo, Swansea Univ. (United Kingdom); Giuseppe Della Valle, Politecnico di Milano (Italy); Denis Barbier, Teemphotonic (France) [7193-32]
- 2:20 pm: **VBG and GMRP stabilized continuous-wave tunable (50 nm) narrow-linewidth thulium fiber laser**, Timothy S. McComb, Robert Sims, Matthew C. Reichert, Vikas Sudesh, Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States); Menelaos K. Poutous, Zachary Roth, Eric G. Johnson, The Univ. of North Carolina at Charlotte (United States). [7193-33]
- 2:40 pm: **A novel tunable diode laser using volume holographic gratings**, Christophe Moser, Ondax, Inc. (United States). [7193-34]
- Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: Conv. Ctr. Room J2 Mon. 3:30 to 6:00 pm

Visible and UV Lasers I

Session Chairs: Norman Hodgson, Coherent, Inc.; Dahv A. V. Kliener, JDS Uniphase Corp.

Joint Session with Conference 7195: Fiber Lasers VI: Technology, Systems, and Applications

- 3:30 pm: **Extending fiber-based supercontinuum generation to shorter wavelengths (Invited Paper)**, Jonathan C. Knight, James M. Stone, Univ. of Bath (United Kingdom) [7195-13]
- 4:00 pm: **Highly stable UV-mode-locked lasers with an output power of 35W at 355 nm**, Michael Mond, Holger Schoene, Andreas Diening, Guenter Hollemann, Wolf R. Seelert, Coherent Lubeck GmbH (Germany). [7193-35]
- 4:20 pm: **Fiber amplifier-based UV laser source**, Manuel J. Leonardo, Mark W. Byer, Gregory L. Keaton, Derek J. Richard, Frank J. Adams, Susi Guzsella, John L. Nightingale, Laura A. Smoliar, Mobius Photonics, Inc. (United States). [7195-14]

- 4:40 pm: **Nanosecond 389-nm coherent light source with injection seeding for nuclear spin polarization of 3He atoms**, Yuta Aoki, Yasutomo Shiomi, Takeshi Yamamoto, Hiroshi Kumagai, Ataru Kobayashi, Osaka City Univ. (Japan) [7193-36]
- 5:00 pm: **Small linewidth CW high-power PM Yb-fiber laser around 1150 nm and yellow generation**, Mathieu Jacquemet, Erwan Goyat, Alain Mugnier, David Pureur, Quantel (France) [7195-15]
- 5:20 pm: **High-power UV generation at 355 nm by means of extra-cavity frequency conversion of a high-repetition rate InnoSlab MOPA system**, Bastian Gronloh, Marco Hoefer, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany). [7193-37]
- 5:40 pm: **High-average power 258-nm generation in a nanosecond fiber MOPA system**, Andreas Diening, Stuart McLean, Andrei N. Starodoumov, Coherent, Inc. (United States) [7195-16]

Tuesday 27 January

SESSION 8

Room: Conv. Ctr. Room J1 Tues. 8:00 to 10:20 am

Visible and UV Lasers II

Session Chairs: W. Andrew Clarkson, Univ. of Southampton (United Kingdom); Pinhas Blau, Soreq Nuclear Research Ctr. (Israel)

Joint Session with Conference 7197: Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications VIII

- 8:00 am: **Tunable, high-power, solid state sources for the blue and ultraviolet (Invited Paper)**, Majid Ebrahim-Zadeh, Institut de Ciències Fotòniques (Spain). [7197-01]
- 8:30 am: **Q-switched diode-pumped Nd:YAG rod laser with output power of 420W at 532 nm and 160-W at 355 nm**, David R. Dudley, Oliver Mehl, Gary Y. Wang, Yang Pang, Norman Hodgson, Coherent, Inc. (United States). [7193-38]
- 8:50 am: **High-power tunable solid-state blue/yellow source**, Yelena Isyanova, Peter F. Moulton, Q-Peak, Inc. (United States); Ramesh K. Shori, Naval Air Warfare Ctr. (United States) [7193-39]
- 9:10 am: **Highly efficient, compact green laser for laser tv (Invited Paper)**, Yoshihito Hirano, Mitsubishi Electric Corp. (Japan) [7197-02]
- 9:40 am: **High-efficiency high-power solid state CW visible lasers for large-format-display applications**, Tatyana A. Chernysheva, Dennis F. Elkins, Jesse P. Anderegg, Forrest L. Williams, Evans & Sutherland (United States). [7197-03]
- 10:00 am: **70-Watt green laser with near diffraction-limited beam quality**, Dan Hu, Eric C. Eisenberg, Diane E. Smith, Roy D. Mead, Eric C. Honea, Lockheed Martin Aculight (United States). [7197-04]
- Coffee Break 10:20 to 10:30 am

SESSION 9

Room: Conv. Ctr. Room J4 Tues. 10:30 am to 12:10 pm

OPS and VECSELs I

Session Chair: Adolf Giesen, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

- 10:30 am: **Recent developments in high-power short-wave mid-infrared semiconductor disk lasers (Invited Paper)**, David Burns, Univ. of Strathclyde (United Kingdom). [7193-40]
- 11:00 am: **2.X-µm-emitting GaSb-based optically pumped semiconductor disk lasers: improved power scaling by using multiple gain elements**, Benno Rösener, Nicola Schulz, Marcel Rattunde, Rüdiger Moser, Christian Manz, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [7193-41]
- 11:20 am: **OPS laser EPI design for different wavelengths (Invited Paper)**, Jerome V. Moloney, Jörg Hader, Nonlinear Control Strategies (United States); Hongbo Li, College of Optical Sciences/The Univ. of Arizona (United States); Stephan W. Koch, Univ. of Marburg (Germany); Wolfgang Stolz, Bernardatte Kunert, NAsP III/V GmbH (Germany). [7193-42]
- 11:50 am: **Aberration-insensitive operation of resonators for OPS lasers**, Andrea L. Caprara, Coherent, Inc. (United States) [7193-43]
- Lunch/Exhibition Break 12:10 to 1:50 pm

LASE

SESSION 10

Room: Conv. Ctr. Room J4 Tues. 1:50 to 3:00 pm

OPS and VECSELS II

Session Chair: **Jerome V. Moloney**,
College of Optical Sciences/The Univ. of Arizona

- 1:50 pm: **Novel ultrafast semiconductor lasers based on surface-emitting lasers** (*Invited Paper*), Ursula Keller, ETH Zürich (Switzerland) [7193-44]
- 2:20 pm: **1220-nm mode-locked GaInNAs disk laser**, Mircea D. Guina, Jussi Rautiainen, Ville-Markus Korpijärvi, Janne Puustinen, Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland).....[7193-45]
- 2:40 pm: **1213-nm GaInNAs semiconductor disk lasers as pump sources for Tm³⁺-doped glass lasers**, Sharon L. Vetter, Univ. of Strathclyde (United Kingdom) and Univ. of St Andrews (United Kingdom) and Tampere Univ. of Technology (Finland).....[7193-47]
- Coffee Break 3:00 to 3:30 pm

SESSION 11

Room: Conv. Ctr. Room J4 Tues. 3:30 to 6:00 pm

Semiconductor Lasers with Harmonic Generation

Session Chair: **David Burns**, Univ. of Strathclyde (United Kingdom)

- 3:30 pm: **Deep-ultraviolet frequency converted optically pumped semiconductor laser** (*Invited Paper*), Yushi Kaneda, College of Optical Sciences/The Univ. of Arizona (United States) [7193-48]
- 4:00 pm: **Intra-cavity tripled optically-pumped semiconductor laser at 355 nm**, Qi-Ze Shu, Andrea L. Caprara, Jill D. Berger, Douglas W. Anthon, Hal Jerman, Luis Spinelli, Coherent, Inc. (United States) [7193-49]
- 4:20 pm: **Ultra-narrow bandwidth OPS laser in the green-yellow wavelength range for Raman spectroscopy**, Christian Kannengiesser, Christoph Simon, Ruediger von Elm, Manuel Bracker, Vasiliy G. Ostroumov, Wolf R. Seelert, Coherent Lubeck GmbH (Germany) [7193-50]
- 4:40 pm: **>1 W, 244-nm generation by resonant cavity, second-harmonic generation of an optically pumped semiconductor laser**, Angus S. Bell, Coherent Scotland Ltd. (United Kingdom); Michael J. Snadden, Coherent, Inc. (United States); David A. Cluble, Coherent Scotland Ltd. (United Kingdom); Chris Ihli, Lukas E. Hunziker, Coherent, Inc. (United States) [7193-51]
- 5:00 pm: **Compact Watt-class visible light sources using direct**, Katrin Paschke, Gunnar Blume, Götz Ebert, Alexander M. Sahn, David Feise, Mirko Uebernickel, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7193-52]
- 5:20 pm: **High-power pulsed intra-cavity frequency doubled vertical extended cavity surface emitting blue laser arrays**, Robert Van Leeuwen, Jean-Francois Seurin, Guoyang Xu, Chuni Ghosh, Princeton Optronics, Inc. (United States).....[7193-53]
- 5:40 pm: **Compact blue light sources based on grating coupled surface emitting lasers**, Oleg V. Smolski, Viktor Smolski, Yigit O. Yilmaz, Eric G. Johnson, The Univ. of North Carolina at Charlotte (United States). . . . [7193-54]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

- The TRUMPF disk laser: high-performance proven technology**, David Havrilla, TRUMPF Inc. (United States); Rüdiger Brockmann, TRUMPF Laser GmbH & Co. KG (Germany) [7193-94]
- Design of petal project main amplifier**, Thierry Berthier, Nathalie Blanchot, Lucien Espert, Jean Pierre Lasserre, Etienne Perrot Minnot, Alain Roques, Commissariat à l'Energie Atomique (France) [7193-95]
- Study of optical centers with near-infrared emission in germanate glasses doped with 6p (Bi, Pb) and 5p (Sn, Sb) ions**, Mikhail Sharonov, Alexei A. Bykov, Vladimir Petricevic, Robert R. Alfano, The City College of New York (United States)..... [7193-97]
- Chirped-pulse long cavity femtosecond Cr:forsterite oscillator**, Vladislav I. Shcheslavskiy, Denis A. Ivanov, Theo Lasser, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Alexander N. Vasil'ev, Alexey M. Zhelitikov, Lomonosov Moscow State Univ. (Russian Federation) [7193-98]
- High-efficient room-temperature CW operating Tm:YAP laser with microchip resonator**, Jan Šulc, Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Škoda, Crytur Ltd. (Czech Republic) [7193-99]
- Simulation of performance of end-pumped Yb:YAG thin-disk lasers**, Ahmad Khayat Jafari, Bonab Univ. of Technology (Iran, Islamic Republic of) [7193-100]
- Continuous-wave and Q-switched laser operation of the disordered Yb:Ca₃(NbGa)_{2-x}Ga₃O₁₂ crystal**, Junhai Liu, Wenjuan Han, Qingdao Univ. (China); Huajin Zhang, Jiyang Wang, Shandong Univ. (China); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7193-101]
- Polarization characteristics of a diode-pumped Yb:GdCa₃O(BO₃)₃ laser**, Junhai Liu, Hongwei Yang, Qingdao Univ. (China); Huajin Zhang, Jiyang Wang, Shandong Univ. (China); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)..... [7193-102]
- Modeling of thermal effects in end-pumped Yb-YAG thin disk lasers**, Seyfollah Toroghi, Bonab Univ. of Technology (Iran, Islamic Republic of) [7193-103]
- Compact, rigid, and high-power ultrafast laser system applying a glass-block cavity**, Shin-Ichiro Aoshima, Shingo Oishi, Toshiharu Moriguchi, Yoichi Kawada, Masatoshi Fujimoto, Katsumi Shibayama, Masaomi Takasaka, Kenshi Fukumitsu, Shigeru Sakamoto, Koei Yamamoto, Hamamatsu Photonics K.K. (Japan)..... [7193-104]
- Flash-lamp pumped Pr:YAP laser operated at wavelengths of 747 nm and 662 nm**, Martin Fibrich, Helena Jelínková, Jan Šulc, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Škoda, Crytur Ltd. (Czech Republic) [7193-106]
- Analytical model of passively Q-switched Nd:YAG/V:YAG microchip laser**, Jan Šulc, Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic) [7193-107]
- Resonantly pumped Er:YAG and Er:YAP lasers**, Michal Nemeč, Helena Jelínková, Jan Šulc, Czech Technical Univ. in Prague (Czech Republic); Karel Nejezchleb, Václav Škoda, Crytur Ltd. (Czech Republic) [7193-108]
- Q-switched hybrid MOPA laser system based on Yb fibre with side pumping by single source**, Sergey M. Kobtsev, Sergey V. Kukarin, Novosibirsk State Univ. (Russian Federation); Yurii Fedotov, Tekhnoscan JSC (Russian Federation) [7193-109]
- Chromium-doped ZnSe and ZnS gain media for optically and electrically pumped mid-IR lasers**, Changsu Kim, The Univ. of Alabama at Birmingham (United States); Jeremy M. Peppers, The Univ. of Alabama at Birmingham (United States) and Univ. of West Georgia (United States); Dmitri V. Martyshkin, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (United States)..... [7193-110]
- Wide-autoscanned narrow-line tunable system based on CW Ti:Sapphire/Dye laser for high-precision experiments in nanophysics**, Sergey M. Kobtsev, Novosibirsk State Univ. (Russian Federation); Vladimir Baraulya, Vladimir M. Lunin, Tekhnoscan JSC (Russian Federation) [7193-111]

Wednesday 28 January

SESSION 12

Room: Conv. Ctr. Room J4 Wed. 8:00 to 10:20 am

Mid-Infrared Lasers

Session Chair: Ramesh K. Shori, Univ. of California, Los Angeles

8:00 am: **GaSb-based compounds tailored for MID-IR disk lasers** (Invited Paper), Mircea D. Guina, Antti Härkönen, Soile Suomalainen, Jonna Paajaste, Rikku Koskinen, Markus Pessa, Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland) [7193-55]

8:30 am: **Lead-chalcogenide VECSELS on Si and BaF₂ for 5 μm emission** (Invited Paper), Hans Zogg, Mohamed Rahim, Ferdinand Felder, Matthias Fill, Dirk Boye, ETH Zürich (Switzerland) [7193-56]

9:00 am: **Tm: fiber MOPA in-band pumping a cryogenically cooled Ho:YAG laser**, Jacob I. Mackenzie, Wendell O. Bailey, Deyuan Shen, Lee Pearson, Ji Won Kim, Yifeng Yang, W. Andrew Clarkson, Univ. of Southampton (United Kingdom) [7193-57]

9:20 am: **Widely-tunable (>100 nm) continuous-wave narrow-linewidth high-power thulium fiber laser**, Timothy S. McComb, Vikas Sudesh, Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States) [7193-58]

9:40 am: **10-Watt room-temperature Er-fiber-laser-pumped pure CW polycrystalline Cr²⁺:ZnS laser**, Igor S. Moskalev, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (United States) [7193-59]

10:00 am: **Bulk Fe:ZnSe laser gain-switched by the Q-switched Er:YAG laser**, Maxim E. Doroshenko, Tasoltan T. Basiev, General Physics Institute (Russian Federation); Petr Koranda, Helena Jelínková, Michal Němec, Miroslav Čech, Czech Technical Univ. in Prague (Czech Republic); Valeriy V. Badikov, Kuban State Univ. (Russian Federation) [7193-60]

Coffee Break 10:20 to 10:30 am

LASE PLENARY SESSION

Room: Montgomery Theater Wed. 10:30 am to 12:30 pm

10:30 am: **A High-Power Fiber Diode**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

Lunch/Exhibition Break 12:30 to 1:00 pm

SESSION 13

Room: Conv. Ctr. Room J4 Wed. 1:00 to 3:10 pm

Ultrafast Lasers

Session Chair: W. Andrew Clarkson, Univ. of Southampton (United Kingdom)

1:00 pm: **High-energy ultrafast thin-disk oscillators** (Invited Paper), Joerg Neuhaus, Univ. of Konstanz (Germany) and TRUMPF Laser GmbH & Co KG (Germany); Dominik Bauer, TRUMPF Laser GmbH & Co KG (Germany) and Univ. of Konstanz (Germany); Dirk H. Sutter, Jochen Kleinbauer, Sascha Weiler, Alexander Killi, TRUMPF Laser GmbH & Co KG (Germany); Thomas Dekorsy, Univ. of Konstanz (Germany) [7193-62]

1:30 pm: **Compact cavity dumped broadband laser oscillator**, Estelle Coadou, Coherent, Inc. (United States); D. Neumeyer, APE GmbH (Germany); Bojan Resan, Coherent, Inc. (United States); Ingo Rimke, APE GmbH (Germany) [7193-63]

1:50 pm: **Pulse-duration management of visible wavelength lasers for multiphoton photolysis applications**, Kyle S. Gardner, Univ. of Strathclyde (United Kingdom); D. Ogden, Univ. Paris 5 (France); Erling Riis, Gail McConnell, Univ. of Strathclyde (United Kingdom) [7193-64]

2:10 pm: **High-peak/average power high-repetition rate**, Sterling J. Backus, Xiaoshi Zhang, Gregory J. Taft, Hsiao-Hua Liu, Dirk Mueller, Henry C. Kapteyn, Margaret M. Murnane, Kapteyn-Murnane Labs. Inc. (United States) [7193-65]

2:30 pm: **Short-pulse-OPO for near-infrared bandwidths of up to 150 nm**, Edlef Buettner, Ingo Rimke, Gero Stibenz, APE GmbH (Germany); William M. Tulloch, Rimas Viselga, Coherent, Inc. (United States) [7193-66]

2:50 pm: **Light-matter interaction processes behind intracavity mode-locking devices**, Narasimha S. Prasad, NASA Langley Research Ctr. (United States); Chandra Roychoudhuri, Univ. of Connecticut (United States) [7193-67]

Coffee Break 3:10 to 3:30 pm

SESSION 14

Room: Conv. Ctr. Room J4 Wed. 3:30 to 5:30 pm

Disk Lasers

Session Chair: Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany)

3:30 pm: **16-kW disk laser: a new generation of industrial laser**, Rüdiger Brockmann, Alexander Killi, Thomas Schwoerer, TRUMPF Laser GmbH & Co. KG (Germany); David Havrilla, TRUMPF Inc. (United States) [7193-68]

3:50 pm: **50-kHz, 400-μJ, sub-100-fs pulses from a thin disk laser amplifier**, Mikhail A. Larionov, TGSW mbH (Germany); Adolf Giesen, Univ. of Stuttgart (Germany) [7193-69]

4:10 pm: **The two-dimensional thin disk geometry**, Alexander Killi, Jochen Kleinbauer, Sven Schad, Christian Stolzenburg, Dirk H. Sutter, Ivo Zawischa, TRUMPF Laser GmbH & Co. KG (Germany); Holger Schlüter, TRUMPF Inc. (United States); Christian Schmitz, TRUMPF Laser GmbH & Co. KG (Germany) [7193-70]

4:30 pm: **Quenching processes in Yb-lasers: correlation to the valence stability of the Yb ion**, Magnus Engholm, Fiber Optic Valley AB (Sweden); Christian Hirt, Susanne Fredrich-Thornton, Klaus Petermann, Guenter Huber, Univ. Hamburg (Germany) [7193-71]

4:50 pm: **Thin disk laser: power scaling to the kW regime in fundamental mode operation**, Jens Mende, Elke Schmid, Jochen Speiser, Gerhard Spindler, Adolf Giesen, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [7193-72]

5:10 pm: **Edge-pumped disk amplifier for an ultrashort pulse laser**, John Vetrovec, Aqwest (United States); Bodo Schmidt, General Atomics (United States) [7193-73]

Thursday 29 January

SESSION 15

Room: Conv. Ctr. Room J4 Thurs. 8:30 to 9:50 am

Laser Materials

Session Chair: Jacob I. Mackenzie, Univ. of Southampton (United Kingdom)

8:30 am: **Development of ceramics as host material for solid state lasers**, Narasimha S. Prasad, NASA Langley Research Ctr. (United States); Sudhir B. Trivedi, Susan Kutcher, Chen-Chia Wang, Brimrose Corp. of America (United States); Uwe H. Hommerich, Hampton Univ. (United States); Vijay Shukla, Rajendra K. Sadangi, Rutgers Univ. (United States) [7193-74]

8:50 am: **Single-frequency Nd:YGG laser at 935 nm for future water-vapour DIAL systems**, Jens Löhring, Ansgar Meissner, Valentin Morasch, Peter Becker, Fraunhofer-Institut für Lasertechnik (Germany); Wolfgang Heddrich, Hochschule Darmstadt (Germany); Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7193-75]

9:10 am: **Potential applications of Cr-doped nano-crystalline laser in communication and instrumentation**, Jimmy Wang, Vincent Huang, Wood-Hi Cheng, National Sun Yat-Sen Univ. (Taiwan) [7193-76]

9:30 am: **Quasi-continuously pumped operation of 2.4% doped crystalline Nd:YAG in a bounce geometry**, Vaclav Kubecek, Michal Jelínek, Miroslav Čech, Petr Hírs, Czech Technical Univ. in Prague (Czech Republic) [7193-78]

Coffee Break 9:50 to 10:30 am

LASE

Conference 7193

SESSION 16

Room: Conv. Ctr. Room J4Thurs. 10:30 to 11:40 am

Applications I

Session Chair: Norman Hodgson, Coherent, Inc.

10:30 am: **Picosecond-pulsed lasers for solar cell applications** (*Invited Paper*), Viren V. Rana, Applied Materials, Inc. (United States) . .[7193-80]

11:00 am: **Comparison of ns and ps pulses for Si and glass micromachining applications**, Stephen Lee, Allan Ashmead, Coherent, Inc. (United States)[7193-81]

11:20 am: **Thin-film scribing using high-power UV-picosecond lasers**, Michael T. Kauf, Rajesh S. Patel, James M. Bovatsek, Newport Spectra-Physics (United States)[7193-82]

Lunch/Exhibition Break11:40 am to 1:20 pm

SESSION 17

Room: Conv. Ctr. Room J4Thurs. 1:20 to 2:50 pm

Applications II

Session Chair: David H. Titterton,
Defence Science and Technology Lab. (United Kingdom)

1:20 pm: **Ultrafast parametric oscillators for spectroscopy** (*Invited Paper*), Derryck T. Reid, Lukasz W. Kornaszewski, T. P. Mueller, Nicolas Gayraud, William N. MacPherson, Duncan P. Hand, James M. Stone, Jonathan C. Knight, Heriot-Watt Univ. (United Kingdom)[7193-84]

1:50 pm: **Multimodal ultrafast spectroscopy system based on 35-fs Ti:Sapphire CPA laser**, Ruben Zadoyan, Newport Corp. (United States)[7193-85]

2:10 pm: **Wide horizons for optical trapping: simultaneous optical manipulation and confocal imaging of live T cells at low magnification**, John Harris, Gail McConnell, Univ. of Strathclyde (United Kingdom)[7193-86]

2:30 pm: **Solid state lasers for wide-field CARS microscopy**, Dmitri M. Simanovskii, Ilya Toytman, Daniel V. Palanker, Stanford Univ. (United States)[7193-87]

BEST STUDENT PRESENTATION AWARDS CEREMONY

Room: Conv. Ctr. Room J4 Thurs. 2:50 to 3:00 pm

Session Chair: Norman Hodgson, Coherent, Inc.

Student Presentation Competition

Qualifying student presentations will be evaluated by a conference steering committee. To be eligible, a student must be listed as an author on an accepted paper, must have conducted the majority of the work being presented, and must give the oral or poster presentation. The prizes will be awarded based on the quality of the presentation and not on the content of the submitted abstract. The winners of the Best Student Presentation Awards will be announced during the Best Student Awards Ceremony.

Best Student Presentation Awards

We are pleased to announce that two prizes in the amounts of \$1,500 US and \$500 US will be awarded to the best student oral presentation and the best student poster presentation, respectively. The prize money has been donated by Coherent, Inc. and the awards will be presented by Norman Hodgson, Vice President of Engineering.

Award Sponsor:



Coffee Break3:00 to 3:30 pm

SESSION 18

Room: Conv. Ctr. Room J4Thurs. 3:30 to 5:30 pm

Applications III

Session Chair: Helena Jelinková,
Czech Technical Univ. in Prague (Czech Republic)

3:30 pm: **Solid state lasers in solar cell manufacturing** (*Invited Paper*), Dave Clark, Newport Spectra-Physics (United States)[7193-88]

4:00 pm: **Industrial applications of high-average power, high-peak power nanosecond pulse duration Nd:YAG lasers** (*Invited Paper*), Paul M. Harrison, Samir S. Elwi, Powerlase Ltd. (United Kingdom)[7193-89]

4:30 pm: **Unique performances and applications of INNOSLAB lasers**, Keming Du, EdgeWave GmbH (Germany)[7193-90]

4:50 pm: **Comparison of solid state laser architectures for micromachining applications**, Stephan Geiger, Susanne Loetzsch, ROFIN/Baasel LaserTech (Germany); Roland M. Mayerhofer, ROFIN-SINAR Inc. (United States)[7193-92]

5:10 pm: **Generation of programmable temporal pulse shape and applications in micromachining**, Xiaoyuan Peng, Bill Jordens, Andy Hooper, Brain Baird, Wensheng Ren, Lei Xu, Lei Sun, Electro Scientific Industries, Inc. (United States)[7193-93]

Conference 7194 · Hilton Hotel, San Carlos Room II

Monday-Tuesday 26-27 January 2009 • Proceedings of SPIE Vol. 7194

Laser Resonators and Beam Control XI

Conference Chairs: **Alexis V. Kudryashov**, Moscow State Open Univ. (Russia); **Alan H. Paxton**, Air Force Research Lab.; **Vladimir S. Ilchenko**, OEwaves, Inc.

Conference Co-Chair: **Lutz Aschke**, LIMO-Lissotschenko Mikrooptik GmbH (Germany)

Program Committee: **Jean-Claude M. Diels**, The Univ. of New Mexico; **Hans-Joachim Eichler**, Technische Univ. Berlin (Germany); **Pierre Galarneau**, Institut National d'Optique (Canada); **Thomas Graf**, Univ. Stuttgart (Germany); **James R. Leger**, Univ. of Minnesota/Twin Cities; **Andrey B. Matsko**, OEwaves, Inc.; **Steve A. Pappert**, Defense Advanced Research Projects Agency

Monday 26 January

SESSION 1

Room: Hilton Hotel, San Carlos Room II. Mon. 8:20 to 10:20 am

Beam Shaping and Manipulation

Session Chair: **Alexis V. Kudryashov**, Moscow State Open Univ. (Russian Federation)

8:20 am: **Ultra-narrow long green lines for laser crystallization of Si**, Mikhail M. Ivanenko, Klaus Bagnschik, Alexei Mikhailov, Yuri Miklyaev, Vitalij Lissotschenko, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7194-03]

8:40 am: **Flat hat glass diffractive optical-beam shaper**, Steffen Reichel, Uwe Petzold, Ralf Biertumpfel, Helge Vogt, SCHOTT AG (Germany) [7194-01]

9:00 am: **Comparison of fly's eye condensers based on regular, chirped and stochastic tandem microlens arrays**, Frank C. Wippermann, Peter Dannberg, Andreas H. Bräuer, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7194-39]

9:20 am: **Beam shaping in resonators with conical reflectors**, Yuriy N. Parkhomenko, Boris Spektor, Joseph Shamir, Technion-Israel Institute of Technology (Israel) [7194-02]

9:40 am: **Fast laser-beam deflector based on of electro-optical arrays**, Mikhail M. Ivanenko, Klaus Bagnschik, Alexei Krasnaberski, Alexei Mikhailov, Yuri Miklyaev, Vitalij Lissotschenko, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7194-04]

10:00 am: **Modal decomposition in step-index fibers by optical correlation analysis**, Thomas Kaiser, Friedrich-Schiller-Univ. Jena (Germany); Siegmund Schröter, IPHT Jena (Germany); Daniela Kauffmann, Univ. Stuttgart (Germany); Michael R. Duparré, Friedrich-Schiller-Univ. Jena (Germany) [7194-07]

Coffee Break 10:20 to 10:40 am

SESSION 2

Room: Hilton Hotel, San Carlos Room II. Mon. 10:40 am to 12:30 pm

Resonators and Beam Characterization

Session Chair: **Lutz Aschke**, LIMO Lissotschenko Mikrooptik GmbH (Germany)

10:40 am: **Shack-Hartmann wavefront sensor and measurements of high power lasers** (*Invited Paper*), Alexis V. Kudryashov, Valentina Y. Zavalova, Alexey L. Rukosuev, Alexander Alexandrov, Julia V. Sheldakova, Moscow State Open Univ. (Russian Federation) [7194-27]

11:10 am: **New method to measure laser-beam spatial parameters**, George Nemes, ASTIGMAT (United States); Magda Ulmeanu, Marian Zamfirescu, National Institute for Lasers, Plasma and Radiation Physics (Romania) [7194-06]

11:30 am: **Scanner deflection of top-hat converted single-mode lasers for cost-effective micro-machining at highest quality**, Bjoern Guetlich, Thomas Mitra, Frank Toennissen, Oliver Homburg, Lutz Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7194-05]

11:50 am: **Shack-Hartmann wavefront sensor versus Fizeau interferometer for laser beam measurements**, Julia V. Sheldakova, Valentina Y. Zavalova, Pavel Romanov, Alexis V. Kudryashov, Moscow State Open Univ. (Russian Federation) [7194-28]

12:10 pm: **Laser-beam characterization by means of modal decomposition versus M2 method**, Michael R. Duparré, Oliver A. Schmidt, Barbara Luedge, Friedrich-Schiller-Univ. Jena (Germany); Schröter Siegmund, Institute of Photonic Technology (Germany) [7194-09]

Lunch Break 12:30 to 1:30 pm

SESSION 3

Room: Hilton Hotel, San Carlos Room II. Mon. 1:30 to 3:10 pm

Resonators and Random Lasing

Session Chair: **Alan H. Paxton**, Air Force Research Lab.

1:30 pm: **Structural parameter dependence of localized modes induced in a waveguide structure surrounded by a random medium** (*Presentation Only*), Hideki Fujiwara, Keiji Sasaki, Hokkaido Univ. (Japan) [7194-10]

1:50 pm: **Random lasing from quantum-dot colloids suspended polymer**, Seiji Takeda, Minoru Obara, Keio Univ. (Japan) [7194-11]

2:10 pm: **Compact self-aligned external cavity lasers using volume gratings**, Christophe Moser, Frank Havermeier, Lawrence Ho, Ondax, Inc. (United States) [7194-12]

2:30 pm: **A long-cavity Nd:YAG laser in dynamical Michelson interferometer configuration**, Anatoliy Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (United States) [7194-13]

2:50 pm: **A model of 21 lines DFB dye laser**, Nasrullah Khan, COMSATS Institute of Information Technology (Pakistan); Naeem Abas, Univ. of Gujrat (Pakistan) [7194-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Hilton Hotel, San Carlos Room II. Mon. 3:40 to 5:20 pm

Lasers: Experiments and Simulations

Session Chair: **Vladimir S. Ilchenko**, OEwaves, Inc.

3:40 pm: **Scattering due to laser-field induced cooling in Nd:YAG gain media**, Alan H. Paxton, Air Force Research Lab. (United States) [7194-15]

4:00 pm: **Thermal lensing effects in pulsed diode end pumped Nd:YAG laser at 946 nm**, Sha Wang, Technische Univ. Berlin (Germany); Jürgen P. Eichler, Technische Fachhochschule Berlin (Germany); Hans-Joachim Eichler, Technische Univ. Berlin (Germany) [7194-29]

4:20 pm: **Modeling of Gaussian beam ensemble flat-tops for applications**, Sydney Sukuta, Thao T. Huynh, San Jose City College (United States) [7194-08]

4:40 pm: **Finite-element simulation of solid state laser resonators**, Matthias Wohlmuth, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [7194-16]

5:00 pm: **Frequency doubling of focused laser beams for blue light generation**, Xin Wang, Frank Kallmeyer, Sha Wang, A. Ding, Hans-Joachim Eichler, Technische Univ. Berlin (Germany) [7194-40]

LASE

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Tuesday 27 January

SESSION 5

Room: Hilton Hotel, San Carlos Room II. Tues. 8:20 to 10:00 am

Microresonators I

Session Chair: **Steve A. Pappert**, Booz Allen Hamilton

8:20 am: **Whispering gallery mode RF photonic receiver**, Vladimir S. Ilchenko, Jerry L. Byrd, Andrey B. Matsko, Anatoly A. Savchenkov, David J. Seidel, Lute Maleki, OEwaves, Inc. (United States) [7194-17]

8:40 am: **Improving resonant photonics devices with sol-gel coatings**, Yoann Jestin, Maurizio Ferrari, Univ. degli Studi di Trento (Italy); Andrey Shavchenkov, Andrey B. Matsko, Lute Maleki, OEwaves, Inc. (United States) [7194-18]

9:00 am: **Whispering gallery modes in acrylic glass and in lithium niobate crystals** (*Invited Paper*), Daniel Haertle, Tobias Beckmann, Judith R. Schwesyg, Anne S. Zimmermann, Matthias Falk, Stephan Gronenborn, Karsten Buse, Univ. Bonn (Germany) [7194-19]

9:30 am: **Cavity optomechanics: backaction cooling of mechanical oscillators** (*Invited Paper*), Tobias J. Kippenberg, Max-Planck-Institut für Quantenoptik (Germany) [7194-20]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: Hilton Hotel, San Carlos Room II. Tues. 10:30 to 11:50 am

Microresonators II

Session Chair: **Alan H. Paxton**, Air Force Research Lab.

10:30 am: **Miniature RF photonic-hyperparametric oscillator**, Andrey B. Matsko, Anatoly A. Savchenkov, Wei Liang, Vladimir S. Ilchenko, David J. Seidel, Lute Maleki, OEwaves, Inc. (United States) [7194-21]

10:50 am: **Disorder and localization in microresonator arrays** (*Invited Paper*), Shayan Mookherjea, Jung-Soo Park, Univ. of California, San Diego (United States) [7194-22]

11:20 am: **Microphotonic thermal detectors and imagers** (*Invited Paper*), Michael R. Watts, Michael J. Shaw, Peter T. Rakich, Anthony L. Lentine, Gregory N. Nielson, Frederick B. McCormick, Sandia National Labs. (United States) [7194-30]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 7

Room: Hilton Hotel, San Carlos Room II. Tues. 1:30 to 3:00 pm

Microresonators III

Session Chair: **Andrey B. Matsko**, OEwaves, Inc.

1:30 pm: **Cavity and atom optomechanics** (*Invited Paper*), Kerry Vahala, California Institute of Technology (United States) [7194-31]

2:00 pm: **Turnstile transport and chaos-assisted tunneling in deformed microcavities** (*Invited Paper*), Kyungwon An, Seoul National Univ. (Korea, Republic of) [7194-32]

2:30 pm: **Wavelength dependence of free-carrier absorption in Si nanocrystals measured by microcavity photoluminescence** (*Invited Paper*), Rohan D. Kekatpure, Mark L. Brongersma, Stanford Univ. (United States) [7194-33]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: Hilton Hotel, San Carlos Room II. Tues. 3:30 to 5:50 pm

Microresonators IV

Session Chair: **Vladimir S. Ilchenko**, OEwaves, Inc.

3:30 pm: **Silicon resonators for novel on-chip applications** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (United States) [7194-34]

4:00 pm: **Force sensors based on the whispering gallery modes of dielectric microspheres** (*Invited Paper*), Tindaro Ioppolo, Ulas K. Ayaz, Volkan Otugen, Southern Methodist Univ. (United States) [7194-35]

4:30 pm: **Quasi-localized coupled-cavity modes in deterministic aperiodic photonic structures: theory and applications** (*Invited Paper*), Svetlana V. Boriskina, Ashwin Gopinath, Sylvanus Lee, Luca Dal Negro, Boston Univ. (United States) [7194-36]

5:00 pm: **Fundamentals and applications of microsphere resonator circuits** (*Invited Paper*), Vasily N. Astratov, The Univ. of North Carolina at Charlotte (United States) [7194-37]

5:30 pm: **Spectroscopy of photonic molecular states in supermonodispersive bispheres**, Seungmoo Yang, Vasily N. Astratov, The Univ. of North Carolina at Charlotte (United States) [7194-38]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Chiral twist defect in the cholesteric elastomer imprinted, Paola M. Castro-Garay, Univ. de Sonora (Mexico); Adrian Reyes, Univ. Nacional Autónoma de México (Mexico); Adalberto Corella-Madueño, Univ. de Sonora (Mexico) [7194-25]

Whispering gallery mode opto-electronic oscillator, Vladimir S. Ilchenko, Andrey B. Matsko, Jerry L. Byrd, Anatoly A. Savchenkov, David J. Seidel, Lute Maleki, OEwaves, Inc. (United States) [7194-26]

Fiber Lasers VI: Technology, Systems, and Applications

Conference Chairs: **Denis V. Gapontsev**, IPG Photonics Corp.; **Dahv A. V. Kliner**, JDSU

Conference Co-Chairs: **Jay Walter Dawson**, Lawrence Livermore National Lab.; **Kanishka Tankala**, Nuferrn

Program Committee: **Oleksiy G. Andrusyak**, College of Optics & Photonics/Univ. of Central Florida; **Jes Broeng**, Crystal Fibre A/S (Denmark); **Fabio Di Teodoro**, Northrop Grumman Space Technology; **Benjamin J. Eggleton**, The Univ. of Sydney (Australia); **Jean-Philippe Fève**, JDSU; **Almantas Galvanauskas**, Univ. of Michigan; **Anderson Stevens Leônidas Gomes**, Univ. Federal de Pernambuco (Brazil); **Anatoly B. Grudinin**, Fianium Ltd. (United Kingdom); **Clifford Headley III**, OFS Labs.; **Eric C. Honea**, Lockheed Martin Aculight; **Yoonchan Jeong**, Univ. of Southampton (United Kingdom); **L. Brandon Shaw**, Naval Research Lab.; **Thomas M. Shay**, Air Force Research Lab.; **Roy Taylor**, Imperial College London (United Kingdom); **William E. Torruellas**, The Johns Hopkins Univ. Applied Physics Lab.; **Andreas Tünnermann**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Robert G. Waarts**, Raydiance, Inc.; **Ji Wang**, Corning Inc.; **Benjamin G. Ward**, U.S. Air Force Academy; **Frank W. Wise**, Cornell Univ.

SPIE and the organizers gratefully acknowledge the following conference cosponsors:



Monday 26 January

INTRODUCTION AND WELCOME

Room: Conv. Ctr. Room J2 Mon. 8:00 to 8:10 am

Dahv A. V. Kliner, JDSU (United States)

SESSION 1

Room: Conv. Ctr. Room J2 Mon. 8:10 to 9:10 am

Fiber Laser Market

Session Chair: **Jay Walter Dawson**, Lawrence Livermore National Lab.

8:10 am: **The rapid market growth of high-power fiber lasers for material processing** (Invited Paper, Presentation Only), William H. Shiner, IPG Photonics Corp. (United States).....[7195-01]

8:40 am: **Overview of DoD (AF) High-Power Fiber Laser Programs** (Invited Paper, Presentation Only), Richard W. Berdine, Air Force Research Lab. (United States).....[7195-02]

SESSION 2

Room: Conv. Ctr. Room J2 Mon. 9:10 to 10:10 am

High-Power Sources I

Session Chair: **Benjamin G. Ward**, U.S. Air Force Academy

9:10 am: **94-W Ytterbium-doped single-mode rod-type photonic crystal fiber operating at 977 nm**, Johan Boulet, Yoann Zaouter, Univ. Bordeaux I (France); François L. Salin, EOLITE Systems (France); Eric Cormier, Univ. Bordeaux I (France).....[7195-03]

9:30 am: **Simple Design for Singlemode High Power CW Fiber Laser using Multimode High NA Fiber**, Bertrand Morasse, Stéphane Chatigny, Cynthia Desrosiers, Eric Gagnon, Marc-André Lapointe, Jean-Philippe de Sandro, CorActive High-Tech Inc. (Canada).....[7195-04]

9:50 am: **High-power single-mode tapered double-clad ytterbium fiber laser pumped by diode-laser bar**, Valery N. Filippov, Tampere Univ. of Technology (Finland); Yuri K. Chamorovskii, Institute of Radio and Electronics of the Russian Academy of Sciences (Russian Federation); Juho Kerttula, Tampere Univ. of Technology (Finland); Artem Kholodkov, Institute of Radio and Electronics of the Russian Academy of Sciences (Russian Federation); Oleg G. Okhatnikov, Tampere Univ. of Technology (Finland).....[7195-05]

Coffee Break 10:10 to 10:40 am

SESSION 3

Room: Conv. Ctr. Room J2 Mon. 10:40 am to 12:00 pm

High-Power Sources II

Session Chair: **Almantas Galvanauskas**, Univ. of Michigan

10:40 am: **Joint High Power Solid State Laser Program advancements at Northrop Grumman** (Invited Paper), Jay Marmo, Hagop Injeyan, Hiroshi Komine, Stuart J. McNaught, Jason P. Machan, Jeffrey L. Sollee, Northrop Grumman Space Technology (United States).....[7195-06]

11:10 am: **Recent progress on high-power CW fiber lasers** (Invited Paper), Valentin P. Gapontsev, IPG Photonics Corp. (United States).....[7195-07]

11:40 am: **Experimental and theoretical studies on kW-class polarized fiber lasers for cw operation**, Oliver Fitzau, Jens Geiger, Hans-Dieter Hoffmann, Fraunhofer Institute for Laser Technology (Germany).....[7195-08]

Lunch Break 12:00 to 1:30 pm

SESSION 4

Room: Conv. Ctr. Room J2 Mon. 1:30 to 3:00 pm

Components

Session Chair: **Jean-Philippe Fève**, JDSU

1:30 pm: **Review of fabrication techniques for fused fiber components for fiber lasers** (Invited Paper), Baishi Wang, Eric W. Mies, Vytran LLC (United States).....[7195-09]

2:00 pm: **Chiral fiber optical isolator**, Victor I. Kopp, Guoyin Zhang, Azriel Z. Genack, Daniel Neugroschl, Chiral Photonics, Inc. (United States).....[7195-10]

2:20 pm: **Large aperture chirped-Bragg gratings in PTR glass for fs-pulse stretching/compression**, Vadim I. Smirnov, Ion Cohanoshi, Eugeniu V. Rotari, OptiGrate (United States); Leonid B. Glebov, College of Optics & Photonics/Univ. of Central Florida (United States).....[7195-11]

2:40 pm: **Two-beam interferometric inscription of UV-femtosecond fiber-Bragg gratings**, Eric Lindner, Martin Becker, Sven Brückner, Joachim Bergmann, Manfred W. Rothhardt, Hartmut Bartelt, Institute of Photonic Technology (Germany).....[7195-12]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: Conv. Ctr. Room J2 Mon. 3:30 to 6:00 pm

Visible and UV Lasers

Session Chairs: **Dahv A. V. Kliner**, JDSU; **Norman Hodgson**, Coherent, Inc.

Joint Session with Conference 7193: Solid State Lasers XVIII: Technology and Devices

3:30 pm: **Extending fiber-based supercontinuum generation to shorter wavelengths** (Invited Paper), Jonathan C. Knight, James M. Stone, Univ. of Bath (United Kingdom).....[7195-13]

4:00 pm: **Highly stable UV-mode-locked lasers with an output power of 35W at 355 nm**, Michael Mond, Holger Schoene, Andreas Dening, Guenter Hollemann, Wolf R. Seelert, Coherent Lubeck GmbH (Germany).....[7193-35]

LASE

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4:20 pm: **Fiber amplifier-based UV laser source**, Manuel J. Leonardo, Mark W. Byer, Gregory L. Keaton, Derek J. Richard, Frank J. Adams, Susi Guzsella, John L. Nightingale, Laura A. Smoliar, Mobius Photonics, Inc. (United States) [7195-14]

4:40 pm: **Nanosecond 389-nm coherent light source with injection seeding for nuclear spin polarization of ^3He atoms**, Yuta Aoki, Yasutomo Shiomi, Takeshi Yamamoto, Hiroshi Kumagai, Ataru Kobayashi, Osaka City Univ. (Japan) [7193-36]

5:00 pm: **Small linewidth CW high-power PM Yb-fiber laser around 1150 nm and yellow generation**, Mathieu Jacquemet, Erwan Goyat, Alain Mugnier, David Pureur, Quantel (France) [7195-15]

5:20 pm: **High-power UV generation at 355 nm by means of extra-cavity frequency conversion of a high-repetition rate InnoSlab MOPA system**, Bastian Gronloh, Marco Hoefer, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7195-17]

5:40 pm: **High-average power 258-nm generation in a nanosecond fiber MOPA system**, Andreas Diening, Stuart McLean, Andrei N. Starodoumov, Coherent, Inc. (United States) [7195-16]

Tuesday 27 January

SESSION 6

Room: Conv. Ctr. Room J2 Tues. 8:00 to 10:00 am

Fiber Designs and Fabrication I

Session Chair: Kanishka Tankala, Nufern

8:00 am: **Fiber design for high-power fiber lasers** (*Invited Paper*), Jayanta K. Sahu, Seongwoo Woo, Alex J. Boyland, Andrew S. Webb, Mridu Kalita, Jean-Noel Maran, Yoonchan Jeong, Johan Nilsson, W. Andrew Clarkson, David N. Payne, Univ. of Southampton (United Kingdom) [7195-17]

8:30 am: **Nonsilica-oxide glass fibers for fiber lasers** (*Invited Paper*), Shubin Jiang, AdValue Photonics, Inc. (United States) [7195-18]

9:00 am: **High-power Yb-doped solid-core photonic bandgap fiber amplifier at 1150-1200 nm**, Akira Shirakawa, Hiroki Maruyama, Ken-ichi Ueda, The Univ. of Electro-Communications (Japan); Christina B. Olausson, Jens K. Lyngsø, Brian J. Mangan, Jes Broeng, Crystal Fibre A/S (Denmark) [7195-19]

9:20 am: **Limits to the manufacturability and scalability of large-mode optical fibers**, Michael J. Messerly, Paul H. Pax, John E. Heebner, Arun Kumar Sridharan, Jay W. Dawson, Lawrence Livermore National Lab. (United States) [7195-20]

9:40 am: **Amplification and ASE suppression in a polarization-maintaining ytterbium-doped all-solid photonic bandgap fibre**, Christina B. Olausson, Crystal Fibre A/S (Denmark) and Technical Univ. of Denmark (Denmark); Charlotte I. Falk, Univ. of Copenhagen (Denmark); Jens K. Lyngsø, Crystal Fibre A/S (Denmark) and Technical Univ. of Denmark (Denmark); Brian B. Jensen, Kasper T. Therkildsen, Jan W. Thomsen, Univ. of Copenhagen (Denmark); Kim P. Hansen, Crystal Fibre A/S (Denmark); Anders O. Bjarklev, Technical Univ. of Denmark (Denmark); Jes Broeng, Crystal Fibre A/S (Denmark) [7195-21]

Coffee Break 10:00 to 10:30 am

SESSION 7

Room: Conv. Ctr. Room J2 Tues. 10:30 am to 12:00 pm

Fiber Designs and Fabrication II

Session Chair: Yoonchan Jeong, Univ. of Southampton (United Kingdom)

10:30 am: **Large effective area optical fibers for high-power lasers** (*Invited Paper*), Liang Dong, Jun Li, Hugh A. McKay, Libin Fu, Brian K. Thomas, IMRA America, Inc. (United States) [7195-22]

11:00 am: **A 25/300-micron erbium-Ytterbium co-doped fiber for use in high-power, low-ASE amplifier applications**, Victor Khitrov, Jim Ding, David Machewirth, Bryce N. Samson, Adrian L. G. Carter, Julia Farroni, Kevin Farley, Nick Jacobson, Kanishka Tankala, Nufern (United States) [7195-23]

11:20 am: **In-fibre resonant pumping of a fibre laser**, David G. Lancaster, Shayne P. Bennetts, Defence Science and Technology Organization (Australia); Stuart D. Jackson, Sydney Univ. (Australia) [7195-24]

11:40 am: **Comparison of silica-based materials and fibers in side- and end-pumped fiber lasers**, Andreas Langner, Gerhard Schötz, Mario Such, Heraeus Quarzglas GmbH & Co. KG (Germany); Volker Reichel, Stephan Grimm, Martin Leich, Johannes Kirchhof, Institut für Photonische Technologien e.V. (Germany); Björn Wedel, Highyag Lasertechnologie GmbH (Germany); Volker K. Krause, Georg Rehmann, Laserline GmbH (Germany) [7195-25]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 8

Room: Conv. Ctr. Room J2 Tues. 1:30 to 3:30 pm

Material Properties and Photodarkening

Session Chair: Ji Wang, Corning Inc.

1:30 pm: **Benchmarking and measuring photodarkening in Yb doped fibers** (*Invited Paper*), Joona J. Koponen, Liekki Oy (Finland) [7195-26]

2:00 pm: **Yb-doped silica-based laser fibers: correlation of photodarkening kinetics and related optical properties with the glass composition** (*Invited Paper*), Johannes Kirchhof, Sonja Unger, Sylvia Jetschke, Anka Schwuchow, Martin Leich, Volker Reichel, IPHT Jena (Germany) [7195-27]

2:30 pm: **The role of charge transfer processes for the induced optical losses in ytterbium-doped fiber lasers**, Magnus Engholm, Fiber Optic Valley AB (Sweden); Lars Norin, Acreo AB (Sweden) [7195-28]

2:50 pm: **Defect Luminescence Spectroscopy in Yb Co-Doped Silica Fibers**, Chad G. Carlson, K. E. Keister, Univ. of Illinois at Urbana-Champaign (United States); André Croteau, Institut National d'Optique (Canada); J. Gary Eden, Peter D. Dragic, Univ. of Illinois at Urbana-Champaign (United States) . [7195-29]

3:10 pm: **Photo darkening of ytterbium cw fiber lasers**, Kent E. Mattsson, Jes Broeng, Crystal Fibre A/S (Denmark) [7195-30]

Coffee Break 3:30 to 4:00 pm

SESSION 9

Room: Conv. Ctr. Room J2 Tues. 4:00 to 6:00 pm

Mid-IR Sources and Frequency Conversion

Session Chair: L. Brandon Shaw, Naval Research Lab.

4:00 pm: **Mid-IR supercontinuum generation** (*Invited Paper*), Mohammed N. Islam, Univ. of Michigan (United States) [7195-31]

4:30 pm: **Pulsed Tm-doped fiber lasers for mid-IR frequency conversion** (*Invited Paper*), Daniel Creeden, Peter A. Budni, Peter A. Ketteridge, BAE Systems (United States) [7195-32]

5:00 pm: **Single-mode, 550-W Tm:SiO₂ fiber amplifier**, Gregory D. Goodno, Lewis D. Book, Joshua E. Rothenberg, Northrop Grumman Space Technology (United States) [7195-34]

5:20 pm: **High-power, low-noise, all-fiber, femtosecond supercontinuum source**, Jeffrey W. Nicholson, Jayesh C. Jasapara, Keisuke Tominaga, Clifford Headley III, OFS Labs. (United States) [7195-35]

5:40 pm: **CW and pulsed operation of a frequency doubled Tm:DCF laser in the 9-xxnm wavelength range**, Michael L. Dennis, William E. Torruellas, Jeffery W. Warren, The Johns Hopkins Univ. Applied Physics Lab. (United States); Gavin P. Frith, Nufern (United States); Timothy S. McComb, Nufern (United States) and College of Optics & Photonics/Univ. of Central Florida (United States); Bryce N. Samson, Nufern (United States); Phillip G. Wilcox, U.S. Army (United States) [7195-83]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Thermal effects in high-power CW fiber laser, Marc-André Lapointe, Stéphane Chatigny, CorActive High-Tech Inc. (Canada) [7195-66]

Temperature-dependent properties of fiber-Bragg gratings generated with UV-femtosecond pulses and with UV-nanosecond pulses, Eric Lindner, Martin Becker, Sven Brückner, Manfred W. Rothhardt, Hartmut Bartelt, Institute of Photonic Technology (Germany) [7195-67]

Fabrication and characterization of Cr:Forsterite single-crystal fiber, Pinghui S. Yeh, Hsine-Yu Wang, National Taiwan Univ. of Science and Technology (Taiwan); Kuang-Yao Huang, National Sun Yat-Sen Univ. (Taiwan); Sheng-Lung L. Huang, Kuang-Yu Hsu, Dong-Yo Jheng, National Taiwan Univ. (Taiwan) [7195-68]

Nanoparticle-doping process for improved fibre amplifiers and lasers, Alain Pastouret, Cedric Gonnet, Ekaterina Burov, Christine Collét, Olivier Cavani, Draka Comteq France (France); Corinne Chaneac, Jean-Pierre Jolivet, Anne Carton, Univ. Pierre et Marie Curie (France) [7195-69]

Benefits of optimized HNL-PCF for RAMAN fibre lasers, Gilles Mélin, Simon Richard, Anne Fleureau, Laurence Galkovsky, Simon Lempereur, Pascale Nouchi, Draka Comteq France (France); Guillaume Beck, Laurent Bigot, Nicolas Y. Joly, Stéphane Randoux, Pierre Suret, Univ. des Sciences et Technologies de Lille (France) [7195-70]

Optical transmission fiber suitable for wideband NIR supercontinuum light, Toshiaki Okuno, Shinichirou Momose, Sumitomo Electric Industries, Ltd. (Japan) [7195-71]

Bending behaviors of all-solid silica large mode area Bragg fibers, Catherine Baskiotis, Univ. des Sciences et Technologies de Lille (France); Denis M. Molin, Draka Comteq France (France); Gérard Bouwmans, Univ. des Sciences et Technologies de Lille (France); Frans Gooijer, Draka Comteq Fibre B.V. (Netherlands); Pierre Sillard, Draka Comteq France (France); Yves Quiquempois, Marc Douay, Univ. des Sciences et Technologies de Lille (France) [7195-72]

High-core and cladding isolation termination for high-power lasers and amplifiers, Alexandre Wetter, Benoit Sévigny, Mathieu Faucher, Nelson Vachon, ITF Labs. (Canada) [7195-73]

LPFG modulator for fiber laser Q switching, Fei Luo, FLT Inc. (United States) [7195-74]

Pump combiner loss as a function of input numerical aperture power distribution, Benoit Sévigny, Pierre Poirier, Mathieu Faucher, ITF Labs. (Canada) [7195-75]

Compact technology equipment RX 20 with pulse fiber laser for materials processing, Mikhail O. Nikonchuk, West-Ter Research Ctr. (Russian Federation); Igor V. Polyakov, Sergey G. Gorny, Dmitri V. Kuzmichev, Laser Technology Ctr. (Russian Federation) [7195-76]

Stable, tunable and single-mode operation of an erbium-doped fibre laser system using a saturable absorber for gas spectroscopy applications, Norhana Arsad, Univ. of Strathclyde (United Kingdom) and National Univ. of Malaysia (Malaysia); George Stewart, Univ. of Strathclyde (United Kingdom) [7195-77]

All-fiber coherent arrays combining high-power lasers, Baishi Wang, Eric W. Mies, Vytran LLC (United States); Monica L. Minden, Cold Canyon Associates (United States); Anthony D. Sanchez, Air Force Research Lab. (United States) [7195-79]

Theoretical analysis and quantitative measurements of fiber amplifier coherent combining on a remote surface through turbulence, Pierre Bourdon, Veronique Jolivet, Baya Bennai, Laurent Lombard, Didier Goular, Guillaume Canat, Olivier Vasseur, ONERA (France) [7195-80]

Characterisation of a coherently coupled 2x2 W fiber amplifier array, Rolf R. Nowack, Ralf Bähnisch, Peter Mahnke, Jochen Speiser, Adolf Giesen, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [7195-81]

A frequency doubled gain switched Yb³⁺-doped fiber laser, Yoav Sintov, Moti Katz, Pinhas Blau, Yaakov Glick, Eyal Lebiush, Yehuda Nafcha, Soreq Nuclear Research Ctr. (Israel) [7195-82]

Comprehensive model of double cladding Thulium-doped fibers pumped at 795 nm, Phillip G. Wilcox, U.S. Army (United States); William E. Torruellas, Michael L. Dennis, Jeffery W. Warren, The Johns Hopkins Univ. Applied Physics Lab. (United States); Gavin P. Frith, Nufern (United States); Timothy S. McComb, Nufern (United States) and Univ. of Optics & Photonics/Univ. of Central Florida (United States); Bryce N. Samson, Nufern (United States) [7195-84]

Characterization of photodarkening processes in Yb-doped fibers, Sylvia Jetschke, Ulrich Röpke, Sonja Unger, Johannes Kirchhoff, IPHT Jena (Germany) [7195-85]

Modeling the photodegradation of large mode area Yb-doped fiber power amplifiers, Pierre Laperle, Louis Desbiens, Karine Le Foulgoc, Mathieu Drolet, Pascal Deladurantaye, Antoine Proulx, Yves Taillon, INO (Canada) [7195-86]

Combined photodarkening and thermal bleaching measurement of an ytterbium-doped fiber, Joan J. Montiel i Ponsoda, Mikko J. Söderlund, Helsinki Univ. of Technology (Finland); Joonas J. Koponen, Liekki Oy (Finland); Aarni T. Iho, Helsinki Univ. of Technology (Finland); Jeffrey P. Koplow, Sandia National Labs. (United States); Seppo K. Honkanen, Helsinki Univ. of Technology (Finland) [7195-87]

Ultrafast-pulse generation and shaping in dispersion oscillating fibers, Alexej A. Sysoliatin, A.M. Prokhorov General Physics Institute (Russian Federation); Andrey I. Konyukhov, Leonid A. Melnikov, Saratov State Univ. (Russian Federation); Vladimir A. Stasyuk, PriTel Inc. (United States) [7195-88]

200 kHz, 150 ps, 10-W average-power microchip laser amplified by a single-stage fiber amplifier, Dirk Nodop, Alexander Steinmetz, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7195-89]

Optimizing stable mode-locked operation of Yb-doped femtosecond fiber laser, Mohamad Abdelalim, Yury Logvin, Univ. of Ottawa (Canada); Daa A. Khalil, Ain Shams Univ. (Egypt); Hanan Anis, Univ. of Ottawa (Canada) [7195-90]

Sensitivity of nonlinear fiber CPA-systems to initial spectral amplitude modulations and spectral phase ripples, Damian N. Schimpf, Enrico Seise, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7195-91]

A theoretical treatment to SBS mitigation with two-tone amplification, Clint Zeringue, Iyad Dajani, Timothy J. Bronder, Air Force Research Lab. (United States) [7195-92]

Tunable laser with tilted-mirrors interferometer and dynamic wavelength reference, Nicolae Miron, Roctest Ltd. (Canada) [7195-93]

Multiwavelength Brillouin-erbium fiber laser incorporating stimulated Brillouin scattering as mirror, Mohd Azdir Mahdi, Mohammed Ajiya, Mohammed Hayder Al-Mansoori, Nor Azura Malini Ahmad Hambali, Yu Gang Shee, Univ. Putra Malaysia (Malaysia) [7195-94]

Low-SBS passive optical fibers for fiber laser pigtailed, components, and power delivery, Peter D. Dragic, Neolight Technologies LLC (United States) [7195-95]

Implementation of the frequency swept laser at 1.5 μm using a simple wavelength selection filter, Chaikyung Woo, Jeehyun Kim, Mansik Jeon, Jae-Won Song, Ho Lee, Jiwook Yoon, Kyungpook National Univ. (Korea, Republic of) [7195-96]

Reduction of SPM Induced Spectral Broadening in a High Peak Power, Narrow Linewidth, IR Fiber Laser Using Phase Modulation, Michael J. Munroe, Deep Photonics Corp. (United States); Mathew Hamamoto, Deep Photonics Corporation (United States); David A. Dutton, Deep Photonics Corp. (United States) [7195-98]

Chirped four-wave mixing in the largely normal dispersion regime from femtosecond pulse-pumped photonic crystal fiber, Haohua Tu, Zhi Jiang, Daniel L. Marks, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (United States) [7195-99]

Novel design of a gain-switched diode-pumped fiber laser, Martin Giesberts, Jens Geiger, Martin Traub, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7195-100]

Conference 7195

Wednesday 28 January

SESSION 10

Room: Conv. Ctr. Room J2 Wed. 8:00 to 10:10 am

Ultrafast Sources

Session Chair: Frank W. Wise, Cornell Univ.

8:00 am: **Tunable high-energy femtosecond soliton fiber laser based on hollow-core photonic bandgap fiber** (*Invited Paper*), Pascal Dupriez, Fianium Ltd. (United Kingdom); Gerome Frederic, Univ. de Limoges (France); Jonathan C. Knight, Univ. of Bath (United Kingdom); John R. Clowes, Fianium Ltd. (United Kingdom); William J. Wadsworth, Univ. of Bath (United Kingdom). . . . [7195-36]

8:30 am: **Transform limited high-energy and high-average-power ultrafast fiber amplifier**, Yoann Zaouter, Eric P. Mottay, Amplitude Systemes (France); Johan Boulet, Eric Cormier, Univ. Bordeaux I (France) [7195-37]

8:50 am: **2-GW peak-power 29-fs pulses delivered by 30-kHz fiber chirped-pulse amplifier pumped optical parametric amplifier**, Jan Rothhardt, Steffen Hädrich, Fabian Röser, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [7195-38]

9:10 am: **Femtosecond fiber CPA system with 325-W average power**, Tino Eidam, Fabian Röser, Enrico Seise, Thomas Gottschall, Steffen Hädrich, Jan Rothhardt, Friedrich-Schiller-Univ. Jena (Germany); Thomas Schreiber, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7195-39]

9:30 am: **Energy scaling of femtosecond and picosecond fiber oscillators beyond the microjoule level**, Büleend Ortac, Martin Baumgartl, Oliver Schmidt, Friedrich-Schiller-Univ. Jena (Germany); Ammar A. Hideur, Univ. de Rouen (France); Isabelle Sagnes, Ctr. National de la Recherche Scientifique (France); Arnaud Garnache, Univ. Montpellier II (France); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7195-40]

9:50 am: **All polarization-maintaining fiber chirped-pulse amplification system for microjoule femtosecond pulses**, Shian Zhou, Cornell Univ. (United States) and Sunx Ltd. (Japan); Tetsuji Takamido, Rakesh Bhandari, Sunx Ltd. (Japan); Andy Chong, Frank W. Wise, Cornell Univ. (United States) [7195-41]

Coffee Break10:10 to 10:30 am

LASE PLENARY SESSION

Room: Montgomery Theater Wed. 10:30 am to 12:30 pm

10:30 am: **A High-Power Fiber Diet**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

Lunch/Exhibition Break12:30 to 2:00 pm

SESSION 11

Room: Conv. Ctr. Room J2 Wed. 2:00 to 3:30 pm

Pulsed Sources I

Session Chair: Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

2:00 pm: **Modeling of pulsed-fiber sources** (*Invited Paper*), Arlee V. Smith, AS-Photonics, LLC (United States); G. Ronald Hadley, Roger L. Farrow, Sandia National Labs. (United States) [7195-42]

2:30 pm: **High-peak-power short-pulse fiber laser for materials processing**, Alison M. Thomas, Deborah Alterman, Mark S. Bowers, Lockheed Martin Aculight (United States) [7195-43]

2:50 pm: **200-W average power, 1mJ pulse energy from spectrally combined pulsed sub-5-ns fiber laser source**, Oliver Schmidt, Büleend Ortac, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany); Thomas V. Andersen, Koheras A/S (Denmark) [7195-44]

3:10 pm: **Actively triggered fiber laser source generating ns pulses of high-energy and peak/average power** (*Invited Paper*), Fabio Di Teodoro, Northrop Grumman Space Technology (United States) [7195-45]

Coffee Break3:30 to 4:00 pm

SESSION 12

Room: Conv. Ctr. Room J2 Wed. 4:00 to 5:20 pm

Pulsed Sources II

Session Chair: Robert G. Waarts, Raydiance, Inc.

4:00 pm: **High-peak and average-power eye-safe fiber sources** (*Invited Paper*), Matthias P. Savage-Leuchs, Christian E. Dille, Sebastian Desmoulin, Jim Stafford, Eric C. Eisenberg, John D. Minelly, Lockheed Martin Aculight (United States) [7195-46]

4:20 pm: **Experimental demonstration of a high-gain, hybrid fiber-bulk regenerative amplifier system**, Arun Kumar Sridharan, Paul H. Pax, Michael J. Messerly, Jay W. Dawson, Lawrence Livermore National Lab. (United States) [7195-47]

4:40 pm: **Enhanced Pulseshaping Capabilities and Reduction of Non-Linear Effects in All-fiber MOPA Pulsed System**, Bertrand Morasse, Stéphane Chatigny, Eric Gagnon, Jean-Philippe de Sandro, Cynthia Desrosiers, CorActive High-Tech Inc. (Canada) [7195-48]

5:00 pm: **Compensation of pulse-shaping due to saturation in fiber amplifiers**, Damian N. Schimpf, Clemens Ruchert, Dirk Nodop, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7195-49]

Thursday 29 January

SESSION 13

Room: Conv. Ctr. Room J2 Thurs. 8:00 to 10:20 am

Narrow-Linewidth Sources and SBS Suppression

Session Chair: Fabio Di Teodoro,

Northrop Grumman Space Technology

8:00 am: **SBS suppression at the kilowatt level** (*Invited Paper*), Johan Nilsson, Univ. of Southampton (United Kingdom) [7195-50]

8:30 am: **Single-frequency fiber oscillators** (*Invited Paper*), Nasser N. Peyghambarian, College of Optical Sciences/The Univ. of Arizona (United States) [7195-51]

9:00 am: **High-energy single-mode single-frequency all-fiber laser pulses covering C-band based on highly co-doped phosphate glass fibers**, Wei Shi, Matthew Leigh, Jie Zong, Zidong Yao, Arturo Chavez-Pirson, NP Photonics, Inc. (United States); Nasser N. Peyghambarian, College of Optical Sciences/The Univ. of Arizona (United States) [7195-52]

9:20 am: **Spectral SBS model for Yb:DCF with discrete acoustic core designs**, William E. Torruellas, The Johns Hopkins Univ. Applied Physics Lab. (United States); Mansoor Alam, John P. Edgecumbe, Kanishka Tankala, Nuferr (United States); Joshua E. Rothenberg, Michael G. Wickham, Northrop Grumman Space Technology (United States) [7195-53]

9:40 am: **Brillouin gain in optical fibers with inhomogeneous acoustic velocity**, Benjamin G. Ward, Justin B. Spring, U.S. Air Force Academy (United States) [7195-54]

10:00 am: **Single-frequency fiber laser at 2.05- μ m based on holmium-doped germanate glass fiber**, Jianfeng Wu, Zhidong Yao, Jie Zong, Arturo Chavez-Pirson, NP Photonics, Inc. (United States); Nasser N. Peyghambarian, College of Optical Sciences/The Univ. of Arizona (United States); Jirong Yu, NASA Langley Research Ctr. (United States) [7195-55]

Coffee Break10:20 to 10:50 am

SESSION 14

Room: Conv. Ctr. Room J2Thurs. 10:50 am to 12:00 pm

Beam Combining I

Session Chair: Eric C. Honea, Lockheed Martin Aculight

10:50 am: **Spectral and coherent beam combining of fiber lasers** (*Invited Paper*), Steven J. Augst, MIT Lincoln Lab. (United States). . . . [7195-56]

11:20 am: **High-power phase locking of a fiber amplifier array**, Thomas M. Shay, Air Force Research Lab. (United States); Jeffrey T. Baker, Boeing LTS, Inc. (United States); Craig A. Robin, Christopher L. Vergien, Clint Zeringue, Air Force Research Lab. (United States); David J. Gallant, Boeing LTS, Inc. (United States); Anthony D. Sanchez, Daniel E. Pilkington, Chunte A. Lu, Timothy J. Bronder, Air Force Research Lab. (United States) [7195-57]

11:40 am: **Coherent fiber combining by digital holography**, Cindy Bellanger, Arnaud Brignon, Joseph Colineau, Jean-Pierre Huignard, Thales Research & Technology (France) [7195-58]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 15

Room: Conv. Ctr. Room J2Thurs. 1:30 to 2:30 pm

Beam Combining II

Session Chair: Oleksiy G. Andrusyak, College of Optics & Photonics/Univ. of Central Florida

1:30 pm: **Multicore leakage-channel fiber for coherent beam combining**, Ingmar Hartl, Andrius Marcinkeivicius, Hugh A. McKay, Liang Dong, Martin E. Fermann, IMRA America, Inc. (United States). [7195-59]

1:50 pm: **Theoretical analysis of multiplexed volume holograms for spectral beam combining**, Gregory B. Ingersoll, James R. Leger, Univ. of Minnesota (United States). [7195-60]

2:10 pm: **Applications of volume-Bragg gratings for spectral control and beam combining of high-power fiber lasers**, Oleksiy G. Andrusyak, College of Optics & Photonics/Univ. of Central Florida (United States); Vadim I. Smirnov, OptiGrate (United States); George B. Venus, Nikolai S. Vorobiev, Leonid B. Glebov, College of Optics & Photonics/Univ. of Central Florida (United States). [7195-61]

SESSION 16

Room: Conv. Ctr. Room J2Thurs. 2:30 to 3:40 pm

Applications

Session Chair: William E. Torruellas, The Johns Hopkins Univ. Applied Physics Lab.

2:30 pm: **Elucidation of phenomena in high-power fiber laser welding, and development of prevention procedures of welding defects** (*Invited Paper*), Seiji Katayama, Yousuke Kawahito, Osaka Univ. (Japan). [7195-62]

3:00 pm: **Material micromachining using a pulsed fiber laser platform with fine temporal nanosecond pulse shaping capability**, Pascal Deladurantaye, David Gay, Alain Cournoyer, Vincent Roy, Bruno Labranche, Marc Levesque, Yves Taillon, INO (Canada) [7195-63]

3:20 pm: **Application of a microchip laser-pumped photonic crystal fiber supercontinuum source for high-sensitive cavity-ring-down optical loss measurements**, Tobias Baselt, Fabiola Basan, Peter Hartmann, West Saxon Univ. of Applied Sciences Zwickau (Germany) [7195-78]

Coffee Break 3:40 to 4:10 pm

SESSION 17

Room: Conv. Ctr. Room J2 Thurs. 4:10 to 4:50 pm

Post-Deadline Session

Session Chair: Denis V. Gapontsev, IPG Photonics Corp.

Photonics West is the top ranked conference on High-Power Fiber Lasers and Systems. This year's conference will feature an exciting Post-Deadline Session to allow novel high-quality work to be presented.

The **submission deadline** for the Post-Deadline Session is **19 January 2009**. Two-page submissions are required. Accepted papers will be printed as submitted without further revision in the front matter of the proceedings (the front matter is not citable).

Best Student Oral Presentation Award Ceremony

Room: Conv. Ctr. Room J2 Thurs. 4:50 to 5:00 pm

Session Chair: Denis V. Gapontsev, IPG Photonics Corp.

Student Presentation Competition

Qualifying student presentations will be evaluated by members of the conference steering committee, led by the 2008 student prize winner, Oleksiy Andrusyak. To be eligible for consideration a student must be an author on an accepted oral paper (in a regular oral or post-deadline session) and must give the oral presentation.

To self-nominate, send an email to <mailto:oandrusy@creol.ucf.edu> Oleksiy Andrusyak and include your SPIE paper number, paper title, and attach a copy of your Student ID Card.

The prize will be awarded based on the quality of the presentation and not on the content of the submitted abstract. The winner of the Best Student Oral Presentation Award will be announced during the Best Student Award Ceremony.

Best Student Oral Presentation Award

We are pleased to announce that a prize in the amount of \$1,000 US will be awarded to the best student oral presentation. The award money has been donated by IPG Photonics Corp. and the award will be presented by an IPG Photonics representative.

Award Sponsor



High Energy/Average Power Lasers and Intense Beam Applications IV

Conference Chairs: **Steven J. Davis**, Physical Sciences Inc.; **Michael C. Heaven**, Emory Univ.; **J. Thomas Schriempf**, The Pennsylvania State Univ.

Program Committee: **David L. Carroll**, CU Aerospace LLC; **Jarmila Kodymová**, Fyzikální Ústav (Czech Republic); **Timothy J. Madden**, Air Force Research Lab.; **William E. McDermott**, Univ. of Denver; **Wilson T. Rawlins**, Physical Sciences Inc.

Monday 26 January

SESSION 1

Room: Hilton Hotel, San Carlos Room I Mon. 8:20 to 10:20 am

COIL and EOIL

Session Chair: **Steven J. Davis**, Physical Sciences Inc.

8:20 am: **Research on chemical and discharge oxygen-iodine lasers** (*Invited Paper*), Jarmila Kodymová, Vít Jirášek, Josef Schmiedberger, Otomar Špalek, Miroslav Censký, Institute of Physics (Czech Republic) [7196-01]

8:50 am: **Systematic technology development of the electric oxygen-iodine laser**, David L. Carroll, Gabriel F. Benavides, CU Aerospace LLC (United States); Joseph W. Zimmerman, Brian S. Woodard, Univ. of Illinois at Urbana-Champaign (United States); Andrew D. Palla, Joseph T. Verdeyen, CU Aerospace LLC (United States); Wayne C. Solomon, Univ. of Illinois at Urbana-Champaign (United States) [7196-02]

9:10 am: **Iodine atom production rates by electron impact versus post discharge reactions for pulsed COIL**, Anatoly P. Napartovich, Igor V. Kochetov, Troitsk Institute for Innovation and Fusion Research (Russian Federation); Nikolay P. Vagin, Nikolay N. Yuryshchev, P.N. Lebedev Physical Institute (Russian Federation) [7196-03]

9:30 am: **Catalytically enhanced singlet oxygen for EOIL** (*Invited Paper*), Seonkyung Lee, Wilson T. Rawlins, Steven J. Davis, Physical Sciences Inc. (United States) [7196-04]

10:00 am: **Gain and continuous-wave atomic iodine laser oscillation pumped by a dry air-helium electric discharge**, Brian Woodard, J. W. Zimmerman, Gabriel F. Benavides, David L. Carroll, Joseph T. Verdeyen, Andrew D. Palla, Tyler H. Field, CU Aerospace LLC (United States); Wayne C. Solomon, Univ. of Illinois at Urbana-Champaign (United States); Steven J. Davis, Wilson T. Rawlins, Seonkyung Lee, Physical Sciences Inc. (United States) [7196-05]

Coffee Break 10:20 to 10:50 am

SESSION 2

Room: Hilton Hotel, San Carlos Room I Mon. 10:50 am to 12:10 pm

High Power Gas Laser Technology I

Session Chair: **J. Thomas Schriempf**, Naval Sea Systems Command

10:50 am: **Electra: a KrF electron-beam-pumped high-average-power laser system for inertial confinement fusion applications**, Patrick M. Burns, Research Support Instruments (United States); John D. Sethian, Matthew F. Wolford, Matt C. Myers, John L. Giuliani, Naval Research Lab. (United States); Frank Hegeler, Moshe Friedman, Commonwealth Technology Inc. (United States); Reginald Jaynes, Science Applications International Corp. (United States) [7196-06]

11:10 am: **Advanced-UV excimer laser processing**, Ralph F. Delmdahl, Coherent GmbH (Germany) [7196-07]

11:30 am: **10-kW short pulse CO₂ laser system for laser-produced plasma generated EUV radiation**, Francisco Villarreal-Saucedo, TRUMPF Inc. (United States); Joachim Schulz, TRUMPF GmbH & Co. KG (Germany); Igor V. Fomenkov, Alexander I. Ershov, Jerzy R. Hoffman, Cymer, Inc. (United States) [7196-08]

11:50 am: **Slab overtone carbon-monoxide laser**, Andrey A. Ionin, Andrey Y. Kozlov, Leonid V. Seleznev, Dmitry V. Sinityn, P.N. Lebedev Physical Institute (Russian Federation) [7196-09]

Lunch Break 12:10 to 1:40 pm

SESSION 3

Room: Hilton Hotel, San Carlos Room I Mon. 1:40 to 2:20 pm

High Power Gas Laser Technology II

Session Chair: **J. Thomas Schriempf**, Naval Sea Systems Command

1:40 pm: **ZnSe aspherical microlens systems enable new beam-shaping approaches for CO₂ lasers**, Oliver Homburg, Bjoern Guettlich, Frank Toennissen, Thomas Mitra, Lutz Aschke, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7196-10]

2:00 pm: **Self-channeled laser pulse induced effects at distance**, Robert Bernath, Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States) [7196-11]

SESSION 4

Room: Hilton Hotel, San Carlos Room I Mon. 2:20 to 4:30 pm

Optically Pumped Alkali Lasers

Session Chair: **Wilson T. Rawlins**, Physical Sciences Inc.

2:20 pm: **Cs-atomic laser pumped by dissociation of an excimer**, Jason D. Readle, Univ. of Illinois at Urbana-Champaign (United States) and CU Aerospace LLC (United States); Clark J. Wagner, Univ. of Illinois at Urbana-Champaign (United States); Joseph T. Verdeyen, David L. Carroll, CU Aerospace LLC (United States); J. Gary Eden, Univ. of Illinois at Urbana-Champaign (United States) [7196-12]

2:40 pm: **Rubidium and potassium alkali vapor lasers**, Jason S. Zweiback, General Atomics (United States); William F. Krupke, WFK Lasers (United States); Gordon D. Hager, Air Force Institute of Technology (United States) [7196-13]

3:00 pm: **Transverse-pumped Cs vapor laser**, Boris V. Zhdanov, Michael Shaffer, Jerry Sell, Randall J. Knize, U.S. Air Force Academy (United States) [7196-14]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Spectroscopic studies of Rb- and Cs- rare gas systems**, Steven J. Davis, Kristin L. Galbally-Kinney, William J. Kessler, Wilson T. Rawlins, Physical Sciences Inc. (United States) [7196-15]

4:10 pm: **Spectroscopic investigations of alkali metal-rare gas interaction potentials**, Jiande Han, Jeremy M. Merritt, Michael C. Heaven, Emory Univ. (United States) [7196-16]

SESSION 5

Room: Hilton Hotel, San Carlos Room I Mon. 4:30 to 5:30 pm

High-Power Fiber Lasers

Session Chair: **Michael C. Heaven**, Emory Univ.

4:30 pm: **Laser weapon system: a COTS-based Navy application of fiber lasers** (*Presentation Only*), J. Thomas Schriempf, Naval Sea Systems Command (United States); Brian J. Hankla, Naval Surface Warfare Ctr. (United States); David H. Kiel, Naval Sea Systems Command (United States) [7196-17]

4:50 pm: **All-fiber narrow frequency, single-mode, single-polarization MOPA fiber lasers**, Ray J. Horley, Michalis N. Zervas, Steve Norman, SPI Lasers UK Ltd. (United Kingdom); Ken Dzurko, SPI Lasers LLC (United States) [7196-18]

5:10 pm: **High harmonic generation at high repetition rate from Ytterbium doped fiber chirped pulse amplification system**, Johan Bouillet, Univ. Bordeaux I (France); Yoann Zaouter, Univ. Bordeaux I (France) and Amplitude Systemes (France); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Stéphane Petit, Eric Mével, Eric Constant, Eric Cormier, Univ. Bordeaux I (France) [7196-19]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

OFI rare-gas excimer amplifier for high-intensity VUV pulse generation,
 Shoichi Kubodera, Masanori Kaku, Kazuyoshi Oda, Tadashi Kamikihara,
 Masahito Katto, Atsushi Yokotani, Univ. of Miyazaki (Japan); Noriaki Miyanaga,
 Kunioki Mima, Osaka Univ. (Japan). [7196-20]

**Constitutional and properties of laser-sealed layers of Yttria partially
 stabilized zirconia (YPSZ) ceramic,** Mohammed J. Kadhim, Univ. of
 Technology Baghdad (Iran, Islamic Republic of). [7196-21]

A new CCD testing temperature system based on DSP in laser melten pool,
 Xichen M. Yang, Cao Zhen, Tianjin Polytechnic Univ. (China) [7196-23]



Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications VIII

Conference Chair: **Peter E. Powers**, Univ. of Dayton

Program Committee: **Darrell J. Armstrong**, Sandia National Labs.; **Pinhas Blau**, Soreq Nuclear Research Ctr. (Israel); **Majid Ebrahim-Zadeh**, Institut de Ciències Fotòniques (Spain); **Robert C. Eckardt**, Cleveland Crystals, Inc.; **Peter Günter**, ETH Zürich (Switzerland); **Richard Hammond**, U.S. Army Research Office; **Angus J. Henderson**, Lockheed Martin Aculight; **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel); **Kenji Kitamura**, National Institute for Materials Science (Japan); **Thomas J. Kulp**, Sandia National Labs.; **Fredrik Laurell**, Kungliga Tekniska Högskolan (Sweden); **Yun-Shik Lee**, Oregon State Univ.; **Michael W. Millard**, Northrop Grumman Information Technology; **Rita D. Peterson**, Air Force Research Lab.; **Kenneth L. Schepler**, Air Force Research Lab.; **Peter G. Schunemann**, BAE Systems; **Ramesh K. Shori**, Naval Air Warfare Ctr.; **Konstantin L. Vodopyanov**, Stanford Univ.

Tuesday 27 January

SESSION 1

Room: Conv. Ctr. Room J1 Tues. 8:00 to 10:20 am

Visible and UV Lasers

Session Chairs: **W. Andrew Clarkson**, Univ. of Southampton (United Kingdom); **Pinhas Blau**, Soreq Nuclear Research Ctr. (Israel)

Joint Session with Conference 7193: Solid State Lasers XVIII: Technology and Devices

8:00 am: **Tunable, high-power, solid state sources for the blue and ultraviolet** (*Invited Paper*), Majid Ebrahim-Zadeh, Institut de Ciències Fotòniques (Spain).[7197-01]

8:30 am: **Q-switched diode-pumped Nd:YAG rod laser with output power of 420W at 532 nm and 160-W at 355 nm**, David R. Dudley, Oliver Mehl, Gary Y. Wang, Yang Pang, Norman Hodgson, Coherent, Inc. (United States) . .[7193-38]

8:50 am: **High-power tunable solid-state blue/yellow source**, Yelena Isyanova, Peter F. Moulton, Q-Peak, Inc. (United States); Ramesh K. Shori, Naval Air Warfare Ctr. (United States).[7193-39]

9:10 am: **Highly efficient, compact green laser for laser tv** (*Invited Paper*), Yoshihito Hirano, Mitsubishi Electric Corp. (Japan)[7197-02]

9:40 am: **High-efficiency high-power solid state CW visible lasers for large-format-display applications**, Tatyana A. Chernysheva, Dennis F. Elkins, Jesse P. Anderegg, Forrest L. Williams, Evans & Sutherland (United States).[7197-03]

10:00 am: **70-Watt green laser with near diffraction-limited beam quality**, Dan Hu, Eric C. Eisenberg, Diane E. Smith, Roy D. Mead, Eric C. Honea, Lockheed Martin Aculight (United States).[7197-04]

SESSION 2

Room: Conv. Ctr. Room J1 Tues. 1:00 to 3:00 pm

Engineered Nonlinear Optics

Session Chair: **Darrell J. Armstrong**, Sandia National Labs.

1:00 pm: **Angular quasi-phase-matching: theory and experiments** (*Invited Paper*), Benoit Boulanger, Univ. Joseph Fourier (France) and Ctr. National de la Recherche Scientifique (France); Pierre Brand, Ctr. National de la Recherche Scientifique (France); Yannick Petit, Univ. of Geneva (Switzerland); Patricia Segonds, Univ. Joseph Fourier (France); Bertrand Menaert, Corinne Felix, Ctr. National de la Recherche Scientifique (France); Takunori Taira, Hideki Ishizuki, Institute for Molecular Science (Japan)[7197-05]

1:30 pm: **Highly efficient single-pass blue-light generation at 488 nm using a PPKTP waveguide crystal and high-brightness diode lasers**, Andreas Jechow, Univ. Potsdam (Germany); Shirley McNeil, Christopher M. Kaleva, ADVR Inc. (United States); Danilo Skoczowsky, Ralf Menzel, Univ. Potsdam (Germany)[7197-06]

1:50 pm: **Calculation of quasi phasematching in optical parametric GaAs/AlGaAs waveguides**, Kenneth L. Schepler, Air Force Research Lab. (United States); Justin B. Spring, U.S. Air Force Academy (United States).[7197-07]

2:10 pm: **Improved material quality and OPO performance in orientation-patterned GaAs**, Rita D. Peterson, David C. Whelan, David F. Bliss, Candace Lynch, Air Force Research Lab. (United States)[7197-08]

2:30 pm: **Orientation-patterned ZnSe devices for nonlinear optical frequency conversion** (*Invited Paper*), Gary Kaner, S. P. Kelley, Narsingh B. Singh, Andre Berghmans, David A. Kahler, David J. Knuteson, Brian P. Wagner, Northrop Grumman Electronic Systems (United States); Angie C. Lin, J. M. Harris, Martin M. Fejer, Stanford Univ. (United States); Kenneth L. Schepler, Rita D. Peterson, Air Force Research Lab. (United States)[7197-09]

Coffee Break3:00 to 3:30 pm

SESSION 3

Room: Conv. Ctr. Room J1 Tues. 3:30 to 5:40 pm

Nonlinear Optical Devices I

Session Chair: **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel)

3:30 pm: **THz sources and detectors based on diode lasers** (*Invited Paper*), Claus-Stefan Friedrich, Carsten Brenner, Tobias Schlauch, Ruhr-Univ. Bochum (Germany); Andreas Klehr, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Christian Jördens, Mohammed A. Salhi, Martin Koch, Technische Univ. Braunschweig (Germany); Martin R. Hofmann, Ruhr-Univ. Bochum (Germany).[7197-10]

4:00 pm: **Coherent terahertz-wave generation and detection over a wide frequency range using DAST crystals** (*Invited Paper*), Hiroaki Minamide, The Institute of Physical and Chemical Research (RIKEN) (Japan); Hiromasa Ito, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Tohoku Univ. (Japan).[7197-11]

4:30 pm: **Boosting efficiency and accurate modeling of parametric down-conversion processes** (*Invited Paper*), Joseph W. Haus, Anup R. Pandey, Peter E. Powers, Univ. of Dayton (United States).[7197-12]

5:00 pm: **Efficient ultraviolet (355 nm)-generation based on single-pass cascaded wavelength conversion using PP-MgSLT**, Hideki Hatano, Shunji Takekawa, Kenji Kitamura, National Institute for Materials Science (Japan) and SWING Corp. (Japan)[7197-13]

5:20 pm: **Beam quality dependent SHG using edge-emitting lasers and a 50-mm bulk PPLN crystal**, Mirko Uebernickel, Gunnar Blume, Christian Fiebig, Christian Kaspari, David Feise, Katrin Paschke, Arnim Ginolas, Bernd Eppich, Reiner Guether, Goetz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany)[7197-14]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Rare-earth-doped solid state phosphor with temperature-induced variable chromaticity, Artur S. Gouveia-Neto, Luciano A. Bueno, Raphael F. Nascimento, Elias A. Silva, Ernande B. da Costa, Univ. Federal Rural de Pernambuco (Brazil) [7197-38]

Extraction of a single soliton from a set of solitons by the use of a nonlinear optical loop mirror, Miguel A. Bello-Jiménez, Evgeny A. Kuzin, Baldemar Ibarra-Escamilla, Ariel Flores-Rosas, Manuel Durán-Sánchez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Oliver Pottiez, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [7197-39]

Femtosecond, nanosecond, and continuous-wave nonlinear optical properties of (H₂)₂SnPc, Sn(OH)₂Pc, Sn(CI)₂Pc studied using Z-scan technique, Venugopal R. Soma, Univ. of Hyderabad (India) [7197-40]

Optical switching of Rose Bengal-based poly-(methacrylate) films, Ahmad Y. Nooraldeen, P. K. Palanisamy, Anna Univ. (India) [7197-41]

Studies of the output efficiency of signal wave as a function of reflectance of output coupler in nanosecond single-resonant optical parametric oscillators, Bum Ku Rhee, Ki-Ho Cho, Sogang Univ. (Korea, Republic of); Song-Hee Han, Mokpo National Maritime Univ. (Korea, Republic of) . . [7197-42]

Second-harmonic generation at wavelength of localized surface plasmon resonance in Au nanoparticles and magnetic garnet composite films, Masahiro Koga, Hironaga Uchida, Kousuke Okada, Toyohashi Univ. of Technology (Japan); Oleg A. Aktsipetrov, Lomonosov Moscow State Univ. (Russian Federation); Alexander V. Baryshev, Mitsuteru Inoue, Toyohashi Univ. of Technology (Japan) [7197-43]

Self-phase modulation of mid-infrared femtosecond pulses in semiconductor materials, Satoshi Ashihara, Tokyo Univ. of Agriculture and Technology (Japan) and Japan Science and Technology Agency (Japan); Yusuke Kawahara, Tokyo Univ. of Agriculture and Technology (Japan) [7197-44]

Supercontinuum generators with CW and pulsed pump: temporal structure and dynamic control of parameters, Sergey M. Kobtsev, Sergey V. Smirnov, Novosibirsk State Univ. (Russian Federation) [7197-45]

Engineering nonlocal medium: the cation influence on the optical nonlocal nonlinear responses of ionic liquids, Márcio A. Alencar, Cássio E. Santos, Monique G. da Silva, Mario R. Meneghetti, Univ. Federal de Alagoas (Brazil); Pedro Migowski, Jairton Dupont, Univ. Federal do Rio Grande do Sul (Brazil); Jandir M. Hickmann, Univ. Federal de Alagoas (Brazil) [7197-46]

High-reflectivity SBS phase conjugate mirror, Frank F. Wu, Anatoliy Khizhnyak, Vladimir B. Markov, MetroLaser, Inc. (United States) [7197-48]

Experimental investigations of second-harmonic generation in optical fibers, Frank F. Wu, MetroLaser, Inc. (United States) [7197-49]

Continuum generation in optical fiber for high-resolution holographic coherence domain imaging application, Linghui Li, Vitaly E. Gruzdev, Ping Yu, Jinn K. Chen, Univ. of Missouri, Columbia (United States) [7197-50]

Wednesday 28 January

SESSION 4

Room: Conv. Ctr. Room J1 Wed. 8:10 to 10:00 am

Nonlinear Optical Devices II

Session Chair: Rita D. Peterson, Air Force Research Lab.

8:10 am: **Walk-off corrected KTP crystal for low-pulse energy pumped optical parametric oscillation**, Xiaodong Mu, Huai-Chuan Lee, Helmut E. Meissner, Onyx Optics, Inc. (United States) [7197-15]

8:30 am: **Externally modulated, diode-seeded Yb³⁺-doped fiber MOPA pumped high-power optical parametric oscillator**, Shaif-ul Alam, Kangkang Chen, Dejiao Lin, Andrew Malinowski, David J. Richardson, Univ. of Southampton (United Kingdom); Yonghang Shen, Shuangshuang Cai, Bo Wu, Peipei Jiang, Zhejiang Univ. (China) [7197-16]

8:50 am: **High-power, single-frequency CW OPOs and their application to spectroscopy (Invited Paper)**, Angus J. Henderson, Lockheed Martin Aculight (United States) [7197-17]

9:20 am: **Mid-infrared tunable optical parametric oscillator pumped by a Q-switched Tm,Ho:YAG ceramic laser**, Hisanao Hazama, Osaka Univ. (Japan); Masaki Yumoto, Tokyo Univ. of Science (Japan) and The Institute of Physical and Chemical Research (RIKEN) (Japan); Takayo Ogawa, The Institute of Physical and Chemical Research (RIKEN) (Japan); Satoshi Wada, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Tokyo Univ. of Science (Japan); Kunio Awazu, Osaka Univ. (Japan) [7197-18]

9:40 am: **Monolithic ring resonator with PPLN crystal for efficient cw SHG of 976 nm emitted by an diode laser**, Danilo Skoczowsky, Andreas Jechow, Ralf Menzel, Univ. Potsdam (Germany); Herbert Stürmer, Torsten Poßner, Grintech GmbH (Germany); Sandra Stry, Joachim R. Sacher, Sacher Lasertechnik GmbH (Germany) [7197-19]

Coffee Break 10:00 to 10:30 am

LASE PLENARY SESSION

Room: Montgomery Theater Wed. 10:30 am to 12:30 pm

10:30 am: **A High-Power Fiber Diet**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 5

Room: Conv. Ctr. Room J1 Wed. 1:30 to 3:20 pm

Nonlinear Optical Materials and Characterization I

Session Chair: Kenneth L. Schepler, Air Force Research Lab.

1:30 pm: **Wideband parametric engineering by localized four-photon mixing (Invited Paper)**, Stojan Radic, Univ. of California, San Diego (United States) [7197-20]

2:00 pm: **The nonlinear coefficient d₃₆ of CdSiP₂**, Valentin P. Petrov, Frank Noack, Ivaylo Tunchev, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Peter G. Schunemann, Kevin Zawilski, BAE Systems (United States) [7197-21]

2:20 pm: **Second-harmonic generation in CdSiP₂**, Leonel P. Gonzalez, Derek Upchurch, Jacob O. Barnes, General Dynamics Information Technology (United States); Peter G. Schunemann, Kevin Zawilski, BAE Systems (United States); Shekhar Guha, Air Force Research Lab. (United States) [7197-22]

2:40 pm: **CdSiP₂: a new mid-IR nonlinear optical crystal for 1-µm and 1.5-µm pumping**, Peter G. Schunemann, Kevin Zawilski, Thomas M. Pollak, BAE Systems (United States); David E. Zelmon, Nils C. Fernelius, F. Kenneth Hopkins, Air Force Research Lab. (United States) [7197-23]

3:00 pm: **90° phase-matched direct third-harmonic generation in LiIO₃**, Kentaro Miyata, Fumihito Tanno, Kiyoshi Kato, Chitose Institute of Science and Technology (Japan) [7197-24]

Coffee Break 3:20 to 3:50 pm

LASE

SESSION 6

Room: Conv. Ctr. Room J1Wed. 3:50 to 6:00 pm

Nonlinear Optical Materials and Characterization II

*Session Chair: Majid Ebrahim-Zadeh,
Institut de Ciències Fotòniques (Spain)*

3:50 pm: **Harnessing second-order optical nonlinearities in compound semiconductors** (*Invited Paper*), Amr S. Helmy, Payam Abolghasem, Bhavin Bijlani, Univ. of Toronto (Canada)[7197-25]

4:20 pm: **Quality evaluation of quasi-phase-matched devices by far-field diffraction pattern analysis**, Krishnamoorthy Pandiyan, Yeon Sook Kang, Hwan Hong Lim, Byeong Joo Kim, Myoungsik Cha, Pusan National Univ. (Korea, Republic of)[7197-26]

4:40 pm: **Optical cleaning of lithium-niobate crystals for suppression of optical damage**, Michael Kösters, Univ. Bonn (Germany) and Institute of Automation and Electrometry (Russian Federation); Patrick Werheit, Daniel Haertle, Univ. Bonn (Germany); Boris I. Sturman, Institute of Automation and Electrometry (Russian Federation); Karsten Buse, Univ. Bonn (Germany)[7197-27]

5:00 pm: **Increased damage threshold on nonlinear optical surfaces using first contact polymer stripcoatings**, James P. Hamilton, Eric S. Bailey, Univ. of Wisconsin-Platteville (United States)[7197-28]

5:20 pm: **Investigation of the photorefractive effect in lithium-niobate crystals using femtosecond laser pulses**, Dominik Maxein, Johanna Bückers, Daniel Haertle, Karsten Buse, Univ. Bonn (Germany)[7197-29]

5:40 pm: **1540-nm excited intense RGB upconversion luminescence in erbium-doped lead-cadmium germanate nanostructured phosphor**, Artur S. Gouveia-Neto, Luciano A. Bueno, Raphael F. Nascimento, Elias A. da Silva, Ernande B. da Costa, Univ. Federal Rural de Pernambuco (Brazil)[7197-30]

Thursday 29 January

SESSION 7

Room: Conv. Ctr. Room J1Thurs. 8:00 to 10:20 am

Nonlinear Optical Applications

Session Chair: Peter E. Powers, Univ. of Dayton

8:00 am: **Frequency doubling of a single-frequency 778-nm Ti:Sapphire laser for nuclear spin polarization of ^3He atoms**, Shingo Maeda, Yutaka Tabata, Hiroshi Morioka, Hiroshi Kumagai, Ataru Kobayashi, Osaka City Univ. (Japan)[7197-31]

8:20 am: **Multistage optical parametric amplifier for the generation of sodium guide star**, Malte W. Duering, Vesselin Z. Kolev, Barry Luther-Davies, The Australian National Univ. (Australia)[7197-32]

8:40 am: **OPO-based narrow-band single-photon source for efficient coupling to quantum memories**, Matthias Scholz, Lars Koch, Oliver Benson, Humboldt-Univ. zu Berlin (Germany)[7197-33]

9:00 am: **Self-phase-locked divide-by-2 sync-pumped optical parametric oscillator as a broadband frequency comb source**, Samuel T. Wong, Tomas Plettner, Konstantin L. Vodopyanov, Robert L. Byer, Stanford Univ. (United States)[7197-34]

9:20 am: **Novel dual-B Brillouin-frequency optical fiber for distributed temperature sensing**, Peter D. Dragic, Neolight Technologies LLC (United States)[7197-35]

9:40 am: **Analysis of the interactions of bright photovoltaic low-divergence soliton-like fields in unbiased self-defocusing photorefractive BaTiO_3** , Michael W. Jones, Esa Jaatinen, Greg Michael, Queensland Univ. of Technology (Australia)[7197-36]

10:00 am: **Transient optical absorption upon femtosecond pulse irradiation in lithium-niobate crystals**, Satoshi Ashihara, Tokyo Univ. of Agriculture and Technology (Japan) and Japan Science And Technology Agency (Japan); Satoru Sasamoto, Tokyo Univ. of Agriculture and Technology (Japan); Junji Hirohashi, Oxide NIMS Corp. (Japan)[7197-37]

Conference 7198 · Convention Center Room J3

Monday-Tuesday 26-27 January 2009 • Proceedings of SPIE Vol. 7198

High-Power Diode Laser Technology and Applications VII

Conference Chair: **Mark S. Zediker**, Consultant

Program Committee: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany); **Stefan W. Heinemann**, Fraunhofer USA Inc.; **Volker K. Krause**, Laserline GmbH (Germany); **Robert J. Martinsen**, nLight Corp.; **Erik P. Zucker**, JDSU

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room J3 Mon. 8:20 am to 12:10 pm

High Power Laser Sources

Session Chair: **Robert J. Martinsen**, nLight Corp.

8:20 am: **High-brightness kW-QCW diode laser stack with ultralow pitches**, David A. Schleuning, Rajiv Pathak, Calvin Luong, Eli S. Weiss, Thomas C. Hasenberg, Coherent, Inc. (United States) [7198-01]

8:40 am: **Brilliant low-fill-factor diode laser bars at 9xx nm for fibre coupling**, Harald Koenig, Guenther Groeninger, Christian Lauer, Andreas Hammer, Josip Maric, OSRAM Opto Semiconductors GmbH (Germany); Heiko Kissel, Matthias Haag, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany); Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [7198-02]

9:00 am: **Power scaling of bars toward 80 mW per 1µm stripe width reliable output power**, Martin Krejci, Yvonne Gilbert, Jürgen Müller, René Todt, Stefan Weiss, Norbert Lichtenstein, Bookham AG (Switzerland) [7198-03]

9:20 am: **Continuous improvement of high-efficiency high-power 780-980 nm diode lasers at Spectra-Physics**, Hanxuan Li, Terry Towe, Irving Chyr, Frank O. Reinhardt, Xu Jin, Kiran Kuppaswamy, Robert Miller, Oscar D. Romero, Daming Liu, Denny Brown, Touyen Nguyen, Tom G. Truchan, Trevor R. Crum, Edmund Wolak, Robert Bullock, James Harrison, Newport Spectra-Physics (United States) [7198-04]

9:40 am: **640-nm laser diode for small laser display**, Naoyuki Shimada, Makoto Yukawa, Kimitaka Shibata, Kenichi Ono, Tetsuya Yagi, Akihiro Shima, Mitsubishi Electric Corp. (Japan) [7198-05]

10:00 am: **Progress in ultra-compact green frequency doubled optically pumped surface emitting lasers**, Ulrich Steegmueller, OSRAM Opto Semiconductors Inc. (United States); Michael Kühnelt, Heiko Unold, Thomas Schwarz, Michael Schmitt, Karsten Auen, Roland Schulz, Christoph Walter, Ines Pietzonka, Stefan Illek, Hans Lindberg, Alvaro Gomez-Iglesias, Michael Furitsch, Christian Lauer, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [7198-06]

Coffee Break 10:20 to 10:50 am

10:50 am: **9xx-nm diode laser bar-based high-performance sources for fiber laser pumping**, Rajiv Pathak, Jouko Haapamaa, Jason P. Watson, David A. Schleuning, Heiko Winhold, Eli S. Weiss, Juergen Pfaff, Thomas C. Hasenberg, Coherent, Inc. (United States); Mika A. Toivonen, Sami Lehtonen, Coherent Finland Oy (Finland); S. David Roh, Nels P. Ostrom, Daniel M. Grasso, Coherent, Inc. (United States) [7198-07]

11:10 am: **Improved laser diode for high power and high temperature applications**, Dominic Schröder, Ekkehard Werner, Matthias Schröder, Jens Meusel, Dirk Lorenzen, Petra Hennig, JENOPTIK Laserdiode GmbH (Germany) [7198-08]

11:30 am: **Optimized high-power diode laser, laser arrays, and bars for pump applications**, Ralf Huelsewede, Haike Schulze, Juergen Sebastian, JENOPTIK Diode Lab. GmbH (Germany); Petra Hennig, Dominic Schröder, Jens Meusel, JENOPTIK Laserdiode GmbH (Germany) [7198-09]

11:50 am: **5-mm long broad-area lasers at 976 nm with 65% wall-plug efficiency**, Jürgen Gilly, Patrick Friedmann, m2k-laser GmbH (Germany); Heiko Kissel, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany); Marc T. Kelemen, m2k-laser GmbH (Germany) [7198-10]

Lunch Break 12:10 to 1:20 pm

SESSION 2

Room: Conv. Ctr. Room J3 Mon. 1:20 to 4:50 pm

High Power Diode Laser Packaging

Session Chair: **Stefan W. Heinemann**, Fraunhofer USA Inc.

1:20 pm: **Space-grade reliability of 808-nm QCW laser-diode stacks delivering over 20-billion pulse shots**, Yuri Berk, Yoram Karni, Genadi Klumel, Moshe Levy, Yaki Openheim, Shlomo Risemberg, SCD - Semi Conductor Devices (Israel); Markus Rech, Hubert Becht, Carl Zeiss Optronics GmbH (Germany); Bruno Frei, Fabrice Monti di Sopra, LASAG AG (Switzerland) [7198-49]

1:40 pm: **Quasi-passive heat sink for high-power laser diodes**, John Vetrovec, Aqwest (United States) [7198-12]

2:00 pm: **High-power operation of 1-cm laser diode bars on Funryu heat sink cooled by fluorinated refrigerant**, Satoru Oishi, Hirofumi Miyajima, Noriyasu Suzuki, Tomoyuki Natsume, Toru Fujita, Koji Nishida, Hironobu Kurino, Ryusuke Okamoto, Nobuto Kageyama, Nobutaka Suzuki, Takayuki Uchiyama, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan) [7198-13]

2:20 pm: **High power IR laser in SMT-package**, Benedikt Pritsch, Martin Behringer, Robin Fehse, Joerg Heerlein, Josip Maric, OSRAM Opto Semiconductors GmbH (Germany) [7198-57]

2:40 pm: **Automated assembly of fast-axis collimation (FAC) lenses for diode laser bar modules**, Joern Miesner, ficonTEC GmbH (Germany); Andre Timmermann, Jens Meinschien, LIMO Lissotschenko Mikrooptik GmbH (Germany); Bernhard Neumann, Steve Wright, Artifex Engineering e.K. (Germany); Tolga Tekin, Henning Schroeder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Thomas Westphalen, Fraunhofer-Institut für Lasertechnik (Germany); Felix Frischkorn, ficonTEC GmbH (Germany) [7198-15]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Investigation of n-side cooling in regards to bar geometry and packaging style of diode laser**, Michael Leers, Thomas Westphalen, Fraunhofer-Institut für Lasertechnik (Germany); Rajiv Pathak, Coherent Inc. (United States) [7198-16]

3:50 pm: **CTE-matched microchannel coolers**, Greg I. Rudd, Kalista Kusnadi, Rob Brox, Spectra-Mat, Inc. (United States); Alan Grantz, Grantz Engineering (United States) [7198-17]

4:10 pm: **Long-term wavelength stability of high-power laser diode bars on microchannel coolers**, David R. Balsley, David C. Dawson, Robert J. Martinsen, nLight Corp. (United States) [7198-18]

4:30 pm: **Packaging influence on laser bars of different dimensions**, Thomas Westphalen, Michael Leers, Martin Traub, Marcel Werner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7198-19]

SESSION 3

Room: Conv. Ctr. Room J3 Mon. 4:50 to 6:10 pm

Laser Diode Applications

Session Chair: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany)

4:50 pm: **Enhanced brightness with new micro-optics**, Daniel Bartoschewski, Andre Timmermann, Udo Fornahl, Jens Meinschien, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7198-20]

5:10 pm: **Application of high-power diode lasers for aluminum welding**, Sonja Huber, Michael F. Zaeh, Technische Univ. München (Germany); Matthias Merzkirch, Volker Schulze, Univ. Karlsruhe (Germany) [7198-21]

5:30 pm: **Improvements of high-power diode laser line generators open up new application fields**, Jens Meinschien, Andreas Bayer, Peter Bruns, Lutz Aschke, Vitalij N. Lissotschenko, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7198-22]

5:50 pm: **Laser applied on railway line profile measurement**, Chaoyong Peng, Li Wang, Zeyong Wang, Xiaorong Gao, Kai Yang, Jian-ping Peng, Yu Zhang, Southwest Jiaotong Univ. (China) [7198-23]

Tuesday 27 January

SESSION 4

Room: Conv. Ctr. Room J3 Tues. 8:00 to 11:50 am

High Power Fiber Coupled Sources I

Session Chair: Erik P. Zucker, JDSU

8:00 am: **High-brightness fiber coupled pumps**, Alexander Ovtchinnikov, Valentin P. Gapontsev, Nikolay Moshegov, Pavel Trubenko, Alexey Komissarov, Igor E. Berishev, Oleg Raiski, Nikolay Strougov, Vadim V. Chuyanov, IPG Photonics Corp. (United States) [7198-24]

8:20 am: **100-W/100- μ m passively cooled, fiber coupled diode laser at 976-nm based on multiple 100- μ m single emitters for CW operation**, Marcel Werner, Christian Wessling, Jens Geiger, Martin Traub, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7198-25]

8:40 am: **High-brightness fiber-coupled single emitter arrays**, Stefan W. Heinemann, Boris Regaard, Torsten Schmidt, Ben Lewis, Fraunhofer USA Inc. (United States) [7198-26]

9:00 am: **High-power fiber-coupled modules based on tapered diode lasers at 975 nm**, Gerd Kochem, Martin Traub, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7198-27]

9:20 am: **Recent progress in fiber-coupled multi-mode pump module and broad-area laser-diode performance from 800-1500 nm**, Vince Wong, Victor V. Rossin, Jay A. Skidmore, Prasad Yalamanchili, Xiangdong Qui, Richard L. Duesterberg, Pierre Doussiere, David Venables, Reddy Raju, James Guo, Michael Au, Laura Zavala, Matthew G. Peters, Guowen Yang, YuZhong Dai, Erik P. Zucker, JDSU (United States) [7198-28]

9:40 am: **100W 105 μ m 0.15NA fiber coupled laser diode module**, Scott R. Karlson, Kirk Price, Aaron Brown, Mitch Reynolds, Ron Mehl, Steve Patterson, Robert J. Martinsen, nLight Corp. (United States) [7198-29]

Coffee Break 10:00 to 10:30 am

10:30 am: **High-brightness fiber-coupled pump sources at 88X nm and 79X nm**, Jason P. Watson, David A. Schleunig, Mike G. Griffin, Heiko Winhold, Sherry Tolman, Rajiv Pathak, Eli S. Weiss, Thomas C. Hasenberg, Coherent, Inc. (United States) [7198-30]

10:50 am: **Low-cost power scaling of mini-bar-based fiber pump modules with integrated fiber combiners**, Edmund Wolak, Newport Spectra-Physics (United States) [7198-31]

11:10 am: **High-peak-power fiber coupled super-pulsed diode laser**, Martin Traub, Martin Giesberts, Jens Geiger, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [7198-32]

11:30 am: **Intensity increasing up to 4 MW/cm² with BALB's via wavelengths coupling**, Andre Timmermann, Christian Schroers, Udo Fornahl, Jens Meinschien, LIMO Lissotschenko Mikrooptik GmbH (Germany) [7198-33]

Lunch Break 11:50 am to 1:20 pm

SESSION 5

Room: Conv. Ctr. Room J3 Tues. 1:20 to 2:00 pm

High Power Fiber Coupled Sources II

Session Chair: Erik P. Zucker, JDSU

1:20 pm: **Very high-brightness fiber-coupled diode lasers**, S. David Roh, Daniel M. Grasso, Jay Small, Coherent, Inc. (United States) [7198-34]

1:40 pm: **A high-power, high-brightness multimode laser pump platform**, Xiangdong Qiu, YuZhong Dai, Michael Au, James Guo, Vince Wong, Victor V. Rossin, David Venables, Jay A. Skidmore, Erik P. Zucker, JDSU (United States) [7198-35]

SESSION 6

Room: Conv. Ctr. Room J3 Tues. 2:00 to 3:20 pm

High Brightness Laser Sources

Session Chair: Mark S. Zediker, Coherent, Inc.

2:00 pm: **Wavelength stabilized high-power diode laser modules**, Bernd Köhler, Thomas Brand, Matthias Haag, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [7198-36]

2:20 pm: **High-power frequency stabilized tapered diode amplifiers at 1064 nm**, Ralf Ostendorf, Gudrun Kaufel, Rudolf Moritz, Christian Schilling, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Gerd Kochem, Fraunhofer-Institut für Lasertechnik (Germany); Patrick Friedmann, Jürgen Gilly, Marc T. Kelemen, m2k-laser GmbH (Germany) [7198-37]

2:40 pm: **High-performance wavelength-locked diode lasers**, Paul O. Leisher, Kirk Price, Scott R. Karlson, David R. Balsley, Robert J. Martinsen, Steve Patterson, nLight Corp. (United States) [7198-38]

3:00 pm: **Synchronization and coherence in high-power semiconductor laser diodes arrays**, Bo Liu, Yun Liu, Yehuda Y. Braiman, Oak Ridge National Lab. (United States) [7198-39]

Coffee Break 3:20 to 3:50 pm

SESSION 7

Room: Conv. Ctr. Room J3 Tues. 3:50 to 6:30 pm

Reliability and Failure Analysis

Session Chair: Volker K. Krause, Laserline GmbH (Germany)

3:50 pm: **20-W continuous wave reliable operation of 980-nm broad-area single emitter diode lasers with an aperture of 96 μ m**, Paul A. Crump, Katrin Paschke, Gunnar Blume, Sven Einfeldt, Armin Ginolas, Frank Bugge, Karl Häusler, Peter Ressel, Bernd Sumpf, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7198-40]

4:10 pm: **Fault protection of broad-area laser diodes**, Jonah H. Jacob, Rodney Petr, Martin A. Jaspán, Stephen D. Swartz, Maciej T. Knapczyk, Allen M. Flusberg, Science Research Lab., Inc. (United States); Aland K. Chin, Aland Chin, LLC (United States); Israel Smilanski, Science Research Lab., Inc. (United States) [7198-41]

4:30 pm: **Reliability of diode lasers for space applications**, Karl Häusler, Ute Zeimer, Bernd Sumpf, Frank Bugge, Peter Ressel, Goetz Erbert, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7198-42]

4:50 pm: **Improved brightness on broad-area single emitter (BASE) modules**, Susanne Pawlik, Boris N. Sverdllov, Nicolai Matuschek, Andrea Guarino, Rainer K. Bättig, Sebastian Arlt, Bernd Valk, Bookham AG (Switzerland); Nadhum Zayer, Jeffery Greatrex, Bookham Technology, plc (United Kingdom); Denis Lu, Bookham Technology (Shenzhen) Co., Ltd. (China); Norbert Lichtenstein, Bookham AG (Switzerland) [7198-43]

5:10 pm: **Catastrophic facet and bulk degradation in high power multi-mode InGaAs strained quantum well single emitters**, Yongkun Sin, Nathan Presser, Brendan Foran, Neil Ives, Steven C. Moss, The Aerospace Corp. (United States) [7198-44]

5:30 pm: **Reliability of single-mode and multi-mode high-power semiconductor lasers at eye-safe wavelengths**, Thomas S. Stakelon, Joel Lucas, Mark L. Osowski, Robert M. Lammert, Steve S. Moon, Chameli Panja, Victor C. Elarde, Kendra Gallup, Wentao Hu, Jeffrey E. Ungar, QPC Lasers, Inc. (United States) [7198-45]

5:50 pm: **A comprehensive model of catastrophic optical-damage in broad-area laser diodes**, Aland K. Chin, Aland Chin, LLC (United States); Rick K. Bertaska, New England Analytical, LLC (United States); Martin A. Jaspán, Allen M. Flusberg, Stephen D. Swartz, Maciej T. Knapczyk, Rod Petr, Israel Smilanski, Jonah H. Jacob, Science Research Lab., Inc. (United States) [7198-46]

6:10 pm: **Product reliability at nLight photonics**, Steve Patterson, Kirk Price, Paul O. Leisher, Ling Bao, Hua Huang, Jun Wang, Mark A. DeVito, Robert J. Martinsen, nLight Corp. (United States) [7198-47]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Reaching 1-watt reliable output power on single-mode 980-nm pump lasers, Mauro A. Bettiati, Vincent Cargemel, Philippe Pagnod, Catherine Hervo, Patrick Garabedian, Pascal Issert, Laurent Raymond, Ludovic Ragot, Jean-Claude Bertreux, Jean-Noël Reygrobellet, Charles Crusson, François J. Laruelle, 3S PHOTONICS SA (France) [7198-48]

High-reliability operation of 2-kW QCW 10-bar laser diode stacks at 808 nm, Valentin Loyo-Maldonado, Gianluca Bacchin, Stephen Robertson, Kwong Man, Bocang Qiu, Stewart D. McDougall, John H. Marsh, Intense Ltd. (United Kingdom) [7198-50]

High-power QCW arrays for operation in adverse environmental conditions, Ryan Feeler, Jeremy Junghans, Edward F. Stephens, Northrop Grumman Cutting Edge Optronics (United States); Dan P. Rini, Ben Saarloos, Rini Technologies, Inc. (United States) [7198-51]

Assessment of the limits to peak power of 1060-nm broad-area single emitter diode lasers under > 200A short-pulse conditions, Xiaozhuo Wang, Paul A. Crump, Christoph Schultz, Agnieszka Pietrzak, Andreas Klehr, Thomas Hoffmann, A. Liero, Arnim Ginolas, Sven Einfeldt, Frank Bugge, Goetz Erbert, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7198-52]

High wall-plug efficiency diode lasers with an Al-free active region at 975 nm, Nicolas Michel, Michel Calligaro, Michel Lecomte, Olivier Parillaud, Michel M. Krakowski, Alcatel-Thales III-V Lab. (France); Thomas Westphalen, Martin Traub, Fraunhofer-Institut für Lasertechnik (Germany) [7198-53]

High-d/gamma values in diode laser structures for very high power, Iulian B. Petrescu-Prahova, Prasanta Modak, Erik Goutain, Diego Silan, David Babrick, John Riordan, Thomas Moritz, Intense US (United States); Bocang Qiu, Stewart D. McDougall, John H. Marsh, Intense UK (United Kingdom) [7198-54]

Power scaling of mini-bar-based, highly reliable, fiber pump modules, Edmund Wolak, Newport Spectra-Physics (United States) [7198-55]

Material survey for packaging semiconductor diode lasers, David A. Schleunig, Jihua Du, Kenneth D. Scholz, Eli S. Weiss, Thomas C. Hasenberg, Coherent, Inc. (United States) [7198-56]

Wavelength-stabilized tapered laser diodes in an external Talbot cavity: simulations and experiments, David Paboeuf, Gaëlle Lucas-Leclin, Patrick M. Georges, Institut d'Optique (France); Nicolas Michel, Michel M. Krakowski, Alcatel-Thales III-V Lab. (France); Jun Lim, Slawomir Sujecki, Eric C. Larkins, The Univ. of Nottingham (United Kingdom) [7198-59]

Self-aligned tunable high-power broad-area laser diodes, Christophe Moser, Frank Havermeyer, Lawrence Ho, Eric Maye, Onda, Inc. (United States) [7198-60]

High-power semiconductor lasers for applications requiring GHz linewidth source, George B. Venus, Ivan Divliansky, Vadim I. Smirnov, Alexandre Gourevitch, Leonid B. Glebov, College of Optics & Photonics/Univ. of Central Florida (United States) [7198-61]

Wheel profile dynamic-inspection system based on slit-diode laser, Zhang Yu, Wang Li, Xiaorong Gao, Zeyong Wang, Quanke Zhao, Southwest Jiaotong Univ. (China) [7198-62]

Dynamic detection for contact line gradient in electrified railway, Jianping Peng, Li Wang, Xiaorong Gao, Zeyong Wang, Quanke Zhao, Southwest Jiaotong Univ. (China) [7198-63]

Medium-range high-accuracy semiconductor laser range finder, Junewen Chen, Chung-Hua Univ. (Taiwan) [7198-64]

High-spectral brightness pump sources for diode-pumped solid state lasers, Falgun D. Patel, Mark L. Osowski, Robert M. Lammert, Se W. Oh, Chameli Panja, Victor C. Elarde, QPC Lasers, Inc. (United States) [7198-65]

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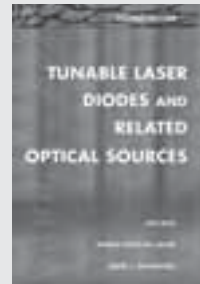
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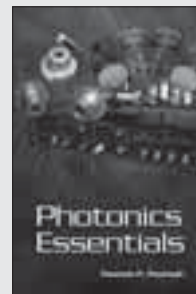
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LASE

Free-Space Laser Communication Technologies XXI

Conference Chair: **Hamid Hemmati**, Jet Propulsion Lab.

Program Committee: **Guy C. Baister**, Oerlikon Space AG (Switzerland); **David Begley**, Ball Aerospace & Technologies Corp.; **Don M. Boroson**, MIT Lincoln Lab.; **Robert T. Carlson**, BAE Systems; **Wayne R. Fenner**, The Aerospace Corp.; **Yoshisada Koyama**, National Institute of Information and Communications Technology (Japan); **Robert Lange**, Tesat-Spacecom GmbH & Co. KG (Germany); **Donald J. Nicholson**, Air Force Research Lab.; **Zoran Sodnik**, European Space Agency (Netherlands); **Morio Toyoshima**, National Institute of Information and Communications Technology (Japan); **Alan E. Willner**, Univ. of Southern California; **Shiro Yamakawa**, Japan Aerospace Exploration Agency (Japan)

Tuesday 27 January

TECHNICAL EVENT

Room: **Fairmont, Hillsborough Room**. **Tues. 7:30 to 9:00 pm**

Laser Communications

Session Chairs **Olga Korotkova**, Univ. of Miami (United States); **Hamid Hemmati**, Jet Propulsion Lab. (United States)

This technical event on Laser Communications will hold its annual meeting in conjunction with the Free-Space Laser Communication Technologies XXI and Atmospheric Propagation of Electromagnetic Waves III conferences. All professionals involved in applications of free-space laser communications and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

Wednesday 28 January

SESSION 1

Room: **Hilton Hotel, Santa Clara Room I** **Wed. 8:30 to 10:00 am**

Invited Session I

Session Chair: **Hamid Hemmati**, Jet Propulsion Lab.

8:30 am: **Technology needs for next-generation space-borne lasercom systems** (*Invited Paper*), Ronald W. Burch, The Boeing Co. (United States) [7199-01]

9:00 am: **Optical data downlinks from Earth-monitoring platforms** (*Invited Paper*), Dirk Giggenbach, DLR Standort Oberpfaffenhofen (Germany) [7199-02]

9:30 am: **Research and development activities on space laser communications in NICT** (*Invited Paper*), Hiroo Kunimori, Yozo Shoji, Morio Toyoshima, Yoshihisa Takayama, National Institute of Information and Communications Technology (Japan) [7199-03]

Coffee Break 10:00 to 10:30 am

LASE PLENARY SESSION

Room: **Montgomery Theater** **Wed. 10:30 am to 12:30 pm**

10:30 am: **A High-Power Fiber Diet**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 2

Room: **Hilton Hotel, Santa Clara Room I** **Wed. 2:00 to 3:00 pm**

Invited Session II

Session Chair: **Hamid Hemmati**, Jet Propulsion Lab.

2:00 pm: **Recent MIT Lincoln Laboratory R&D in optical communications** (*Invited Paper, Presentation Only*), Don M. Boroson, MIT Lincoln Lab. (United States) [7199-04]

2:30 pm: **5.65-Gbps optical inter-satellite communication link** (*Invited Paper*), Stefan U. Seel, Tesat-Spacecom GmbH & Co. KG (Germany) [7199-05]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: **Hilton Hotel, Santa Clara Room I** **Wed. 3:30 to 6:10 pm**

Demonstrations

Session Chair: **Don M. Boroson**, MIT Lincoln Lab.

3:30 pm: **Experimental evaluation of a Radio-on-FSO communication system for multiple RF signal transmission**, Kamugisha R. Kazaura, Pham Dat, Abdelmoula Bekkali, Toshiji Suzuki, Kazuhiko Wakamori, Mitsuyuki Matsumoto, Waseda Univ. (Japan); Takuya Nakamura, Koichi Takahashi, Takeshi Higashino, Yuji Aburakawa, Katsutoshi Tsukamoto, Shozo Komaki, Osaka Univ. (Japan) [7199-06]

3:50 pm: **Compact free-space optical terminal for multi-gigabit signal transmission with a single-mode fiber**, Yoshinori Arimoto, National Institute of Information and Communications Technology (Japan) [7199-07]

4:10 pm: **Aircraft-to-ground unidirectional laser-communications terminal for high-resolution sensors**, Joachim Horwath, DLR Standort Oberpfaffenhofen (Germany); Christian Fuchs, German Aerospace Ctr. (Germany) [7199-08]

4:30 pm: **Demonstration of a high-efficiency free-space optical communications link**, Kevin M. Birnbaum, William H. Farr, Jonathan W. Gin, Bruce Moision, Kevin J. Quirk, Malcolm W. Wright, Jet Propulsion Lab. (United States) [7199-09]

4:50 pm: **Results from the DOLCE (Deep Space Optical Link Communications Experiment) Project**, Guy C. Baister, Thomas Dreischer, Klaus H. Kudielka, Michael Tuechler, Oerlikon Space AG (Switzerland) [7199-10]

5:10 pm: **Robust short-pulse, high-peak-power laser transmitter for optical communications**, Malcolm W. Wright, Jet Propulsion Lab. (United States) [7199-11]

5:30 pm: **Compensation of large-diameter optical system aberrations with spatial light modulators and deformable mirrors**, Hamid Hemmati, Yijiang Chen, Jet Propulsion Lab. (United States) [7199-12]

5:50 pm: **Mid-infrared interband cascade lasers for free-space laser communication**, Alexander Soibel, Cory J. Hill, Malcolm W. Wright, William H. Farr, Jet Propulsion Lab. (United States) [7199-13]

Thursday 29 January

SESSION 4

Room: Hilton Hotel, Santa Clara Room IThurs. 8:20 to 10:00 am

Acquisition, Tracking, and Pointing

Session Chair: Ronald W. Burch, The Boeing Co.

- 8:20 am: **Wide field of regard agile beam free-space-optics communication**, Gil A. Tidhar, Martin Gurovitch, Optigo Systems, Ltd. (Israel) [7199-14]
- 8:40 am: **Continuous laser-beam steering based on EO-ceramic optical-phased array and variable blazed grating**, Jérôme Bourderionnet, Daniel Dolfi, Thales Research & Technology (France); Fayçal Bouamrane, Thomas Bouvet, Stephan Megtert, Ctr. National de la Recherche Scientifique (France) and Thales Research & Technology (France); Matthias Rungenhagen, Hans Dieter Tholl, Diehl BGT Defence GmbH & Co. KG (Germany) [7199-15]
- 9:00 am: **Autonomous access links using laser communications**, Joseph M. Kovalik, Abhijit Biswas, Malcolm W. Wright, Kevin M. Birnbaum, Jeffrey R. Charles, Vachik Garkanian, Jet Propulsion Lab. (United States) [7199-16]
- 9:20 am: **A sub-Hertz vibration isolation system (LFVIP) for a deep-space optical communication transceiver**, Virginio Sannibale, Gerardo G. Ortiz, William H. Farr, Jet Propulsion Lab. (United States) [7199-17]
- 9:40 am: **Fourier transform OPO for nonmechanical beam steering in the 3 to 5- μ m spectral range**, Jérôme Bourderionnet, Arnaud Brignon, Jean-Pierre Huignard, Thales Research & Technology (France) [7199-18]
- Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Hilton Hotel, Santa Clara Room I . . .Thurs. 10:30 am to 12:30 pm

Systems Under Development

Session Chair: William H. Farr, Jet Propulsion Lab.

- 10:30 am: **Canonical deep-space optical communications transceiver**, Gerardo G. Ortiz, William H. Farr, Jet Propulsion Lab. (United States) [7199-19]
- 10:50 am: **An efficient optical design for a 15-cm deep-space communications terminal**, W. Thomas Roberts, Jeffrey R. Charles, Jet Propulsion Lab. (United States) [7199-20]
- 11:10 am: **BER performance of MIMO diffuse free-space optical systems**, Douglas S. Pfeil, Sai Vamsidhar, Timothy P. Kurzweg, Kapil R. Dandekar, Drexel Univ. (United States) [7199-21]
- 11:30 am: **Combined lasercom and laser ranging transponder for Moon and Mars**, Hamid Hemmati, Kevin M. Birnbaum, William H. Farr, Slava G. Turyshev, Jet Propulsion Lab. (United States) [7199-22]
- 11:50 am: **New deformable mirror and experimental setup for free-space optical communication**, Frédéric Rooms, Sebastien Camet, Jean-Francois Curis, ALPAO (France); Julien Charton, Laurent Jocou, Lab. d'Astrophysique de l'Observatoire de Grenoble (France) [7199-32]
- 12:10 pm: **Modified PN code laser modulation technique for laser measurements**, James B. Abshire, Xiaoli Sun, NASA Goddard Space Flight Ctr. (United States) [7199-33]
- Lunch/Exhibition Break 12:30 to 2:20 pm

SESSION 6

Room: Hilton Hotel, Santa Clara Room IThurs. 2:20 to 3:00 pm

Detectors and Receivers

Session Chair: Hamid Hemmati, Jet Propulsion Lab.

- 2:20 pm: **Negative avalanche feedback detectors for photon-counting optical communications**, William H. Farr, Jet Propulsion Lab. (United States) [7199-23]
- 2:40 pm: **Single photon counting NIR linear-mode APD receivers**, George M. Williams, Jr., Voxtel, Inc. (United States) [7199-25]
- Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: Hilton Hotel, Santa Clara Room IThurs. 3:30 to 4:50 pm

Analysis

Session Chair: Abhijit Biswas, Jet Propulsion Lab.

- 3:30 pm: **Virtual array receiver options for 64-ary pulse position modulation (PPM)**, Antonio J. Mendez, Mendez R&D Associates (United States); Vincent J. Hernandez, Lawrence Livermore National Lab. (United States); Robert M. Gagliardi, Univ. of Southern California (United States); Corey V. Bennett, Lawrence Livermore National Lab. (United States) [7199-26]
- 3:50 pm: **Improved bit-error-rate estimation over experimental optical wireless channels**, Mamdouh El Tabach, France Telecom R&D (France); Samir Saoudi, TELECOM Bretagne (France); Patrick Tortelier, Olivier Bouchet, France Telecom R&D (France); Ramesh Pyndiah, TELECOM Bretagne (France) [7199-27]
- 4:10 pm: **Modeling and analysis of optical wireless communication link using traffic signal light with illumination LEDs**, Moonsoo Kang, Chosun Univ. (Korea, Republic of); Chul-Soo Park, A*STAR Institute for Infocomm Research (Singapore); Chung-Ghui Lee, Chosun Univ. (Korea, Republic of) [7199-28]
- 4:30 pm: **Using MIMO transmissions in free-space optical communications in presence of clouds and turbulence**, Zeinab Hajjarian Kashary, Mohsen Kavehrad, The Pennsylvania State Univ. (United States) [7199-29]



Conference 7200 · Hilton Hotel, University Room

Monday-Tuesday 26-27 January 2009 • Proceedings of SPIE Vol. 7200

Atmospheric Propagation of Electromagnetic Waves III

Conference Chair: **Olga Korotkova**, Univ. of Miami

Program Committee: **Larry C. Andrews**, Univ. of Central Florida; **Yahya K. Baykal**, Çankaya Univ. (Turkey); **Aristide C. Dogariu**, College of Optics & Photonics, Univ. of Central Florida; **Frank D. Eaton**, Air Force Research Lab.; **Greg Gbur**, The Univ. of North Carolina at Charlotte; **Alex S. Mahalov**, Arizona State Univ.; **Ronald L. Phillips**, Univ. of Central Florida; **Jixiong Pu**, Hua Qiao Univ. (China); **Robert K. Tyson**, The Univ. of North Carolina at Charlotte; **Daomu Zhao**, Zhejiang Univ. (China)

Monday 26 January

SESSION 1

Room: Hilton Hotel, University Room Mon. 8:00 to 9:50 am

Beam Propagation in the Atmosphere: Theory

Session Chair: **Olga Korotkova**, Univ. of Miami

8:00 am: **Effect of beam types on the scintillations: a review** (*Invited Paper*), Yahya K. Baykal, Halil T. Eyyuboglu, Çankaya Univ. (Turkey); Yangjian Cai, Univ. of Erlangen (Germany) [7200-01]

8:30 am: **The propagation properties of TW-femtosecond multiple laser pulses named "Azimuthons" in air**, Xusheng Zhou, Jifeng Zu, Shanghai Institute of Optics and Fine Mechanics (China) [7200-02]

8:50 am: **Propagation of scalar and vector vortex beams through turbulent atmosphere**, Qiwen Zhan, Joseph W. Haus, Univ. of Dayton (United States) and Ladar and Optical Communications Institute (LOCI) (United States); Wen Cheng, Univ. of Dayton (United States) [7200-03]

9:10 am: **Fluctuations in Stokes parameters of stochastic-electromagnetic beams propagating in atmospheric turbulence**, Serkan Sahin, Olga Korotkova, Univ. of Miami (United States) [7200-04]

9:30 am: **Average received intensity for optical beam of arbitrary field profile after propagation in turbulent atmosphere**, Yahya K. Baykal, Caglar Arpalı, Çankaya Univ. (Turkey) [7200-05]

Coffee Break 9:50 to 10:20 am

SESSION 2

Room: Hilton Hotel, University Room Mon. 10:20 am to 12:00 pm

Characterization and Modeling of Turbulence and General Aspects of EM Wave Propagation in the Atmosphere

Session Chair: **Olga Korotkova**, Univ. of Miami

10:20 am: **Remarks on polarimetric-radiative transfer in atmosphere involving ground reflections**, Saba Mudaliar, Air Force Research Lab. (United States) [7200-07]

10:40 am: **Broad-spectrum optical turbulence assessments from climatological temperature, pressure, humidity, and wind**, Steven Fiorino, Richard Bartell, Matthew J. Krizo, Brandon McClung, Kenneth Moore, Thomas Harris, Robb Randall, Salvatore J. Cusumano, Air Force Institute of Technology (United States) [7200-08]

11:00 am: **Turbulence characterization by using a laser beam wandering in a differential image motion setup: outdoor measurements**, Dario G. Perez, Pontificia Univ. Católica de Valparaíso (Chile); Luciano Zunino, Damian Gulich, Gustavo Funes, Ctr. de Investigaciones Ópticas (Argentina); Alejandro Roldan, Pontificia Univ. Católica de Valparaíso (Chile); Mario Garavaglia, Ctr. de Investigaciones Ópticas (Argentina) [7200-09]

11:20 am: **Cirrus cloud diagnosis using numerical weather-prediction model and a comparison with observations**, Alex S. Mahalov, Arizona State Univ. (United States); Randy Lefevre, ATK Mission Research and Technical Services (United States); Stephen B. Cocks, Kirtland AFB (United States) [7200-10]

11:40 am: **Estimation of the error of tracked object coordinates measurement in conditions of thermal blooming and atmospheric turbulence**, Grigory A. Filimonov, Vadim V. Dudorov, Valeriy V. Kolosov, Institute of Atmospheric Optics (Russian Federation) [7200-27]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: Hilton Hotel, University Room Mon. 1:30 to 3:20 pm

Beam Propagation in the Atmosphere: Simulations and Experiments

Session Chair: **Olga Korotkova**, Univ. of Miami

1:30 pm: **A review of partial spatially coherent beams for free-space optical communications** (*Invited Paper*), David G. Voelz, Xifeng Xiao, New Mexico State Univ. (United States) [7200-11]

2:00 pm: **Analysis and simulation of a fiber bundle method for creating a partial spatially coherent beam**, Xifeng Xiao, Jagan K. Aluguri, New Mexico State Univ. (United States); David G. Voelz, Michigan Technological Univ. (United States) [7200-12]

2:20 pm: **Experimental study of partially coherent vortex beams propagating in a turbulent atmosphere**, Jixiong Pu, Tao Wang, Ziyang Chen, Huaqiao Univ. (China) [7200-13]

2:40 pm: **The filament by phase segmentation spatially for femtosecond laser pulses in air**, Xusheng Zhou, Jifeng Zu, Shanghai Institute of Optics and Fine Mechanics (China) [7200-14]

3:00 pm: **Production and propagation of a modulated optical vortex through atmospheric turbulence**, Marco Scipioni, Robert K. Tyson, Greg Gbur, The Univ. of North Carolina at Charlotte (United States); Jaime Viegas, Univ. do Porto (Portugal) [7200-15]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Hilton Hotel, University Room Mon. 3:50 to 6:10 pm

Mitigation of Atmospheric Effects in Lasercom and Laser Radar Systems

Session Chair: **Olga Korotkova**, Univ. of Miami

3:50 pm: **Suppression of scintillations and beam wandering in free space gigabit rate optical communication based on spectral encoding of a partially coherent beam** (*Invited Paper*), Gennady P. Berman, Alan R. Bishop, Boris M. Chernobrod, Los Alamos National Lab. (United States); Alexandr A. Chumak, Vyacheslav N. Gorshkov, Los Alamos National Lab. (United States) and Institute of Physics (Ukraine) [7200-16]

4:20 pm: **Integrated approach to free-space optical communication** (*Invited Paper*), Jason D. Schmidt, James A. Louthain, Air Force Institute of Technology (United States) [7200-17]

4:50 pm: **Iterative mitigation of atmospheric effects by adaptive optics for free-space optical communications**, Noah H. Schwartz, Vincent Michau, ONERA (France); Frédéric Chazallet, Shaktiware (France); Marie-Thérèse Velluet, ONERA (France) [7200-18]

5:10 pm: **Wave optics simulation study of multiple Gaussian-beam transmitters for free-space optical transmission through turbulence**, Xifeng Xiao, David G. Voelz, New Mexico State Univ. (United States) [7200-19]

5:30 pm: **Discrimination of targets from background of different temperature using two methods in the (3-5) μm and (11-12) μm regions**, Bassaad H. Hamza, Al-Mustansirya Univ. (Iraq) [7200-25]

5:50 pm: **Adaptive control of laser beam with sensing of the guide source channel**, Vladimir P. Lukin, Institute of Atmospheric Optics (Russian Federation) [7200-26]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

The intensity and polarization of stochastic-electromagnetic beams with astigmatism in a turbulent atmosphere, Ziyang Chen, Jixiong Pu, Huaqiao Univ. (China) [7200-21]

Propagation of non-uniformly polarized partially coherent beams in a turbulent atmosphere, Tao Wang, Jixiong Pu, Huaqiao Univ. (China) [7200-22]

Propagation of cross-polarization properties of random beams in turbulent atmosphere, Serkan Sahin, Univ. of Miami (United States); Guowen Zhang, Jixiong Pu, Huaqiao Univ. (China); Olga Korotkova, Univ. of Miami (United States) [7200-23]

Speckle-field simulator characterization, Jared Cordray, Ladar and Optical Communications Institute (United States); Edward A. Watson, Air Force Research Lab. (United States); Igor Anisimov, Ladar and Optical Communications Institute (United States) [7200-24]

TECHNICAL EVENT

Room: Fairmont, Hillsborough Room. Tues. 7:30 to 9:00 pm

Laser Communications

Session Chairs **Olga Korotkova**, Univ. of Miami (United States); **Hamid Hemmati**, Jet Propulsion Lab. (United States)

This technical event on Laser Communications will hold its annual meeting in conjunction with the Free-Space Laser Communication Technologies XXI and Atmospheric Propagation of Electromagnetic Waves III conferences. All professionals involved in applications of free-space laser communications and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.



Conference 7201 · See Individual Sessions for Location

Monday-Thursday 26-29 January 2009 • Proceedings of SPIE Vol. 7201

Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV

Conference Chairs: **Michel Meunier**, École Polytechnique de Montréal (Canada); **Andrew S. Holmes**, Imperial College London (United Kingdom); **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan); **Bo Gu**, IPG Photonics Corp.

Program Committee: **Craig B. Arnold**, Princeton Univ.; **Eric Audouard**, Univ. Jean Monnet Saint-Etienne (France); **Ian W. Boyd**, Univ. College London (United Kingdom); **J. Thomas Dickinson**, Washington State Univ.; **Malcolm C. Gower**, Nanophoton Technologies (United Kingdom); **Guido Hennig**, MDC Max Daetwyler AG (Switzerland); **Lambertus Hesselink**, Stanford Univ.; **Alberto Piqué**, Naval Research Lab.; **Koji Sugioka**, The Institute of Physical and Chemical Research (Japan); **Michael J. Withford**, Macquarie Univ. (Australia)

Monday 26 January

WELCOME

Room: Conv. Ctr. Room F1 Mon. 8:30 to 8:40 am

Session Chair: **Michel Meunier**,
Ecole Polytechnique de Montréal (Canada)

SESSION 1

Room: Conv. Ctr. Room F1 Mon. 8:40 to 10:00 am

Laser Nanofabrication

Session Chair: **Michel Meunier**,
Ecole Polytechnique de Montréal (Canada)

8:40 am: **Nanostructure formation processes in femtosecond laser ablation of thin film surfaces** (*Invited Paper*), Godai Miyaji, Kenzo Miyazaki, Kyoto Univ. (Japan) [7201-01]

9:20 am: **Self-perfection of nanostructures by laser-liquafaction** (*Invited Paper*), Stephen Y. Chou, Princeton Univ. (United States) [7201-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room F1 Mon. 10:30 am to 12:10 pm

Laser Induced Thin Film Formation and Modification

Session Chair: **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan)

10:30 am: **Synthesis of nano-grained MnO₂ thin films by laser ablation**, Malek D. Tabbal, Maya Abi Akl, Samih Isber, American Univ. of Beirut (Lebanon) [7201-04]

10:50 am: **Deposition of nano-composite DNA thin films through thin film ablation**, Steven B. Fairchild, Air Force Research Lab. (United States); Paul T. Murray, Univ. of Dayton Research Institute (United States); Fahima Ouchen, Air Force Research Lab. (United States); Olga A. Shenderova, International Technology Ctr. (United States) [7201-05]

11:10 am: **Investigations of the dynamic response of a thick film absorbing layer during laser-induced forward transfer**, Matt Brown, Nick Kattamis, Craig B. Arnold, Princeton Univ. (United States) [7201-06]

11:30 am: **Laser decal transfer of thin film-like conductive patterns**, Alberto Piqué, Ray C. Auyeung, Heungsoo Kim, Kristin Metkus, Scott A. Mathews, Naval Research Lab. (United States) [7201-07]

11:50 am: **Iterative in-situ optical control of the laser-induced diffusible resistance process for trimming analog microelectronics**, Michel Meunier, Stephane Laforte, Ecole Polytechnique de Montréal (Canada) [7201-08]

Lunch Break 12:10 to 1:40 pm

SESSION 3

Room: Conv. Ctr. Room F1 Mon. 1:40 to 3:10 pm

Laser Micromachining I

Session Chair: **Alberto Piqué**, Naval Research Lab.

1:40 pm: **Health risks of nanoparticulate emissions during laser machining** (*Invited Paper*), Stephan Barcikowski, Laser Zentrum Hannover e.V. (Germany) [7201-09]

2:10 pm: **Advanced micromachining combining ns lasers with water jet-guided laser technology**, Alexandre Pauchard, Kyumin Lee, Nandor Vago, Synova SA (Switzerland) [7201-10]

2:30 pm: **Real-time process control for laser micromachining applications**, Paul D. Apte, Rideo Systems Ltd. (United Kingdom) and Blueacre Technology Ltd. (Ireland); David R. Gillen, Blueacre Technology Ltd. (Ireland) [7201-11]

2:50 pm: **Surface microstructuring of inclined trench structures of silica glass by laser-induced backside wet etching**, Hiroyuki Niino, Yoshizo Kawaguchi, Tadatake Sato, Aiko Narazaki, Ryoza Kurosaki, National Institute of Advanced Industrial Science and Technology (Japan) [7201-12]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Room: Conv. Ctr. Room F1 Mon. 3:40 to 5:20 pm

Laser Micromachining II

Session Chair: **Bo Gu**, IPG Photonics Corp.

3:40 pm: **Entering the era of high speed laser micromachining** (*Invited Paper*), Henry Peng, GE China Technology Ctr. (China) [7201-13]

4:10 pm: **From fundamentals to industrial applications: micromachining with high-average-power picosecond lasers** (*Invited Paper*), Sascha Weiler, Simone Russ, Severin Massa, Christoph Scharfenberg, Uwe Stute, Birgit Faisst, TRUMPF Laser GmbH & Co. KG (Germany) [7201-14]

4:40 pm: **Industrial applications of a fiber-based, high-average-power picosecond laser**, Colin Moorhouse, Coherent Scotland Ltd. (United Kingdom) [7201-15]

5:00 pm: **Programmable picosecond pulse packets for micromachining with multiwatt UV fiber lasers**, Theodore Alekel III, David H. Foster, Jordan Crist, Deep Photonics Corp. (United States) [7201-16]

Tuesday 27 January

SESSION 5

Room: Conv. Ctr. Rooms F1/F2 Tues. 8:00 to 10:10 am

Femtosecond Laser Interaction with Materials and Nanomaterials

Session Chair: **Michel Meunier**,
Ecole Polytechnique de Montréal (Canada)

Joint Session with Conference 7203: Commercial and Biomedical Applications of Ultrafast Lasers IX

- 8:00 am: **Nonequilibrium/metastable high-pressure phase quenching of condensed matters using femtosecond laser-driven shock compression** (*Invited Paper*), Tomokazu Sano, Akio Hirose, Osaka Univ. (Japan) [7201-17]
- 8:30 am: **A Study of Material Removal Rates for Shallow Drilling with an Ultrashort Pulse Laser**, Benjamin R. Campbell, Lucas A. Forster, James A. Moore, Thomas M. Lehecka, Jeffrey G. Thomas, Vladimir V. Semak, The Pennsylvania State Univ. (United States) [7201-18]
- 8:50 am: **Dynamics of femtosecond laser-induced breakdowns in water**, Akihiro Takita, Yoshio Hayasaki, Utsunomiya Univ. (Japan) [7201-19]
- 9:10 am: **Femtosecond laser doping of silicon beyond the solubility limit**, Mark T. Winkler, Meng-Ju Sher, Eric D. Mazur, Harvard Univ. (United States) [7201-20]
- 9:30 am: **Nano-hemi-shell arrays produced by femtosecond laser microprocessing for SERS applications**, Tetsuo Sakai, Keio Univ. (Japan); Eric D. Diebold, Kevin Vora, Harvard Univ. (United States); Yuji Nishizawa, Henry Nugroho, Minoru Obara, Keio Univ. (Japan); Eric D. Mazur, Harvard Univ. (United States) [7201-21]
- 9:50 am: **Near-field nanostructure processing with femtosecond laser excitation: metallic versus dielectric particle**, Yuto Tanaka, Yuji Nishizawa, Tomoya Miyayoshi, Keio Univ. (Japan); Nikolay N. Nedyalkov, Petar A. Atanasov, Keio Univ. (Japan) and Bulgarian Academy of Sciences (Bulgaria); Minoru Obara, Keio Univ. (Japan) [7201-22]
- Coffee Break 10:10 to 10:40 am

SESSION 6

Room: Conv. Ctr. Rooms F1/F2 Tues. 10:40 am to 12:10 pm

Femtosecond Laser Processing of Photonics Devices I

Session Chair: **Koji Sugioka**,
The Institute of Physical and Chemical Research (Japan)

Joint Session with Conference 7203: Commercial and Biomedical Applications of Ultrafast Lasers IX

- 10:40 am: **Discrete optics in femtosecond-laser written waveguide arrays** (*Invited Paper*), Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany) [7201-23]
- 11:10 am: **Volumetric photonic structures fabricated with femtosecond lasers** (*Invited Paper*), Timothy Gerke, Rafael Piestun, Univ. of Colorado at Boulder (United States) [7201-24]
- 11:40 am: **On the use of femtosecond lasers to fabricate small optical instruments made from fused-silica monoliths** (*Invited Paper*), Philippe Bado, Mark A. Dugan, Ali A. Said, Thomas F. Haddock, Translume, Inc. (United States) [7201-25]
- Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION JT1

Room: Conv. Ctr. Rooms F1/F2 Tues. 1:40 to 3:20 pm

Femtosecond Laser Processing

Session Chair: **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

Joint Session with Conference 7203: Commercial and Biomedical Applications of Ultrafast Lasers IX

- 1:40 pm: **Ultrashort pulse laser drilling of metals using a high-repetition rate, high-average-power fiber CPA system** (*Invited Paper*), Antonio Ancona, Univ. degli Studi di Bari (Italy) and Friedrich-Schiller-Univ. of Jena (Germany); Cesar Jauregui, Fabian Röser, Jens Limpert, Stefan Nolte, Friedrich-Schiller-Univ. of Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. of Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7203-33]
- 2:10 pm: **Toward femtosecond laser micromachined opto-fluidic devices for detection and identification of algae** (*Invited Paper*), Yves Bellouard, Vijay K. Pahlwani, Eindhoven Univ. of Technology (Netherlands); Thomas Rohrlack, Norwegian Institute for Water Research (Norway); Ali A. Said, Mark A. Dugan, Philippe Bado, Translume, Inc. (United States) [7203-34]
- 2:40 pm: **Three-dimensional photonic devices fabricated by ultrafast lasers for optical sensing in lab-on-a-chip**, Rebeca Martinez Vazquez, Roberto Osellame, Politecnico di Milano (Italy); Chaitanya Dongre, Hugo J. Hoekstra, Markus Pollnau, Univ. Twente (Netherlands); Hans H. van den Vlekert, Lionix BV (Netherlands); Rob van Weeghel, Zebra Bioscience B.V. (Netherlands); Paul Watts, The Univ. of Hull (United Kingdom); Roberta Ramponi, Giulio Cerullo, Politecnico di Milano (Italy) [7203-35]
- 3:00 pm: **Waveguides with controllable cross-section produced by fs-laser writing using a spatial light modulator**, Alejandro Ruiz de la Cruz, Andrés Ferrer Moreu, Daniel Puerto Garcia, Wojciech Gawelda, Marcial Galván Sosa, Jan Siegel, Francisco Javier Solís Céspedes, Consejo Superior de Investigaciones Científicas (Spain) [7203-36]
- Coffee Break 3:20 to 3:50 pm

SESSION JT2

Room: Conv. Ctr. Rooms F1/F2 Tues. 3:50 to 4:50 pm

Diagnostics of Laser-Written Devices

Session Chair: **Wataru Watanabe**, National Institute of Advanced Industrial Science and Technology (Japan)

Joint Session with Conference 7203: Commercial and Biomedical Applications of Ultrafast Lasers IX

- 3:50 pm: **Local force detection of femtosecond laser-induced stress wave using atomic force microscope**, Yoichiro Hosokawa, Nara Institute of Science and Technology (Japan); Kazunori Okano, Nara Institute of Science and Technology (Japan) and Tohoku Fukushi Univ. (Japan); Hiroshi M. Masuhara, Nara Institute of Science and Technology (Japan) and National Chiao Tung Univ. (Taiwan) [7203-37]
- 4:10 pm: **5D multiphoton microscopy: in-situ diagnostics for ultrafast laser 3D nanofabrication**, Jianzhao Li, Shane M. Eaton, Peter R. Herman, Univ. of Toronto (Canada) [7203-38]
- 4:30 pm: **Optical coherence microscopy for nondestructive 3D imaging of femtosecond laser written structures**, Jiyeon Choi, Kye-Sung Lee, Troy P. Anderson, Jannick P. Rolland, Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States) [7203-39]

Conference 7201

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Development of a tool for nanostructuring and multiphoton imaging with nanojoule femtosecond laser pulses, David Bruneel, Martin Schwarz, Fraunhofer-Institut für Biomedizinische Technik (Germany); Eric Audouard, Lab. Hubert Curien (France); Ronan Le Harzic, Fraunhofer-Institut für Biomedizinische Technik (Germany) [7201-02]

Application of KrCl-excilamp (222 nm) for natural and synthetic diamonds identification, Edward A. Sosnin, Sergei M. Avdeev, Evgenii I. Lipatov, Victor F. Tarasenko, Institute of High Current Electronics (Russian Federation); Yurii N. Novoselov, P.N. Lebedev Physical Institute (Russian Federation) [7201-42]

Large-aperture VUV excilamps for microelectronic applications, Dmitry V. Schitz, Mikhail I. Lomaev, Victor S. Skakun, Victor F. Tarasenko, Institute of High Current Electronics (Russian Federation) [7201-43]

Fabrication of nanostructured ITO thin films on the nanoimprinted glass by pulsed laser deposition, Yasuyuki Akita, Makoto Hosaka, Yuki Sugimoto, Yushi Kato, Yusaburo Ono, Mamoru Yoshimoto, Tokyo Institute of Technology (Japan); Osami Sakata, Japan Synchrotron Radiation Research Institute (Japan); Masahiro Mita, Hideo Oi, Kyodo International Inc. (Japan) [7201-45]

Ablation of aluminum-nitride films by nanosecond and femtosecond laser pulses, Vitaly E. Gruzdev, Robert D. Tzou, Univ. of Missouri, Columbia (United States); Ildar Salakhutdinov, Yuriy Danylyuk, Gregory W. Auner, Erik McCullen, Wayne State Univ. (United States) [7201-46]

Waveguide fabrication with femtosecond laser pulse shaped by computer-generated hologram, Jun'ichi Suzuki, Masahiro Yamaji, Shuhei Tanaka, New Glass Forum (Japan) [7201-47]

Parallel femtosecond laser processing with a computer-generated hologram, Satoshi Hasegawa, Utsunomiya Univ. (Japan) [7201-48]

Multiprobe atomic force nanoelectrical and TERS chemical probing of semiconductor structures, Aaron Lewis, The Hebrew Univ. (Israel); Andrey Ignatov, Hesham Taha, Nanonics Imaging Ltd. (Israel) [7201-49]

Generation of nanostructured surfaces by interfering and no-interfering ultra-short pulse laser processing, Yoshiaki Nakata, Takuya Hiromoto, Noriaki Miyanaga, Osaka Univ. (Japan) [7201-50]

Inflection point of the spectral shifts of the random lasing in dye solution with TiO₂ nanoscatters, Shuzhen Fan, Xingyu Zhang, Qingpu Wang, Chen Zhang, Zhengping Wang, Ruijun Lan, Shandong Univ. (China) [7201-51]

Relation between diffusion constant and particle density in TiO₂ suspended solutions, Chen Zhang, Xingyu Zhang, Qingpu Wang, Shuzhen Fan, Shandong Univ. (China) [7201-52]

Laser polishing of vidicon's glass substrates, S. P. Sidorenko, Ja. V. Ficner, Vadim P. Veiko, A. O. Golubok, Vadim V. Levichev, Vladimir A. Chuiko, Evgeny B. Yakovlev, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [7201-53]

Iterative laser rapid thermal annealing technique for high-precision selective area quantum well intermixing in GaAs/AlGaAs heterostructures, Radoslaw W. Stanowski, Univ. de Sherbrooke (Canada); Hark H. Tan, Chennupati Jagadish, The Australian National Univ. (Australia); Jan J. Dubowski, Univ. de Sherbrooke (Canada) [7201-54]

Wednesday 28 January

SESSION 7

Room: Conv. Ctr. Room F1 Wed. 8:10 to 10:00 am

Laser Lithography and Cleaning

Session Chair: **Andrew S. Holmes**, Imperial College London (United Kingdom)

8:10 am: **Chemical mapping of three-dimensional microstructures fabricated by two-photon polymerization using CARS microscopy** (Invited Paper), Max Zimmerley, Eric O. Potma, Univ. of California, Irvine (United States); Ruben Zadayan, Tommaso Baldacchini, Newport Corp. (United States) [7201-26]

8:40 am: **Interference lithography processes with high-power laser pulses**, Ainara Rodriguez, Miguel Ellman, Isabel Ayerdi, Noemi Pérez, Ctr. de Estudios e Investigaciones Técnicas de Gipuzkoa (Spain); Yury K. Verevkin, Institute of Applied Physics (Russian Federation); Thierry Berthou, Slios Technologies (France); Zuobin Wang, Cardiff Univ. (United Kingdom); ChangSi Peng, Tampere Univ. of Technology (Finland); Santiago M. Olaizola, Ctr. de Estudios e Investigaciones Técnicas de Gipuzkoa (Spain) [7201-27]

9:00 am: **Optical characterization of mask-writing process in bimetallic grayscale photomasks**, James M. Dykes, Glenn H. Chapman, Simon Fraser Univ. (Canada) [7201-28]

9:20 am: **Dynamics of debris from laser-irradiated Sn droplet for EUV lithography light source**, Daisuke Nakamura, Tomoya Akiyama, Akihiko Takahashi, Tatsuo Okada, Kyushu Univ. (Japan) [7201-29]

9:40 am: **Enhancement of cleaning efficiency by geometrical confinement of plasma expansion in the laser-shock cleaning process for nanoscale contaminant removal**, Deoksuk Jang, Joon Ho Oh, Pohang Univ. of Science and Technology (Korea, Republic of); Jong-Myoung Lee, IMT Co. Ltd. (Korea, Republic of); Dongsik Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [7201-30]

Coffee Break 10:00 to 10:30 am

LASE PLENARY SESSION

Room: Montgomery Theater Wed. 10:30 am to 12:30 pm

10:30 am: **A High-Power Fiber Diet**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 8

Room: Conv. Ctr. Room F1 Wed. 2:00 to 3:30 pm

Laser-Induced Surface Treatment

Session Chair: **Craig B. Arnold**, Princeton Univ.

2:00 pm: **News applications in authentication and traceability using ultrafast laser marking** (Invited Paper), Zbigniew Sagan, Benjamin Dusser, ATT Advanced Track & Trace (France) [7201-31]

2:30 pm: **Photochemical decomposition of fluorocarbon polymers with 197-nm excimer laser radiation**, Sharon John, Stephen C. Langford, J. Thomas Dickinson, Washington State Univ. (United States) [7201-32]

2:50 pm: **Selective cell culture on UV-transparent polymer by F2 laser modification**, Yasutaka Hanada, Koji Sugioka, Hiroyuki Kawano, The Institute of Physical and Chemical Research (RIKEN) (Japan); Atsushi Miyawaki, Brain Science Institute (Japan); Katsumi Midorikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) [7201-33]

3:10 pm: **Emission of aluminum ions from oxidized aluminum during 193-nm excimer laser irradiation**, Enamul Khan, Stephen C. Langford, J. Thomas Dickinson, Washington State Univ. (United States) [7201-34]

Coffee Break 3:30 to 4:00 pm

SESSION 9

Room: Conv. Ctr. Room F1 Wed. 4:00 to 6:20 pm

Synthesis and Photonics of Nanoscale Materials

Session Chair: Jan J. Dubowski, Univ. de Sherbrooke (Canada)

4:00 pm: **Atomic layer epitaxy of TiO₂/ZnO multilayers for "Water-Window" attosecond optics**, Yuji Tanaka, Yusuke Masuda, Hiroshi Kumagai, Osaka City Univ. (Japan); Tsutomu Sinagawa, Osaka Municipal Technical Research Institute (Japan); Ataru Kobayashi, Osaka City Univ. (Japan). [7201-35]

4:20 pm: **Fabrication and spectroscopic analyses of nanocrystalline Er³⁺: Y₂O₃ in PMMA host**, Sree Chandrasekharan, John B. Gruber, The Univ. of Texas at San Antonio (United States); Gary W. Burdick, Andrews Univ. (United States); Waldemar Gorski, Maogen Zhang, Dhiraj K. Sardar, The Univ. of Texas at San Antonio (United States). [7201-36]

4:40 pm: **Stochastic models of exciton dynamics in a 5- μ m long single air-suspended single-walled carbon nanotube (SWCNT)**, Yee-fang Xiao, Tam Nhan, Mark Wilson, James Fraser, Queen's Univ. (Canada) [7201-37]

5:00 pm: **Nanometer-scale modification of alkali-halide surfaces by 248-nm excimer laser irradiation**, J. Thomas Dickinson, Washington State Univ. (United States); Kenichi Kimura, National Printing Bureau (Japan). [7201-38]

5:20 pm: **Probing photoelectronic emission from nanostructures based on conductive atomic force microscopy and femtosecond laser illumination**, Nipun Misra, David J. Hwang, Costas P. Grigoropoulos, Univ. of California, Berkeley (United States); Emmanuel Stratakis, Emmanuel Spanakis, Institute of Electronic Structure and Laser of the Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece) and Technological Educational Institute of Crete (Greece); Costas Fotakis, Panagiotis Tzanetakis, Institute of Electronic Structure and Laser of the Foundation for Research and Technology-Hellas (Greece) [7201-39]

5:40 pm: **Mechanisms of particle size reduction by laser irradiation**, Alexander Pyatenko, National Institute of Advanced Industrial Science and Technology (Japan). [7201-40]

6:00 pm: **UV laser-induced quantum well intermixing for fabrication of infrared broadband emitters**, R. Beal, Vincent Aimez, Jan J. Dubowski, Univ. de Sherbrooke (Canada) [7201-55]

Thursday 29 January

SESSION 10

Room: Hilton Hotel, Winchester Rooms I/II Thurs. 2:10 to 5:10 pm

Photovoltaics

Session Chair: Wilhelm Pfleging, Forschungszentrum Karlsruhe (Germany)

Joint Session with Conference 7202: Laser-Based Micro- and Nano-Packaging and Assembly III
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2:10 pm: **Novel laser technologies for crystalline silicon solar cell production (Invited Paper)**, Andreas Grohe, Jan F. Nekarda, Annerose Knorz, Ulrich Jäger, Ralf Preu, Fraunhofer-Institut für Solare Energiesysteme (Germany) [7202-24]

2:40 pm: **Effects of pulse duration on the ns-laser pulse induced removal of thin film materials used in photovoltaics**, James M. Bovatsek, Ashwini Tamhankar, Rajesh S. Patel, Newport Spectra-Physics (United States); Nadezhda M. Bulgakova, Institute of Thermophysics (Russian Federation); Jörn Bonse, Newport Spectra-Physics GmbH (Germany) [7201-41]

3:00 pm: **Thin-layer ablation with lasers of different beam profiles: energy efficiency and over filling factor**, Keming Du, EdgeWave GmbH (Germany) [7202-25]

3:20 pm: **Optical characterization of the heat-affected zone in laser patterning of thin film a-Si:H**, Carlos L. Molpeceres, Monica Colina, Miguel Holgado, Miguel Morales, Isabel Sanchez, Sara Lauzurica, Juan J. Garcia-Ballesteros, José L. Ocaña, Univ. Politécnica de Madrid (Spain) [7202-26]

Coffee Break :3:20 to 3:40 pm

4:00 pm: **Laser-processing for high-efficiency silicon solar cells (Invited Paper)**, Peter Engelhart, Q-Cells AG (Germany) [7202-27]

4:30 pm: **Laser concepts and processes for the industrial solar-cell production**, Roland M. Mayerhofer, Michael Nardozzi, Rofin-Sinar Inc. (United States); Richard Hendel, Carl Baasel Lasertechnik GmbH & Co. KG (Germany) [7202-28]

4:50 pm: **Efficient production processes for solar cells with application-optimized laser-beam profiles**, Dirk Hauschild, Oliver Homburg, Thomas Mitra, Mikhail M. Ivanenko, Manfred Jarczyński, Jens Meinschien, Andreas Bayer, Vitalij N. Lissotschenko, LIMO Lissotschenko Mikroskopik GmbH (Germany) [7202-29]

Laser-Based Micro- and Nano-Packaging and Assembly III

Conference Chairs: **Wilhelm Pfleging**, Forschungszentrum Karlsruhe (Germany); **Yongfeng Lu**, Univ. of Nebraska/Lincoln; **Kunihiko Washio**, Paradigm Laser Research Ltd (Japan)

Conference Co-Chairs: **Willem Hoving**, XiO Photonics (Netherlands); **Jun Amako**, Seiko Epson Corp. (Japan)

Program Committee: **Friedrich G. Bachmann**, Rofin-Sinar Laser GmbH (Germany); **Dieter Bäuerle**, Johannes Kepler Univ. Linz (Austria); **Shaochen Chen**, The Univ. of Texas at Austin; **Ramona Eberhardt**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Costas P. Grigoropoulos**, Univ. of California/Berkeley; **Bo Gu**, IPG Photonics Corp.; **Matthew Henry**, Laser Materials Processing Specialist (United Kingdom); **Martin F. Jensen**, Danish Technological Institute (Denmark); **Nam Seong Kim**, EO Technics (South Korea); **Thomas Klotzbucher**, Institut für Mikrotechnik Mainz GmbH (Germany); **Udo Klotzbach**, Fraunhofer-Institut für Werkstoff- und Strahltechnik (Germany); **Xinbing Liu**, Panasonic Technologies Co.; **Tomoaki Matsushima**, Panasonic Electric Works Co., Ltd. (Japan); **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany); **Marius Przybylski**, ATL Lasertechnik GmbH (Germany); **Gurinder P. Singh**, Hitachi Global Storage Technologies; **Koji Sugioka**, The Institute of Physical and Chemical Research (Japan); **Xiaoyan Zeng**, Huazhong Univ. of Science and Technology (China)

Wednesday 28 January

SESSION 1

Room: Hilton Hotel, Winchester Rooms I/IIWed. 8:20 to 10:00 am

Optical Components and Devices

Session Chair: **Willem Hoving**, XiO Photonics (Netherlands)

8:20 am: **Integration of micro-optics and microfluidics in a glass chip by fs-laser for opto-fluidic applications** (*Invited Paper*), Roberto Osellame, Rebeca Martinez Vazquez, Paolo Laporta, Roberta Ramponi, Giulio Cerullo, Politecnico di Milano (Italy)[7202-01]

8:50 am: **Parametric investigation of solder bumping for assembly of optical components**, Thomas Burkhardt, Marcel Hornaff, Erik Beckert, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)[7202-02]

9:10 am: **New packaging concepts for highly stable laser-diode modules** (*Invited Paper*), Guido F. Bonati, Ekkehard Werner, JENOPTIK Laserdiode GmbH (Germany); Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)[7202-03]

9:40 am: **Laser splicing of end caps: process requirements in high-power laser applications**, Steffen Boehme, Erik Beckert, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)[7202-04]

Coffee Break10:00 to 10:30 am

LASE PLENARY SESSION

Room: Montgomery Theater Wed. 10:30 am to 12:30 pm

10:30 am: **A High-Power Fiber Diet**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

Lunch/Exhibition Break. 12:30 to 1:50 pm

SESSION 2

Room: Hilton Hotel, Winchester Rooms I/IIWed. 1:50 to 3:40 pm

Direct-write Processing and Surface Modification

Session Chair: **Yongfeng Lu**, Univ. of Nebraska, Lincoln

1:50 pm: **Submicron writing by laser irradiation on metal nano-particle dispersed films toward flexible electronics** (*Invited Paper*), Akira Watanabe, Mohammad Aminuzzaman, Tokuji Miyashita, Tohoku Univ. (Japan)[7202-05]

2:20 pm: **Laser-assisted structuring and modification of LiCoO₂ thin films**, Wilhelm Pfleging, Robert Kohler, Johannes Proell, Sven Ulrich, Bernt Ketterer, Vanessa Trouillet, Sylvio Indris, Forschungszentrum Karlsruhe (Germany); Marius Przybylski, ATL Lasertechnik GmbH (Germany)[7202-06]

2:40 pm: **Fabrication of ferroelectric Pb(Zr,Ti)O₃ thin films on Si substrates by excimer laser lift-off technique**, Tomoaki Matsushima, Norihiro Yamauchi, Kazuyuki Yamae, Kenihiro Tanaka, Masao Kubo, Matsushita Electric Works, Ltd. (Japan); Kiyotaka Wasa, Isaku Kanno, Kyoto Univ. (Japan)[7202-07]

3:00 pm: **Controlled-growth of single-walled carbon nanotubes using optical near-field effects**, Wei Xiong, Y. S. Zhou, M. M. Samani, W. Q. Yang, Kaijun Yi, Xiangnan He, Yongfeng Lu, Univ. of Nebraska, Lincoln (United States)[7202-08]

3:20 pm: **Local modification of ceramic surfaces by a laser-induced cladding process**, Sabine Schreck, Magnus Rohde, Forschungszentrum Karlsruhe (Germany)[7202-09]

Coffee Break3:40 to 4:00 pm

SESSION 3

Room: Hilton Hotel, Winchester Rooms I/IIWed. 4:00 to 5:40 pm

Modeling and Characterization

Session Chair: **Costas P. Grigoropoulos**, Univ. of California, Berkeley

4:00 pm: **Multiscale modeling of phase changes during femtosecond laser metal interaction** (*Invited Paper*), Lan Jiang, Xin Li, Beijing Institute of Technology (China); Hai-Lung Tsai, Missouri Univ. of Science and Technology (United States)[7202-10]

4:30 pm: **Comprehensive laser beam and optics characterization for applications in material processing** (*Invited Paper*), Klaus Mann, Laser-Lab. Göttingen e.V. (Germany)[7202-11]

5:00 pm: **Laser-induced breakdown spectroscopy with high-detection sensitivity**, Xiaokang Shen, Hao Ling, Yongfeng Lu, Univ. of Nebraska, Lincoln (United States)[7202-12]

5:20 pm: **Raman characterization of residual stresses with nanoscale spatial resolution in silicon nanostructures using tip-enhanced Raman spectroscopy**, Xiangnan He, Kaijun Yi, Yongfeng Lu, Univ. of Nebraska, Lincoln (United States)[7202-13]

Thursday 29 January

SESSION 4

Room: Hilton Hotel, Winchester Rooms I/IIThurs. 8:20 to 10:10 am

Processes for MEMS

Session Chair: **Kunihiko Washio**,
Paradigm Laser Research Ltd (Japan)

- 8:20 am: **Low-stress dicing assisted by pulsed laser for multilayer MEMS** (*Invited Paper*), Masayuki Fujita, Yusaku Izawa, Yosuke Tsurumi, Osaka Univ. (Japan); Shuji Tanaka, Hideyuki Fukushi, Tohoku Univ. (Japan); Keiichi Sueda, Yoshiki Nakata, Noriaki Miyanaga, Osaka Univ. (Japan); Masayoshi Esashi, Tohoku Univ. (Japan)[7202-14]
- 8:50 am: **High-quality laser-cleaving process for mono- and polycrystalline silicon**, Rainer Kling, Oliver Haupt, Andreas Ostendorf, Laser Zentrum Hannover e.V. (Germany)[7202-15]
- 9:10 am: **Fiber-laser microjoining for novel dissimilar-material combinations**, Steffen Ehrenmann, Fraunhofer Ctr. for Laser Technology (United States); Rahul Patwa, Hans Herfurth, Stefan W. Heinemann, Fraunhofer USA Inc. (United States); Gregory W. Auner, G. L. Georgiev, Golam Newaz, Ron J. Baird, Wayne State Univ. (United States)[7202-16]
- 9:30 am: **Laser-based microbonding using hot melt adhesives**, Stefan Böhm, Gregor Hemken, Technische Univ. Braunschweig (Germany)[7202-17]
- 9:50 am: **Laser soldering of enameled wires**, Stefan Böhm, Gregor Hemken, Technische Univ. Braunschweig (Germany)[7202-18]
- Coffee Break10:10 to 10:40 am

SESSION 5

Room: Hilton Hotel, Winchester Rooms I/IIThurs. 10:40 am to 12:40 pm

Micro- and Nanomachining

Session Chair: **Jun Amako**, Seiko Epson Corp. (Japan)

- 10:40 am: **Large-area plasmonics structures fabricated by laser nanopatterning and their applications** (*Invited Paper*), Minghui Hong, National Univ. of Singapore (Singapore) and Data Storage Institute (Singapore); Boris S. Luk'yanchuk, Luping Shi, Chong-Tow Chong, Data Storage Institute (Singapore)[7202-19]
- 11:10 am: **Subwavelength resist patterning using liquid-immersion interference exposure with a deep-UV holographic grating**, Daisuke Sawaki, Jun Amako, Seiko Epson Corp. (Japan)[7202-20]
- 11:30 am: **Micro-scale large-area UV laser processing**, Ludolf Herbst, Jan Brune, Coherent GmbH (Germany)[7202-21]
- 11:50 am: **Micro ID marking for semiconductor chips: recent progress and future prospects** (*Invited Paper*), Akira Mori, Komatsu Engineering Co., Ltd. (Japan)[7202-22]
- 12:20 pm: **Variable time delay of picosecond double pulses for micromachining**, Rainer Kling, Oliver Suttman, Bodo Wojakowski, Ulrich Klug, Laser Zentrum Hannover e.V. (Germany); Andreas Ostendorf, Ruhr-Univ. Bochum (Germany)[7202-23]
- Lunch/Exhibition Break12:40 to 2:10 pm

SESSION 6

Room: Hilton Hotel, Winchester Rooms I/IIThurs. 2:10 to 5:10 pm

Photovoltaics

Session Chair: **Wilhelm Pflöging**,
Forschungszentrum Karlsruhe (Germany)

Joint Session with Conference 7201: Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV

- 2:10 pm: **Novel laser technologies for crystalline silicon solar cell production** (*Invited Paper*), Andreas Grohe, Jan F. Nekarda, Annerose Knorz, Ulrich Jäger, Ralf Preu, Fraunhofer-Institut für Solare Energiesysteme (Germany)[7202-24]
- 2:40 pm: **Effects of pulse duration on the ns-laser pulse induced removal of thin film materials used in photovoltaics**, James M. Bovatsek, Ashwini Tamhankar, Rajesh S. Patel, Newport Spectra-Physics (United States); Nadezhda M. Bulgakova, Institute of Thermophysics (Russian Federation); Jörn Bonse, Newport Spectra-Physics GmbH (Germany)[7201-41]
- 3:00 pm: **Thin-layer ablation with lasers of different beam profiles: energy efficiency and over filling factor**, Keming Du, EdgeWave GmbH (Germany)[7202-25]
- 3:20 pm: **Optical characterization of the heat-affected zone in laser patterning of thin film a-Si:H**, Carlos L. Molpeceres, Monica Colina, Miguel Holgado, Miguel Morales, Isabel Sanchez, Sara Lauzurica, Juan J. Garcia-Ballesteros, José L. Ocaña, Univ. Politécnica de Madrid (Spain)[7202-26]
- Coffee Break3:40 to 4:00 pm
- 4:00 pm: **Laser-processing for high-efficiency silicon solar cells** (*Invited Paper*), Peter Engelhart, Q-Cells AG (Germany)[7202-27]
- 4:30 pm: **Laser concepts and processes for the industrial solar-cell production**, Roland M. Mayerhofer, Michael Nardozzi, Rofin-Sinar Inc. (United States); Richard Hendel, Carl Baasel Lasertechnik GmbH & Co. KG (Germany)[7202-28]
- 4:50 pm: **Efficient production processes for solar cells with application-optimized laser-beam profiles**, Dirk Hauschild, Oliver Homburg, Thomas Mitra, Mikhail M. Ivanenko, Manfred Jarczyński, Jens Meinschien, Andreas Bayer, Vitalij N. Lissotschenko, LIMO Lissotschenko Mikroskopik GmbH (Germany)[7202-29]



Conference 7203 · See Individual Sessions for Location

Sunday-Wednesday 25-28 January 2009 • Proceedings of SPIE Vol. 7203

Commercial and Biomedical Applications of Ultrafast Lasers IX

Conference Chairs: Joseph Neev, JYN Industries Inc.; Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany); Rick P. Trebino, Georgia Institute of Technology

Program Committee: Samer Banna, Brookhaven National Lab.; James E. Carey III, SiOnyx, Inc.; Donald J. Harter, IMRA America, Inc.; Denise M. Krol, Univ. of California/Davis; Holger Lubatschowski, Laser Zentrum Hannover e.V. (Germany); Eric D. Mazur, Harvard Univ.; Howard M. Milchberg, Univ. of Maryland/College Park; Eric P. Mottay, Amplitude Systemes (France); Levi Schachter, Technion-Israel Institute of Technology (Israel); Christopher B. Schaffer, Cornell Univ.; Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany); Wataru Watanabe, National Institute of Advanced Industrial Science and Technology (Japan); Michael J. Withford, Macquarie Univ. (Australia)

SPIE and the organizers gratefully acknowledge the following conference cosponsors:



Sunday 25 January

WELCOME

Room: Conv. Ctr. Room C3 Sun. 8:30 am to 8:40 pm

Session Chairs: Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany); Joseph Neev, JYN Industries Inc.

SESSION 1

Room: Conv. Ctr. Room C3 Sun. 8:40 to 10:00 am

Light Interaction With Cells and Plasmonics Ablation

Session Chair: Joseph Neev, JYN Industries Inc.

8:40 am: **Femtosecond laser irradiation of near-infrared absorbing nanoparticles in tissue phantoms**, Amit S. Paranjape, Li Ma, Jinze Qiu, Keith P. Johnston, Shaochen Chen, Thomas E. Milner, The Univ. of Texas at Austin (United States) [7203-01]

9:00 am: **Modeling the nanoplasmonics-enhanced ultrafast laser interaction on biological tissue**, Etienne Boulais, Guillaume Poulin, Michel Meunier, Ecole Polytechnique de Montréal (Canada) [7203-02]

9:20 am: **Selective cellular membrane ablation by the enhanced near-field scattering of femtosecond laser light by membrane-bound gold nanostructures**, Daniel S. Eversole, Ozgur Ekici, Rick Harrison, Nicholas J. Durr, Adela Ben-Yakar, The Univ. of Texas at Austin (United States) [7203-03]

9:40 am: **Fs-laser-induced reactive oxygen species formation during opto-perforation for cell transfection**, Judith Baumgart, Kai Küttemeyer, Laser Zentrum Hannover e.V. (Germany); Willem Bintig, Anaclet Ngezahayo, Wolfgang Ertmer, Leibniz Univ. Hannover (Germany); Holger Lubatschowski, Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany) [7203-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room C3 Sun. 10:30 am to 12:00 pm

Multiphoton Imaging and Guided Surgery

Session Chair: Alfred Vogel, Univ. zu Lübeck (Germany)

10:30 am: **New developments in two-photon analysis of human skin in vivo** (*Invited Paper*), Iris Riemann, Martin Schwarz, Frank Stracke, Alexander Ehlers, Ronan Le Harzic, Fraunhofer-Institut für Biomedizinische Technik (Germany) [7203-05]

11:00 am: **OCT-aided femtosecond laser micromachining device**, Ole Massow, Laser Zentrum Hannover e.V. (Germany); Fabian Will, Holger Lubatschowski, Rowiak GmbH (Germany) [7203-06]

11:20 am: **Multiphoton fluorescence microscopy using compact femtosecond fiber laser**, Cheryl Zhan, Chulmin Joo, Siavash Yazdanfar, GE Global Research (United States); Mikhail Berezin, Sam Achilefu, Washington Univ. in St. Louis School of Medicine (United States) [7203-07]

11:40 am: **Near-infrared femtosecond laser ablation of urinary calculi with submicron debris**, Jinze Qiu, The Univ. of Texas at Austin (United States); Joel M. Teichman, The Univ. of British Columbia (Canada); Roman V. Kuranov, Austin B. McElroy, Volcano Corp. (United States); Tianyi Wang, Amit S. Paranjape, Thomas E. Milner, The Univ. of Texas at Austin (United States) [7203-08]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room C3 Sun. 1:30 to 3:50 pm

Laser Application in Micro-Organisms and Biotechnology

Session Chair: Alexander Heisterkamp, Laser Zentrum Hannover e.V. (Germany)

1:30 pm: **Femtosecond-laser nano-axotomy lab-on-a-chip for in-vivo nerve regeneration studies** (*Invited Paper*), Samuel X. Guo, Frederic G. Bourgeois, The Univ. of Texas at Austin (United States); Trushal Chokshi, Univ. of Michigan (United States); Nicholas J. Durr, The Univ. of Texas at Austin (United States); Massimo Hilliard, The Univ. of Queensland (Australia); Nikos Chronis, Univ. of Michigan (United States); Adela Ben-Yakar, The Univ. of Texas at Austin (United States) [7203-09]

2:00 pm: **Probing cilia-driven flow in living embryos using femtosecond laser ablation and fast imaging** (*Invited Paper*), Willy Supatto, Scott E. Fraser, Julien Vermot, California Institute of Technology (United States) [7203-10]

2:30 pm: **The femtosecond laser scalpel for proteomic and metabolomic mass spectrometry**, Christine L. Kalcic, Tissa C. Gunaratne, Gavin E. Reid, A. Daniel Jones, Marcos M. Dantus, Michigan State Univ. (United States) [7203-11]

2:50 pm: **Ablation of targeted neural processes in the zebrafish hindbrain using femtosecond laser pulses** (*Invited Paper*), Jennifer Shum, Minoru Koyama, Francesca Minale, Nozomi Nishimura, Joseph Fetcho, Christopher B. Schaffer, Cornell Univ. (United States) [7203-41]

3:20 pm: **High-throughput on-chip In vivo neural regeneration studies using femtosecond laser nano-surgery and microfluidics** (*Invited Paper*), C. Rohde, C. Gilleland, C. Samara, F. Zeng, Mehmet F. Yanik, Massachusetts Institute of Technology (United States) [7203-42]

Monday 26 January

SESSION 4

Room: Conv. Ctr. Room F2 Mon. 8:30 to 10:00 am

Laser Direct-Written Devices I

Session Chair: Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany)

8:30 am: **Femtosecond laser writing of integrated Bragg-grating waveguides and microfluidic channels for optofluidic sensing**, Jason R. Grenier, Valeria A. Maselli, Stephen Ho, Shicong Yang, Peter R. Herman, Univ. of Toronto (Canada) [7203-12]

8:50 am: **Femtosecond laser direct written diffractive optical elements and their integration in oxide glass**, Jiyeon Choi, Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States) [7203-13]

9:10 am: **Evanescence coupled fs laser-written type-II waveguide array in lithium niobate**, Matthias Heinrich, Felix Dreisow, Alexander Szameit, Jens U. Thomas, Sven Döring, Friedrich-Schiller-Univ. Jena (Germany); Antonio Ancona, Univ. degli Studi di Bari (Italy); Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7203-14]

9:30 am: **Integrating optics and micro-fluidic channels using femtosecond laser irradiation** (*Invited Paper*), Troy P. Anderson, M. Ramme, College of Optics & Photonics/Univ. of Central Florida (United States); Nathan Carlie, Clemson Univ. (United States); Jiyeon Choi, C. Faris, College of Optics & Photonics/Univ. of Central Florida (United States); Laeticia C. Petit, Kathleen Richardson, Clemson Univ. (United States); Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States) [7203-15]

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room F2 Mon. 10:30 am to 12:10 pm

Laser Direct-Written Devices II

Session Chair: Denise M. Krol, Univ. of California, Davis

10:30 am: **Interaction of ultrashort IR-laser pulses with PTR glass: fundamental mechanisms and applications**, Leo A. Siiman, Julien Lumeau, Leonid B. Glebov, Univ. of Central Florida (United States) [7203-16]

10:50 am: **Self imaging in segmented waveguide arrays**, Matthias Heinrich, Alexander Szameit, Felix Dreisow, Friedrich-Schiller-Univ. Jena (Germany); Frederic Louradour, Eric Suran, XLIM Institut de Recherche (France); Thomas Pertsch, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Alain Bathelémy, XLIM Institut de Recherche (France); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7203-17]

11:10 am: **Femtosecond laser written chirped fiber Bragg gratings**, Christian Voigtländer, Jens U. Thomas, Elodie Wikszak, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [7203-18]

11:30 am: **High-strength fused-silica flexures manufactured by femtosecond laser**, Yves Bellouard, Eindhoven Univ. of Technology (Netherlands); Ali A. Said, Mark A. Dugan, Philippe Bado, Translume, Inc. (United States) [7203-19]

11:50 am: **Density modulation of transparent polymers by irradiation of femtosecond laser**, Hiroyuki Mochizuki, Wataru Watanabe, National Institute of Advanced Industrial Science and Technology (Japan); Yasuyuki Ozeki, Kazuyoshi Itoh, Osaka Univ. (Japan); Katsumi Matsuda, Satoshi Hirono, Omron Corp. (Japan) [7203-20]

Lunch Break 12:10 to 1:40 pm

SESSION 6

Room: Conv. Ctr. Room F2 Mon. 1:40 to 3:20 pm

Interaction of Matter with Ultrashort Pulses

Session Chair: Howard M. Milchberg, Univ. of Maryland, College Park

1:40 pm: **Femtosecond-laser surface structuring of biocompatible metals**, Anatoliy Y. Vorobyev, Chunlei Guo, Univ. of Rochester (United States) [7203-21]

2:00 pm: **Trapping gas bubble in water with tightly focused ultrashort laser pulses**, Sergey Oshemkov, Pixar Technology Ltd. (Israel); Dvorkin Lev, Lasermax Engineering Ltd. (Israel); Vladimir Dmitriev, Pixar Technology Ltd. (Israel) [7203-22]

2:20 pm: **Ultrafast imaging of plasmas produced in conditions of femtosecond waveguide writing in dielectrics**, Wojciech Gawelda, Daniel Puerto Garcia, Jan Siegel, Alejandro Ruiz de la Cruz, Andrés Ferrer Moreu, Marcial Galván Sosa, Francisco Javier Solís Céspedes, Consejo Superior de Investigaciones Científicas (Spain) [7203-23]

2:40 pm: **High-speed structuring of CIS thin-film solar cells with picosecond laser ablation**, Heinz P. Huber, Marina Englmaier, Matthias Kemnitzner, Andreas Heiss, Munich Univ. of Applied Sciences (Germany) [7203-24]

3:00 pm: **Nanosecond laser-induced low-density plasmas: a new regime for nanomorphing in bulk dielectrics**, Alfred Vogel, Norbert Linz, Sebastian Freidank, Joachim Noack, Univ. zu Lübeck (Germany) [7203-25]

Coffee Break 3:20 to 3:50 pm

SESSION 7

Room: Conv. Ctr. Room F2 Mon. 3:50 to 6:30 pm

Laser Sources and Characterization

Session Chair: Rick P. Trebino, Georgia Institute of Technology

3:50 pm: **Ultrafast Yb:YAG thin-disk oscillator with pulse energies exceeding 25 μ J suitable for efficient ablation with negligible heat effects**, Joerg Neuhaus, Univ. of Konstanz (Germany); Dominik Bauer, TRUMPF Laser GmbH & Co. KG (Germany) and Univ. of Konstanz (Germany); Christoph Scharfenberg, Jochen Kleinbauer, Alexander Killi, Sascha Weiler, Dirk H. Sutter, TRUMPF Laser GmbH & Co. KG (Germany); Thomas Dekorsy, Univ. of Konstanz (Germany) [7203-26]

4:10 pm: **High-energy and high-power Yb:KGW femtosecond regenerative amplifier**, Taisuke Miura, Shinji Ito, OMRON Laserfront Inc. (Japan) [7203-27]

4:30 pm: **Ultrafast dual-laser system for picosecond acoustics**, Eric P. Mottay, Pierre Rigail, Amplitude Systemes (France); Claire Bastianelli, Sebastien Ermeueux, ALPhANOV (France); Clement Rossignol, Jean-Michel Rampoux, Stefan Dilhaire, Univ. Bordeaux I (France) [7203-28]

4:50 pm: **Femtosecond fiber laser system for medical applications**, Clemens Hönninger, JT Optical Engine GmbH & Co. KG (Germany); Marco Plötner, Bürend Ortac, Roland Ackermann, Robert Kammel, Jens Limpert, Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7203-29]

5:10 pm: **Measuring the spatiotemporal electric field of tightly focused ultrashort pulses with submicron spatial resolution**, Pamela R. Bowlan, Georgia Institute of Technology (United States); Ulrike Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Rick P. Trebino, Georgia Institute of Technology (United States); Uwe Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7203-30]

5:30 pm: **When shorter is better**, Marcos M. Dantus, Michigan State Univ. (United States) and BioPhotonic Solutions Inc. (United States) [7203-31]

5:50 pm: **Single grism pulse compressor**, Vikrant K. Chauhan, Pamela R. Bowlan, Georgia Institute of Technology (United States); Edward Miesak, Lockheed Martin Corp. (United States); Steve Kane, HORIBA Jobin Yvon, Inc. (United States); Rick P. Trebino, Georgia Institute of Technology (United States) [7203-32]

6:10 pm: **Tunable broadband Ti:sapphire laser for OCT and two-photon microscopy**, Gregory J. Taft, Kevin M. Shea, Kapteyn-Murnane Labs., Inc. (United States); Margaret M. Murnane, Henry C. Kapteyn, Univ. of Colorado at Boulder (United States) [7203-40]

Tuesday 27 January

SESSION JT1

Room: Conv. Ctr. Rooms F1/F2 Tues. 8:00 to 10:10 am

Femtosecond Laser Interaction with Materials and Nanomaterials

Session Chair: Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Joint Session with Conference 7201: Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV

8:00 am: **Nonequilibrium/metastable high-pressure phase quenching of condensed matters using femtosecond laser-driven shock compression (Invited Paper)**, Tomokazu Sano, Akio Hirose, Osaka Univ. (Japan) [7201-17]

8:30 am: **A Study of Material Removal Rates for Shallow Drilling with an Ultrashort Pulse Laser**, Benjamin R. Campbell, Lucas A. Forster, James A. Moore, Thomas M. Lehecka, Jeffrey G. Thomas, Vladimir V. Semak, The Pennsylvania State Univ. (United States) [7201-18]

8:50 am: **Dynamics of femtosecond laser-induced breakdowns in water**, Akihiro Takita, Yoshio Hayasaki, Utsunomiya Univ. (Japan) [7201-19]

9:10 am: **Femtosecond laser doping of silicon beyond the solubility limit**, Mark T. Winkler, Meng-Ju Sher, Eric D. Mazur, Harvard Univ. (United States) [7201-20]

9:30 am: **Nano-hemi-shell arrays produced by femtosecond laser microprocessing for SERS applications**, Tetsuo Sakai, Keio Univ. (Japan); Eric D. Diebold, Kevin Vora, Harvard Univ. (United States); Yuji Nishizawa, Henry Nugroho, Minoru Obara, Keio Univ. (Japan); Eric D. Mazur, Harvard Univ. (United States) [7201-21]

9:50 am: **Near-field nanostructure processing with femtosecond laser excitation: metallic versus dielectric particle**, Yuto Tanaka, Yuji Nishizawa, Tomoya Miyayoshi, Keio Univ. (Japan); Nikolay N. Nedyalkov, Petar A. Atanasov, Keio Univ. (Japan) and Bulgarian Academy of Sciences (Bulgaria); Minoru Obara, Keio Univ. (Japan) [7201-22]

Coffee Break 10:10 to 10:40 am

Conference 7203

SESSION JT2

Room: Conv. Ctr. Rooms F1/F2 Tues. 10:40 am to 12:10 pm

Femtosecond Laser Processing of Photonics Devices I

Session Chair: **Koji Sugioka**,
The Institute of Physical and Chemical Research (Japan)

Joint Session with Conference 7201: Laser Applications in
Microelectronic and Optoelectronic Manufacturing XIV

10:40 am: **Discrete optics in femtosecond-laser written waveguide arrays** (*Invited Paper*), Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany) [7201-23]

11:10 am: **Volumetric photonic structures fabricated with femtosecond lasers** (*Invited Paper*), Timothy Gerke, Rafael Plestun, Univ. of Colorado at Boulder (United States) [7201-24]

11:40 am: **On the use of femtosecond lasers to fabricate small optical instruments made from fused-silica monoliths** (*Invited Paper*), Philippe Bado, Mark A. Dugan, Ali A. Said, Thomas F. Haddock, Translume, Inc. (United States) [7201-25]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 8

Room: Conv. Ctr. Rooms F1/F2 Tues. 1:40 to 3:20 pm

Femtosecond Laser Processing

Session Chair: **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

Joint Session with Conference 7201: Laser Applications in
Microelectronic and Optoelectronic Manufacturing XIV

1:40 pm: **Ultrashort pulse laser drilling of metals using a high-repetition rate, high-average-power fiber CPA system** (*Invited Paper*), Antonio Ancona, Univ. degli Studi di Bari (Italy) and Friedrich-Schiller-Univ. of Jena (Germany); Cesar Jauregui, Fabian Röser, Jens Limpert, Stefan Nolte, Friedrich-Schiller-Univ. of Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. of Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7203-33]

2:10 pm: **Toward femtosecond laser micromachined opto-fluidic devices for detection and identification of algae** (*Invited Paper*), Yves Bellouard, Vijay K. Pahlwani, Eindhoven Univ. of Technology (Netherlands); Thomas Rohrlack, Norwegian Institute for Water Research (Norway); Ali A. Said, Mark A. Dugan, Philippe Bado, Translume, Inc. (United States) [7203-34]

2:40 pm: **Three-dimensional photonic devices fabricated by ultrafast lasers for optical sensing in lab-on-a-chip**, Rebeca Martinez Vazquez, Roberto Osellame, Politecnico di Milano (Italy); Chaitanya Dongre, Hugo J. Hoekstra, Markus Pollnau, Univ. Twente (Netherlands); Hans H. van den Vlekert, Lionix BV (Netherlands); Rob van Weeghel, Zebra Bioscience B.V. (Netherlands); Paul Watts, The Univ. of Hull (United Kingdom); Roberta Ramponi, Giulio Cerullo, Politecnico di Milano (Italy) [7203-35]

3:00 pm: **Waveguides with controllable cross-section produced by fs-laser writing using a spatial light modulator**, Alejandro Ruiz de la Cruz, Andrés Ferrer Moreu, Daniel Puerto Garcia, Wojciech Gawelda, Marcial Galván Sosa, Jan Siegel, Francisco Javier Solís Céspedes, Consejo Superior de Investigaciones Científicas (Spain) [7203-36]

Coffee Break 3:20 to 3:50 pm

SESSION 9

Room: Conv. Ctr. Rooms F1/F2 Tues. 3:50 to 4:50 pm

Diagnostics of Laser-Written Devices

Session Chair: **Wataru Watanabe**, National Institute of Advanced Industrial Science and Technology (Japan)

Joint Session with Conference 7201: Laser Applications in
Microelectronic and Optoelectronic Manufacturing XIV

3:50 pm: **Local force detection of femtosecond laser-induced stress wave using atomic force microscope**, Yoichiro Hosokawa, Nara Institute of Science and Technology (Japan); Kazunori Okano, Nara Institute of Science and Technology (Japan) and Tohoku Fukushi Univ. (Japan); Hiroshi M. Masuhara, Nara Institute of Science and Technology (Japan) and National Chiao Tung Univ. (Taiwan) [7203-37]

4:10 pm: **5D multiphoton microscopy: in-situ diagnostics for ultrafast laser 3D nanofabrication**, Jianzhao Li, Shane M. Eaton, Peter R. Herman, Univ. of Toronto (Canada) [7203-38]

4:30 pm: **Optical coherence microscopy for nondestructive 3D imaging of femtosecond laser written structures**, Jiyeon Choi, Kye-Sung Lee, Troy P. Anderson, Jannick P. Rolland, Martin C. Richardson, College of Optics & Photonics/Univ. of Central Florida (United States) [7203-39]

Wednesday 28 January

STUDENT COMPETITION SESSION

Room: Convention Center, F2 Wed. 8:00 to 9:00 am

Session Chairs: **Alexander Heisterkamp**,
Laser Zentrum Hannover e.V. (Germany);
Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

Papers submitted to Conference 7203 by **graduate and undergraduate students are eligible**. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during this special student competition session. Here the **students present** a brief **5-minute summary** of their original talk or poster presented at the conference. The winner and runner-up will be announced and awarded a cash prize during the Student Competition Award Ceremony.

SESSION 10

Room: Conv. Ctr. Room F2 Wed. 9:00 to 10:00 am

Post Deadline Session

Session Chair: **Alexander Szameit**,
Friedrich-Schiller-Univ. Jena (Germany)

This is the chance to present your latest ground breaking results in the field of ultrashort laser applications.

The **submission deadline** for the Post-Deadline Session is **11 January 2009**. Two-page submissions are required.

Authors will be notified of acceptance one week prior to the meeting. **Accepted submissions will be printed as submitted without further revision** in the front matter of the proceedings, and authors will be encouraged to submit a full-length manuscript (8-12 pages) the week of the meeting. Please note that the 2-page submission is not citable, but an 8-12-page manuscript is an official record of publication and is citable.

Student Competition Award Ceremony

Room: Conv. Ctr. Room F2 Wed. 10:00 to 10:30 am

Session Chairs: **Alexander Heisterkamp**,
Laser Zentrum Hannover e.V. (Germany);
Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

An award will be presented to the winner and runner-up of the Best Student Presentation (both poster and oral papers considered).

LASE PLENARY SESSION

Room: Montgomery Theater Wed. 10:30 am to 12:30 pm

10:30 am: **A High-Power Fiber Diet**, David N. Payne, Univ. of Southampton (United Kingdom) [PW09PLL-01]

11:10 am: **Tailored Light - Innovation by New Laser Concepts and New Applications**, Reinhart Poprawe, Arnold Gillner, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [PW09PLL-02]

11:50 am: **Laser Processing for Thin Film and Wafer-Based Silicon Photovoltaics**, Peter Borden, Applied Materials, Inc. (United States) [PW09PLL-03]

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Micro/Nanofabrication

Devices/Applications/Reliability

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Daily Conference Schedule

Saturday 24 January	Sunday 25 January	Monday 26 January	Tuesday 27 January	Wednesday 28 January	Thursday 29 January
Micro/Nanofabrication					
			7204 Micromachining and Microfabrication Process Technology XIII (Maher, Chiao, Resnick) p. 185		
		7205 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II (Suleski, Schoenfeld, Wang) p. 186			
		7201 Laser Applications in Microelectronic and Optoelectronic Manufacturing XIV (Meunier, Holmes, Niino, Gu) p. 174			
				7202 Laser-Based Micro- and Nano-Packaging and Assembly III (Pflieger, Lu, Washio) p. 178	
		7221 Photonics Packaging, Integration, and Interconnects IX (Glebov, Chen) p. 229			
Devices/Applications/Reliability					
		7207 Microfluidics, BioMEMS, and Medical Microsystems VII (Wang) p. 190		7206 Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices VIII (Kullberg, Ramesham) p. 189	
			7208 MOEMS and Miniaturized Systems VIII (Dickensheets, Schenk, Piyawattanametha) p. 192		
				7209 MEMS Adaptive Optics III (Olivier, Bifano, Kubby) p. 194	
				7210 Emerging DMD-Based Systems and Applications (Hornbeck, Douglass) p. 196	

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See pages 35–40 for course daily schedule.

Conference 7204 · Hilton Hotel, San Carlos Room I

Tuesday 27 January 2009 • Proceedings of SPIE Vol. 7204

Micromachining and Microfabrication Process Technology XIII

Conference Chairs: **Mary-Ann Maher**, SoftMEMS; **Jung-Chih Chiao**, The Univ. of Texas at Arlington; **Paul J. Resnick**, Sandia National Labs.

Program Committee: **Mu Chiao**, The Univ. of British Columbia (Canada); **Debabani Choudhury**, HRL Labs., LLC; **Eric Donzier**, Consultant (United Kingdom); **Sanjay Krishna**, The Univ. of New Mexico; **Tamal Mukherjee**, Carnegie Mellon Univ.; **Yu-Chuan Su**, National Tsing Hua Univ. (Taiwan); **T. C. Yih**, Oakland Univ.; **Nan Zhang**, General MEMS Corp.

Tuesday 27 January

SESSION 1

Room: Hilton Hotel, San Carlos Room I Tues. 8:50 to 11:30 am

Devices

Session Chair: **Mary-Ann Maher**, SoftMEMS

- 8:50 am: **Cost-effective method of manufacturing a 3D MEMS optical switch**, Emily J. Carr, Ping Zhang, Doug Keebaugh, Kelvin K. Chau, Glimmerglass Networks, Inc. (United States) [7204-01]
- 9:10 am: **Uncooled infrared and terahertz detectors based on micromechanical mirror as a radiation pressure sensor**, Gennady P. Berman, Boris M. Chernobrod, Alan R. Bishop, Los Alamos National Lab. (United States); Vyacheslav N. Gorshkov, Instytut Fizyki (Ukraine) [7204-02]
- 9:30 am: **A novel fabrication method for semiconductor ring lasers that ensures optimal electrical pumping**, Neilanjan Dutta, Jaya Prakash Gupta, Janusz A. Murakowski, Dennis W. Prather, Univ. of Delaware (United States) [7204-04]
- 9:50 am: **Optical fiber packaging for MEMS interfacing**, Jose Mireles, Jr., Miguel Garcia, Roberto Ambrosio, Univ. Autónoma de Ciudad Juárez (Mexico); Ernest J. Garcia, Sandia National Labs. (United States); Wilfrido Calleja-Arriaga, Claudia Reyes-Betanzo, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7204-05]
- Coffee Break 10:10 to 10:30 am
- 10:30 am: **A high-sensitivity Hall sensor fabricated on a SOI wafer using surface micromachining technique**, Namit Singh, Horacio V. Estrada, Univ. of North Carolina at Charlotte (United States) [7204-06]
- 10:50 am: **Sharpened transparent-micronozzles fabrication for cell membrane piercing**, Eva M. Campo, Ctr. Nacional de Microelectrónica (Spain) [7204-07]
- 11:10 am: **Fabrication of reliable RF-MEMS switches in CPW configuration**, Jaibir Sharma, Amitava DasGupta, Indian Institute of Technology Madras (India) [7204-08]
- Lunch/Exhibition Break 11:30 am to 12:50 pm

SESSION 2

Room: Hilton Hotel, San Carlos Room I Tues. 12:50 to 3:20 pm

Process: Lasers, Milling, CMP

Session Chair: **Nan Zhang**, General MEMS Corp.

- 12:50 pm: **Stretchable, multilayer, self-aligned interconnects fabricated using excimer laser photoablation and in-situ masking (Invited Paper)**, Kevin L. Lin, Kanti Jain, Univ. of Illinois at Urbana-Champaign (United States) [7204-09]
- 1:20 pm: **An empirical method for limiting the heat-affected zone during precision laser machining of Polyamide 12**, Fabien Bernard, Tony Flaherty, National Univ. of Ireland, Galway (Ireland) [7204-10]
- 1:40 pm: **Pulsed laser breaking technique for glass substrates**, Chwan-Huei Tsai, Wei-Han Chang, Huafan Univ. (Taiwan) [7204-11]
- 2:00 pm: **Micromachining with near-infrared fiber lasers**, Anthony P. Hoult, SPI Lasers LLC (United States); Jack Gabzdyl, SPI Lasers plc (United Kingdom); Ken Dzurko, SPI Lasers LLC (United States) [7204-12]
- 2:20 pm: **Two-photon polymerization for fabrication of three-dimensional micro- and nanostructures over a large area**, Mangirdas Malinauskas, Vytautas Purlys, Marius Rutkauskas, Roaldas Gadonas, Vilnius Univ. (Lithuania) [7204-13]
- 2:40 pm: **A study of burr formation and the influence of cutting parameters on micro-milling of steel with cubic boron nitride (CBN) tools**, Fritz Klocke, Kristian Arntz, Fernando Quito, Alexandre A. Souza, Fraunhofer-Institut für Produktionstechnologie (Germany) [7204-14]
- 3:00 pm: **Micromachining of silicon wafer using micro electro discharge machining with tool wear compensation**, Muralidhara Rao, Nilesh J. Vasa, Singaperumal Makaram, Indian Institute of Technology Madras (India) [7204-16]

SESSION 3

Room: Hilton Hotel, San Carlos Room I Tues. 4:00 to 5:40 pm

Special Session on CAD

Session Chair: **Metin Ozen**, Ozen Engineering, Inc.

- 4:00 pm: **3D laser machining model using an artificial neural network**, Gabriel Arias, Univ. Politècnica de Catalunya (Spain); Joaquim Ciurana, Univ. de Girona (Spain) [7204-17]
- 4:20 pm: **Design of MEMS complaint devices with topology optimization**, Mehrnaz Motiee, Amir Khajepour, Raafat R. Mansour, Univ. of Waterloo (Canada) [7204-18]
- 4:40 pm: **Fast MEMS design tool with high-accuracy process simulation**, C. Boese, Udo Triltsch, Stephanus Büttgenbach, Technische Univ. Braunschweig (Germany); Sameh Abdelwahab, SoftMEMS (Egypt) . . . [7204-19]
- 5:00 pm: **Simulation of Si-LED (450nm-750nm) light propagation phenomena in CMOS 0.35 micron-integrated circuitry: MOEMS applications**, Kingsley Ogudo, Lukas W. Snyman, Gustave Udahemuka, Tshwane Univ. of Technology (South Africa); Monuko Du Plessis, Univ. of Pretoria (South Africa) [7204-20]
- 5:20 pm: **1/f noise in single-walled carbon nanotube films**, Ashkan Behnam, Gijis Bosman, Ant Ural, Univ. of Florida (United States) [7204-21]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

- Laser micromachining in azopolymers**, Marcos R. Cardoso, Vinicius Tribuzi, Debora T. Balogh, Lino Misoguti, Cleber R. Mendonça, Univ. de São Paulo (Brazil) [7204-22]
- Wiring microstructures with tapered fibers**, Cleber R. Mendonça, Daniel S. Corrêa, Marcos R. Cardoso, Vinicius Tribuzi, Lino Misoguti, Univ. de São Paulo (Brazil) [7204-24]
- Physical characterization and dissolution behavior of Simvastatin—Gelucire 44/14 solid dispersion**, Nirav V. Patel, Anand Pharmacy College (India); Rajnikant C. Patel, Kalol Institute of Pharmacy (India) [7204-25]
- Polymeric nanosieves fabricated by UV lithography**, Luis E. Gutierrez-Rivera, Lucila H. Cescato, Univ. Estadual de Campinas (Brazil) [7204-26]
- Measurement of the engine-oil deterioration using the type of passive RFID**, Jaedong Cho, Sunghyun Kim, Yongsub Jung, Sekwang Park, Kyungpook National Univ. (Korea, Republic of) [7204-28]
- Nanorod measurement-layer separate structure for nanorod-character measurement, simulation, and application as sensor devices**, Myoung-Kun Leem, Jin-Uk Park, Chang-Man Kim, Kyu-Jin Kim, Se-Hyuk Yeom, Woo-Youp Choi, Kyungpook National Univ. (Korea, Republic of); Won-Seok Kang, Jae-Ho Kim, Ajou Univ. (Korea, Republic of); Shin-Won Kang, Kyungpook National Univ. (Korea, Republic of) [7204-29]
- A novel metal separation membrane by femtosecond laser microprocessing**, Xichen M. Yang, Gang Wang, Jianbo Lei, Tianjin Polytechnic Univ. (China) [7204-30]

Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II

Conference Chairs: **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte; **Winston V. Schoenfeld**, College of Optics & Photonics/Univ. of Central Florida; **Jian Jim Wang**, NanoNuvo Corp.

Program Committee: **John M. Ballato**, Clemson Univ.; **Gregg T. Borek**, MEMS Optical, Inc.; **Stefano Cabrini**, Lawrence Berkeley National Lab.; **Matthew A. Davies**, The Univ. of North Carolina at Charlotte; **Erez Hasman**, Technion-Israel Institute of Technology (Israel); **Aaron R. Hawkins**, Brigham Young Univ.; **Tsinghua Her**, The Univ. of North Carolina at Charlotte; **Saulius Juodkazis**, Hokkaido Univ. (Japan); **Shanayn A. Kemme**, Sandia National Labs.; **Ernst-Bernhard Kley**, Friedrich-Schiller-Univ. Jena (Germany); **Stephen M. Kuebler**, College of Optics & Photonics/Univ. of Central Florida; **Dwayne L. LaBrake**, Molecular Imprints, Inc.; **Akhlesh Lakhtakia**, The Pennsylvania State Univ.; **Ki-Dong Lee**, LG Electronic Institute of Technology (South Korea); **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel); **Marko Loncar**, Harvard Univ.; **Patrick P. Naulleau**, Lawrence Berkeley National Lab.; **Dennis W. Prather**, Univ. of Delaware; **John A. Rogers**, Univ. of Illinois at Urbana-Champaign; **Markus Rossi**, Heptagon Oy (Switzerland); **Raymond C. Rumpf**, Prime Research, LC; **Georg von Freymann**, Forschungszentrum Karlsruhe (Germany); **Michael P. Watts**, Impattern Solutions; **Wei Wu**, Hewlett-Packard Labs.

Monday 26 January

MOEMS-MEMS PLENARY SESSION

Room: Marriott Hotel, San Jose Ballroom Salon III. Mon. 9:00 am to 12:00 pm
9:10 am: **Massively Parallel Soft Pen Nanolithography**, Chad A. Mirkin, Northwestern Univ. (United States) [PW09PLM-01]
10:20 am: **The High Versatility of Silicon Based Micro-Optical Modulators**, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [PW09PLM-02]
11:10 am: **Subwavelength Optical Elements and Nanoimprint Technology for Chip Integration of Optical Systems and MEMS**, Stephen Y. Chou, Princeton Univ. (United States) [PW09PLM-03]

SESSION 1

Room: Hilton Hotel, Almaden Ballroom I Mon. 1:30 to 3:00 pm

Nanofabrication I: Photonic Nanostructures

Session Chair: **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte

1:30 pm: **Focused ion-beam milling for nanophotonics, optoelectronics, and quantum optics** (*Invited Paper*), Marko Loncar, Harvard Univ. (United States) [7205-01]
2:00 pm: **Design and fabrication of bow-tie nanoantenna on photonic crystal resonator**, Allan Chang, Stefano Cabrini, Alexander F. Weber-Bargioni, Bruce D. Harteneck, Scott D. Dhuey, Deirdre L. Olynick, P. J. Schuck, Lawrence Berkeley National Lab. (United States) [7205-02]
2:20 pm: **Wire-grid polarizer for the UV spectral region**, Thomas Weber, Hans-Jörg Fuchs, Holger Schmidt, Ernst-Bernhard Kley, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7205-03]
2:40 pm: **Two-dimensional photonic-crystal polarization filter with dual-band and wide working wavelength range**, Kwang-Yao Chai, Te-Hung Chang, Yu-Wen Yeh, Sheng-Hui Chen, Cheng-Chung Lee, National Central Univ. (Taiwan) [7205-04]
Coffee Break 3:00 to 3:30 pm

SESSION 2

Room: Hilton Hotel, Almaden Ballroom I Mon. 3:30 to 5:00 pm

Biologically Inspired Nanofabrication

Session Chair: **Marko Loncar**, Harvard Univ.

3:30 pm: **Reproduction, mass-production, and control of the Morpho butterfly's blue** (*Invited Paper*), Akira Saito, Osaka Univ. (Japan) and RIKEN Harima Institute, SPring-8 (Japan) and PRESTO, JST (Japan); Yusuke Miyamura, Yoko Ishikawa, Junichi Murase, Megumi Akai-Kasaya, Yuji Kuwahara, Osaka Univ. (Japan) [7205-05]
4:00 pm: **Replication of biotemplates for the development of highly efficient biomimetic optical devices** (*Invited Paper*), Raul J. Martin-Palma, Univ. Autonoma de Madrid (Spain) and The Pennsylvania State Univ. (United States); Akhlesh Lakhtakia, Carlo G. Pantano, The Pennsylvania State Univ. (United States) [7205-06]
4:30 pm: **Spectroscopy nanofabrication and biophotonics** (*Invited Paper*), Enzo M. di Fabrizio, Univ. degli studi Magna Græcia di Catanzaro (Italy) [7205-07]

Tuesday 27 January

SESSION 3

Room: Hilton Hotel, Almaden Ballroom I Tues. 8:30 to 10:10 am

Micro- and Nano-Etching

Session Chair: **Raymond C. Rumpf**, Prime Research, LC

8:30 am: **Sub-100-nm pattern transfer on compound semiconductor using sol-gel-based TiO₂ resist**, Boyang Liu, Seng-Tiong Ho, Northwestern Univ. (United States) [7205-08]
8:50 am: **Vapor phase release of silicon nanostructures for optomechanics application**, Parag B. Deotare, Mughees Khan, Marko Loncar, Harvard Univ. (United States) [7205-09]
9:10 am: **Shallow Fresnel lens fabrication using gray-scale lithography**, Tali Nachmias, Avi Ohayon, Sheffer E. Meltzer, Rafael Advanced Defense Systems Ltd. (Israel); Uriel Levy, The Hebrew Univ. of Jerusalem (Israel) [7205-10]
9:30 am: **High-density transmission gratings with a deterministic antireflective pattern**, Sebastian Werner, Marcel Schulze, Tina Clausnitzer, Ernst-Bernhard Kley, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) [7205-11]
9:50 am: **Fabrication and performance of Mo/Si phase structures and application to EUV optics**, Farhad H. Salmassi, Lawrence Berkeley National Lab. (United States) [7205-12]
Coffee Break 10:10 to 10:40 am

SESSION 4

Room: Hilton Hotel, Almaden Ballroom I Tues. 10:40 to 11:50 am

Nanofabrication II: Growth and Deposition

Session Chair: Christopher J. Summers,
Georgia Institute of Technology10:40 am: **Self-aligned process for nanoscale fabrication of single quantum dot microcavities** (*Invited Paper*), Dennis G. Deppe, Univ. of Central Florida (United States). [7205-13]11:10 am: **An evaporative co-assembly method for highly ordered inverse opal films and their reactive conversion to high-refractive index materials**, Benjamin Hatton, Lidiya Mishchenko, Harvard Univ. (United States); Robert A. Norwood, College of Optical Sciences/The Univ. of Arizona (United States); Stan Davis, Ken Sandhage, Georgia Institute of Technology (United States); Joanna Aizenberg, Harvard Univ. (United States). [7205-14]11:30 am: **Microlithographically patterned optical thin films coatings**, Jim Lane, Phil Buchsbaum, Jason M. Eichenholz, Ocean Optics, Inc. (United States). [7205-15]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 5

Room: Hilton Hotel, Almaden Ballroom I Tues. 1:30 to 3:00 pm

3-D Nanofabrication

Session Chair: Uriel Levy, The Hebrew Univ. of Jerusalem (Israel)

1:30 pm: **Fabrication of 3D and 2D photonic crystals by application of atomic layer deposition and selective etching protocols** (*Invited Paper*), Christopher J. Summers, Georgia Institute of Technology (United States). [7205-16]2:00 pm: **Metallo-dielectric 3D photonic crystals prepared by metallization of optically microfabricated polymeric templates**, Vygantas Mizeikis, Hokkaido Univ. (Japan); Rima Tarozaitė, Lithuanian Academy of Sciences (Lithuania); Saulius Juodkakis, Hiroaki Misawa, Hokkaido Univ. (Japan). [7205-17]2:20 pm: **Er-doped As₂S₃ high index of refraction photoresist for 3D direct laser writing**, Sean Wong, Forschungszentrum Karlsruhe (Germany); Dieter Fenske, Oliver Kiowski, Manfred M. Kappes, Univ. Karlsruhe (Germany); Frank C. Peiris, Kenyon College (United States); Jörg K. Lindner, Univ. Augsburg (Germany); Geoffrey A. Ozin, Univ. of Toronto (Canada); Michael Thiel, Univ. Karlsruhe (Germany); Alexandra Ledermann, Markus Braun, Martin Wegener, Georg von Freymann, Forschungszentrum Karlsruhe (Germany). [7205-18]2:40 pm: **Fabrication of large area woodpile structure in polymer**, Jaya Prakash Gupta, Neilanjan Dutta, Peng Yao, Ahmed S. Sharkawy, Chunchen Lin, Garrett J. Schneider, Dennis W. Prather, Univ. of Delaware (United States). [7205-19]

Coffee Break 3:00 to 3:30 pm

SESSION 6

Room: Hilton Hotel, Almaden Ballroom I Tues. 3:30 to 5:00 pm

Applications

Session Chair: Dennis W. Prather, Univ. of Delaware

3:30 pm: **Advances in diffractive nanophotonics enabled by commercial projection lithography** (*Invited Paper*), Christoph M. Greiner, Dmitri Lazikov, Thomas W. Mossberg, LightSmyth Technologies, Inc. (United States). [7205-20]4:00 pm: **Fabrication of diffractive optics for dense optical interconnects in optical computing**, Alvaro A. Cruz-Cabrera, Shanalyn A. Kemme, Joel R. Wendt, Sandia National Labs. (United States); Tony R. Carter, Sandia Staffing Alliance, LLC (United States); Sally Samora, LMATA Government Services, LLC (United States). [7205-21]4:20 pm: **Pixelated spectral filter for integrated focal plane array in the long-wave IR**, Shanalyn A. Kemme, Robert R. Boye, Alvaro A. Cruz-Cabrera, Ronald D. Briggs, Tony R. Carter, Sally Samora, Sandia National Labs. (United States). [7205-22]4:40 pm: **Diffraction gratings for compact integrated optical structures**, Ildar Salakhutdinov, Gregory W. Auner, Wayne State Univ. (United States). [7205-23]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Threshold measurement of two-photon photo-polymerization via Z-scan, Yuri B. Boiko, YBBR, Inc. (Canada). [7205-39]

Fabrication of two-layer diffractive optical element for single-beam and single-exposure fabrication of diamond-like photonic crystal, Yuankun Lin, Ahmad Harb, Daniel Rodriguez, Karen Lozano, The Univ. of Texas-Pan American (United States); Di Xu, Kevin P. Chen, Univ. of Pittsburgh (United States). [7205-40]

A bed-of-nails substrate for surface enhanced Raman scattering (SERS), Jing Tang, Fung Suong Ou, Huei Pei Kuo, Hewlett-Packard Labs. (United States); William F. Stickle, Hewlett-Packard Co. (United States); Shih-Yuan Wang, Wei Wu, Zhiyong Li, R. Stanley Williams, Hewlett-Packard Labs. (United States). [7205-41]

Characterization of SU-8 for hybrid molding and lithographic fabrication of micro-optics, Aaron Cannistra, Thomas J. Suleski, The Univ. of North Carolina at Charlotte (United States). [7205-42]

Wednesday 28 January

SESSION 7

Room: Hilton Hotel, Almaden Ballroom I Wed. 8:30 to 10:00 am

Nanofabrication III:
Metallic Nanostructures and Plasmonics

Session Chair: Shanalyn A. Kemme, Sandia National Labs.

8:30 am: **Nanoskiving: a new method to produce arrays of nanostructures for nanophotonics** (*Invited Paper*), Qiaobing Xu, Jiming Bao, Robert M. Rioux, Michael D. Dickey, Federico Capasso, George M. Whitesides, Harvard Univ. (United States). [7205-24]

9:00 am: **Fabrication of surface plasmon resonators by nanoskiving single-crystalline gold microplates**, Benjamin J. Wiley, Darren Lipomi, Jiming Bao, Federico Capasso, George M. Whitesides, Harvard Univ. (United States). [7205-25]

9:20 am: **E-beam assisted fabrication of a subwavelength aluminum mesh**, Clarisse Mazuir, Winston V. Schoenfeld, College of Optics & Photonics/Univ. of Central Florida (United States). [7205-26]

9:40 am: **Fabrication of novel plasmonics-active substrates**, Anuj Dhawan, Duke Univ. (United States); Michael D. Gerhold, U. S. Army Research Office (United States); Yan Du, Veena Misra, North Carolina State Univ. (United States); Tuan Vo-Dinh, Duke Univ. (United States). [7205-27]

Coffee Break 10:00 to 10:30 am

Conference 7205

SESSION 8

Room: Hilton Hotel, Almaden Ballroom I Wed. 10:30 to 11:40 am

Micro- and Nanoreplication

Session Chair: **Jian Jim Wang**, NanoNuvo Corp.

10:30 am: **Roll-to-roll manufacturing of subwavelength optics** (*Invited Paper*), Vivian W. Jones, 3M Co. (United States) [7205-28]

11:00 am: **Large-area roll-to-roll and roll-to-plate nanoimprint lithography**, Se Hyun Ahn, L. Jay Guo, Univ. of Michigan (United States) [7205-29]

11:20 am: **Ultrafast response of negative-index metamaterials in the near infrared**, David J. Cho, Feng Wang, Xiang Zhang, Yuen-Ron Shen, Univ. of California, Berkeley (United States); Wei Wu, Ekaterina Ponizovskaya, Hewlett-Packard Labs. (United States); Pratik Chaturvedi, Univ. of Illinois at Urbana-Champaign (United States); Alexander M. Bratkovksy, Shih-Yuan Wang, Hewlett-Packard Labs. (United States) [7205-30]

Lunch/Exhibition Break 11:40 am to 1:30 pm

SESSION 9

Room: Hilton Hotel, Almaden Ballroom I Wed. 1:30 to 3:00 pm

Advanced Lithography

Session Chair: **Winston V. Schoenfeld**,
College of Optics & Photonics/Univ. of Central Florida

1:30 pm: **Parallel direct-write nanopatterning using near-field focusing by optically trapped microspheres** (*Invited Paper*), Craig B. Arnold, Princeton Univ. (United States) [7205-31]

2:00 pm: **A technique to transfer metallic nanoscale patterns to small and non-planar surfaces for nanophotonic devices**, Elizabeth J. Smythe, Michael D. Dickey, Jiming Bao, George M. Whitesides, Federico Capasso, Harvard Univ. (United States) [7205-32]

2:20 pm: **Correlation of fabrication tolerances with the performance of Guided-Mode-Resonance micro-optical components.**, Menelaos K. Poutous, Zach Roth, Kaia N. Buhl, Aaron Pung, Eric G. Johnson, The Univ. of North Carolina at Charlotte (United States) [7205-33]

2:40 pm: **Overlay nanofabrication processes for sub-10-nm soft x-ray zone plate microscopy**, Weilun Chao, Lawrence Berkeley National Lab. (United States); Jihoon Kim, Univ. of California, Berkeley (United States); Erik H. Anderson, Lawrence Berkeley National Lab. (United States); David T. Attwood, Lawrence Berkeley National Lab. (United States) and Univ. of California, Berkeley (United States) [7205-34]

Coffee Break 3:00 to 3:30 pm

SESSION 10

Room: Hilton Hotel, Almaden Ballroom I Wed. 3:30 to 4:50 pm

Laser-based Fabrication for Photonics

Session Chair: **Menelaos K. Poutous**,
The Univ. of North Carolina at Charlotte

3:30 pm: **In-volume waveguides by fs-laser direct writing in rare-earth doped fluoride glass**, Dagmar Esser, Dirk Wortmann, Jens Gottmann, RWTH Aachen (Germany) [7205-35]

3:50 pm: **Demonstration of inscription and ablation of phase masks for the production of 1st, 2nd, and 3rd order FBG gratings using femtosecond light**, Graham N. Smith, Aston Univ. (United Kingdom); Kyriacos Kalli, Cyprus Institute of Technology (Cyprus); Ian Bennion, Kate Sugden, Aston Univ. (United Kingdom) [7205-36]

4:10 pm: **Dynamic ultrafast laser beam tailoring for multiphoton photo-inscription of deep photonic devices in bulk transparent materials**, Cyril Mauclair, Guanghua Cheng, Nicolas Huot, Eric Audouard, Lab. Hubert Curien (France); Arkadi Rosenfeld, Ingolf V. Hertel, Max-Born-Institut (Germany); Razvan I. Stoian, Lab. Hubert Curien (France) [7205-37]

4:30 pm: **Microfabrication of refractive optics, waveguides, microfluidics, and high-aspect ratio structures realized by direct laser lithography**, Paul M. Coudray, Pierre Blanchet, Cécile Aubert, Nicolas Brillouet, Kloe SA (France) [7205-38]

Reliability, Packaging, Testing, and Characterization of MEMS/MOEMS and Nanodevices VIII

Conference Chairs: **Richard C. Kullberg**, Arthur Jonath Associates; **Rajeshuni Ramesham**, Jet Propulsion Lab.

Conference Co-Chairs: **Allyson L. Hartzell**, Boston Micromachines Corp.; **James L. Zunino III**, U.S. Army Armament Research, Development and Engineering Ctr. Program Committee; **Enakshi Bhattacharya**, Indian Institute of Technology Madras (India); **Jason O. Clevenger**, Exponent Inc.; **Colin K. Drummond**, ASM International; **Sonia Garcia-Blanco**, Institut National d'Optique (Canada); **Christopher K. Harrison**, Schlumberger Ltd.; **Albert K. Henning**, Nanolink, Inc.; **Maurice S. Karpman**, Charles Stark Draper Lab., Inc.; **Olivier N. Pierron**, Georgia Institute of Technology; **Herbert R. Shea**, École Polytechnique Fédérale de Lausanne (Switzerland); **Danelle M. Tanner**, Sandia National Labs.

Wednesday 28 January

SESSION 1

Room: Hilton Hotel, University Room Wed. 1:30 to 4:30 pm

MEMS Packaging: Assembly and Reliability

Session Chair: **Sonia Garcia-Blanco**, Institut National d'Optique (Canada)

1:30 pm: **Hybrid wafer-level vacuum hermetic micropackaging technology for MOEMS-MEMS**, Sonia Garcia-Blanco, Karine Le Foulgoc, Christine Alain, Hubert Jerominek, Patrice A. Topart, Institut National d'Optique (Canada) [7206-02]

1:50 pm: **Packaging of a silicon-based biochip (Invited Paper)**, Thomas Velten, Margit Biehl, Timo Koch, Werner Haberer, Fraunhofer Institute for Biomedical Engineering (Germany) [7206-03]

2:20 pm: **Radiometric packaging of uncooled microbolometer FPA arrays for space applications**, Sonia Garcia-Blanco, Patrice Cote, Melanie R. Leclerc, Nathalie Blanchard, Fabien Dupont, Institut National d'Optique (Canada); Linh Ngo-Phong, Canadian Space Agency (Canada); Francois J. Châteauneuf, Timothy D. Pope, Institut National d'Optique (Canada) [7206-04]

Coffee Break 2:40 to 3:10 pm

3:10 pm: **Determination of true leak rate of nanoliter packages using helium mass spectrometer**, Arindam Goswami, Bongtae Han, Univ. of Maryland, College Park (United States) [7206-06]

3:30 pm: **Examining internal gas compositions of a variety of microcircuit package types and ages with a focus on sources of internal moisture**, Robert K. Lowry, Richard C. Kullberg, Oneida Research Services (United States) [7206-01]

3:50 pm: **Hermeticity evaluation of polymer-based micro-MEMS packages**, Arindam Goswami, Bongtae Han, Univ. of Maryland, College Park (United States) [7206-08]

4:10 pm: **Dispersive evaluation and self-sensing of single-fiber/acid-treated CNT-epoxy nanocomposites using electromechanical techniques and acoustic emission**, Joung-Man Park, Gyeongsang National Univ. (Korea, Republic of) and The Univ. of Utah (United States); Jung-Hoon Jang, Zuojia Wang, Gyeongsang National Univ. (Korea, Republic of); Woo Il Lee, Seoul National Univ. (Korea, Republic of); Jong-Kyoo Park, Agency for Defense Development (Korea, Republic of); Lawrence K. DeVries, The Univ. of Utah (United States) [7206-23]

Thursday 29 January

SESSION 2

Room: Hilton Hotel, University Room Thurs. 8:30 to 10:20 am

MEMS/MOEMS Reliability

Session Chair: **Richard C. Kullberg**, Arthur Jonath Associates

8:30 am: **Reliability of piezoMEMS-based RF devices (Invited Paper)**, Daniel C. Judy, Jeff Pulskamp, Robert Proie, Ronald G. Polcawich, Army Research Lab. (United States) [7206-13]

9:00 am: **Tribological behavior of micron-scale polycrystalline silicon films in ambient air**, Daan Hein Alsem, Lawrence Berkeley National Lab. (United States); Ruben van der Hulst, Univ. of Groningen (Netherlands); Eric A. Stach, Purdue Univ. (United States); Michael T. Dugger, Sandia National Labs. (United States); Jeff T. de Hosson, Univ. of Groningen (Netherlands); Robert O. Ritchie, Lawrence Berkeley National Lab. (United States) and Univ. of California, Berkeley (United States) [7206-10]

9:20 am: **Fatigue properties of single-crystal silicon films in harsh environments**, Olivier N. Pierron, Pierre-Olivier Theillet, Georgia Institute of Technology (United States) [7206-11]

9:40 am: **Electrical properties of TiO₂/Co piezoelectric μ membrane for aural assistance**, Aurelio H. Heredia-Jimenez, Laura Castro, Manuel Gonzalez-Perez, Berenice Suarez R., Univ. Popular Autonoma del estado de Puebla (Mexico) [7206-12]

10:00 am: **Reliability study of micromechanical actuators for electro-static RMS voltage measurements fabricated using bulk-silicon technology**, Jan Dittmer, Technische Univ. Braunschweig (Germany) and Physikalisch-Technische Bundesanstalt (Germany); Rolf Judaschke, Physikalisch-Technische Bundesanstalt (Germany); Stephanus Büttgenbach, Technische Univ. Braunschweig (Germany) [7206-09]

Coffee Break 10:20 to 10:50 am

SESSION 3

Room: Hilton Hotel, University Room Thurs. 10:50 to 11:50 am

Testing, Characterization, and Failure Analysis of MEMS/MOEMS-I

Session Chair: **Rajeshuni Ramesham**, Jet Propulsion Lab.

10:50 am: **Flatness accuracy of structured light profilometry for MEMS metrology**, Wojtek J. Walecki, Fanny Szondy, Sunrise Optical LLC (United States) [7206-14]

11:10 am: **Acoustic-optic modulated stroboscopic interferometer for characterization of microstructures using temporal phase-shifting method**, Davoud Mohammadalizadeh, Muthukumaran Packirisamy, Sivakumar Narayanswamy, Concordia Univ. (Canada) [7206-15]

11:30 am: **An acoustic phonon detection test setup for evaluating the frequency stability of clamped-clamped beam resonators**, Chee-Leong Wong, Moorthi Palaniapan, National Univ. of Singapore (Singapore) [7206-16]

Lunch Break 11:50 am to 1:40 pm

SESSION 4

Room: Hilton Hotel, University Room Thurs. 1:40 to 3:20 pm

Testing, Characterization, and Failure Analysis of MEMS/MOEMS-II

Session Chair: **Rajeshuni Ramesham**, Jet Propulsion Lab.

1:40 pm: **A novel test-structures for characterization of microsystems parameters at wafer level**, Alexey V. Shaporin, Petra Streit, Wolfram Doetzel, Jan Mehner, Technische Univ. Chemnitz (Germany) [7206-17]

2:00 pm: **The concept of new, simple low-voltage cathodoluminescence set-up with CNT field emission cathodes**, Piotr Psuja, Dariusz Hreniak, Wieslaw Strek, Institute of Low Temperature and Structure Research (Poland) [7206-18]

2:20 pm: **Analysis of image quality for laser display scanner test**, Hendrik Specht, Steffen Kurth, Detlef Billep, Thomas Gessner, Fraunhofer ENAS (Germany) [7206-19]

2:40 pm: **Environmental testing of COTS components for space applications**, Rajeshuni Ramesham, Jet Propulsion Lab. (United States) [7206-20]

3:00 pm: **Development of a novel surface acoustic wave MEMS-IDT gyroscope**, Haekwan Oh, Kee-Keun Lee, Wen Wang, Sungjin Yun, Sang Sik Yang, Ajou Univ. (Korea, Republic of) [7206-22]

MOEMS-MEMS

Conference 7207 · Hilton Hotel, Santa Clara Rooms I/II

Monday-Tuesday 26-27 January 2009 • Proceedings of SPIE Vol. 7207

Microfluidics, BioMEMS, and Medical Microsystems VII

Conference Chair: **Wanjun Wang**, Louisiana State Univ.

Conference Co-Chair: **Holger Becker**, Microfluidic ChipShop GmbH (Germany)

Program Committee: **Eva M. Campo**, Ctr. Nacional de Microelectrónica (Spain); **Bruce K. Gale**, The Univ. of Utah; **Claude M. Vauchier**, Commissariat à l'Energie Atomique (France); **Yu-Cheng Lin**, National Cheng Kung Univ. (Taiwan); **Yuehe Lin**, Pacific Northwest National Lab.; **Ian Papautsky**, Univ. of Cincinnati; **Albert van den Berg**, Univ. Twente (Netherlands); **Bernhard H. Weigl**, PATH

Monday 26 January

SESSION 1

Room: Hilton Hotel, Santa Clara Rooms I/II. Mon. 2:00 to 3:40 pm

Special Session: Dip Pen Nanolithography

2:00 pm: **Employing solvent effects in nanografting to control patterning of nanoscale assemblies**, Amanda Schuckman, James D. Batteas, Texas A&M Univ. (United States) [7207-01]

2:20 pm: **Dip-pen nanolithography combined with surface-enhanced resonance Raman scattering (SERRS) for bio-analysis**, Duncan Graham, Robert J. Stokes, Jennifer Dougan, Karen Faulds, Univ. of Strathclyde (United Kingdom); Jason R. Haaheim, Tom Levesque, Nanolnk, Inc. (United States) [7207-02]

2:40 pm: **Dip-pen nanolithography of electrodes for probing intrinsic electrical properties of organic semiconductors**, Wechung M. Wang, Melbourne C. LeMieux, Zhenan Bao, Stanford Univ. (United States) [7207-03]

3:00 pm: **Ink transport in dip-pen nanolithography**, Brandon L. Weeks, Omkar A. Nafday, Texas Tech Univ. (United States) [7207-04]

3:20 pm: **MEMS-enabled dip pen nanolithography for directed nanoscale deposition and high-throughput nanofabrication**, Jason R. Haaheim, Joseph Fragala, Roger Shile, Tom Levesque, Omkar A. Nafday, Nanolnk, Inc. (United States) [7207-33]

Tuesday 27 January

SESSION 2

Room: Hilton Hotel, Santa Clara Rooms I/II. Tues. 8:00 to 9:40 am

Microfluidics and Applications

Session Chair: **Wanjun Wang**, Louisiana State Univ.

8:00 am: **SU-8 microfluidic channels with porous side walls for biological applications**, Michael R. Padgen, Alison Gracias, Natalya Tokranova, Nathaniel Cady, James Castracane, Univ. at Albany (United States) [7207-05]

8:20 am: **Sample preparation of bacteria from soil by microfluidic filtration and mixing techniques**, Jan Claußen, Susanne Selzer, Isabell Wick, Marion Sommer, Frithjof von Germar, Institut für Mikrotechnik Mainz GmbH (Germany) [7207-06]

8:40 am: **Active integrated components for fluid control in automatic analytical chip-based systems**, Frithjof von Germar, Jan Claussen, Rainer Gransee, Eva Schaeffer, Lhoucine B. Mohammadi, Thomas Klotzbücher, Institut für Mikrotechnik Mainz GmbH (Germany) [7207-07]

9:00 am: **Microfabrication of a two-stage BioMEMS microfluidic cell sorter**, Meggie Grafton, Pooja Rajdev, Lisa M. Reece, Han-Sheng Chuang, Ben Geheb, Jae-Hyuk Jang, Byunghoo Jung, Pedro P. Irazoqui, Steven T. Wereley, James F. Leary, Purdue Univ. (United States) [7207-08]

9:20 am: **On-the-flow absorption and refractive index measurements in a microfluidic device**, Markus Beck, Peter Kiesel, Jörg Martini, Noble M. Johnson, Palo Alto Research Center, Inc. (United States) [7207-09]

Coffee Break 9:40 to 10:10 am

SESSION 3

Room: Hilton Hotel, Santa Clara Rooms I/II. Tues. 10:10 to 11:50 am

Micro-Biomedical Devices and Systems

Session Chair: **Bernhard H. Weigl**, PATH

10:10 am: **Microsystem for minimally invasive blood-glucose monitoring**, Peiyu Zhang, Graham A. Jullien, Univ. of Calgary (Canada) [7207-10]

10:30 am: **Integration of a bioMEMS device into a disposable microfluidic cartridge for medical diagnostics**, Pedro Ortiz, Neil Keegan, Julia Spoor, John Hedley, Alun J. Harris, James S. Burdess, Richard Burnett, Univ. of Newcastle Upon Tyne (United Kingdom); Thomas Velten, Margit Biehl, Thorsten Knoll, Werner Haberer, Fraunhofer-Institut für Biomedizinische Technik (Germany); Matthew D. Solomon, Andrew Campitelli, MiniFAB (Australia) Pty Ltd. (Australia); Calum J. McNeil, Univ. of Newcastle Upon Tyne (United Kingdom) [7207-11]

10:50 am: **A new diagnostic for cancer dynamics: status and initial tests of the NANIVID**, Waseem K. Raja, Andrew J. Borocan, Univ. at Albany (United States); Bojana Gligorijevic, John S. Condeelis, Albert Einstein College of Medicine (United States); James Castracane, Univ. at Albany (United States) [7207-12]

11:10 am: **Obstacles to the production of protein micro-array cassettes**, Jean I. Montagu, Decision Biomarkers, Inc. (United States) [7207-13]

11:30 am: **Fast and precise detection of ricin with microcapillary sensor system**, Jun-Tae Lee, Dosi Dosev, Mikaela I. Nichkova, Zhiya Ma, Shirley J. Gee, Bruce D. Hammock, Ian M. Kennedy, Univ. of California, Davis (United States) [7207-14]

Lunch Break 11:50 am to 1:40 pm

SESSION 4

Room: Hilton Hotel, Santa Clara Rooms I/II. Tues. 1:40 to 3:00 pm

Biosensors and Lab-on-a-Chip Technologies

Session Chair: **Eva M. Campo**, Ctr. Nacional de Microelectrónica (Spain)

1:40 pm: **Coupling confocal fluorescence microscopy and microfluidic device for single-molecule detection**, Paul Shen, Luna Innovations Inc. (United States); Xiaoxuan Li, Lloyd M. Davis, The Univ. of Tennessee Space Institute (United States) [7207-16]

2:00 pm: **Integration of Bragg grating waveguides and microfluidic channels with femtosecond laser irradiation for refractive index sensing**, Valeria A. Maselli, Jason R. Grenier, Stephen Ho, Peter R. Herman, Univ. of Toronto (Canada) [7207-17]

2:20 pm: **Continuous-flow PCR using segmented flow and integrating sample preparation**, Holger Becker, Nadine Hlawatsch, Cornelia Carstens, Claudia Gärtner, Microfluidic ChipShop GmbH (Germany) [7207-18]

2:40 pm: **Integration of an ELISA assay for breast cancer analysis into disposable, microfluidic chips for automatic diagnostics**, Frithjof von Germar, Thomas E. Hansen-Hagge, Daniel Latta, Institut für Mikrotechnik Mainz GmbH (Germany); Ciara O'Sullivan, Alex Fragoso, Univ. Rovira i Virgili (Spain); Mattia Bertschi, Stephan Dasen, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); Livio Cognolato, Olivetti-Jet S.p.A. (Italy) [7207-19]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: Hilton Hotel, Santa Clara Rooms I/II Tues. 3:30 to 5:10 pm

Point-of-Care BioMEMS Systems

Session Chairs: **Holger Becker**, Microfluidic ChipShop GmbH (Germany); **Wanjun Wang**, Louisiana State Univ.

3:30 pm: **Integrated biophotonic micro-total analysis systems for flow cytometry and particle detection**, Arvind Chandrasekaran, Muthukumararan Packirisamy, Concordia Univ. (Canada) [7207-20]

3:50 pm: **LABONFOIL: laboratory skin patches and SmartCards based on OLED-on-CMOS and MEMS components**, Michael Scholles, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Hugh Doyle, Biosensia Ltd. (Ireland); Chris Merveille, Jesus Ruano-Lopez, IKERLAN (Spain); Uwe Vogel, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [7207-21]

4:10 pm: **Label-free affinity based geno-sensors for point-of-care diagnostic applications**, Teena James, Manu Sebastian Mannoor, Dentocho V. Ivanov, New Jersey Institute of Technology (United States); Les Beadling, William Braunlin, Rational Affinity Devices, LLC (United States) [7207-22]

4:30 pm: **Microfluidic-based flow cytometer for point-of-care applications based on a spatial modulation technique**, Peter Kiesel, Markus Beck, Michael Bassler, Noble M. Johnson, Palo Alto Research Center, Inc. (United States) [7207-23]

4:50 pm: **Development of a micro-flow cytometer with three-dimensional hydrofocusing and integrated optical cell counting units**, Guocheng Shao, Wanjun Wang, Louisiana State Univ. (United States) [7207-24]

Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Integrating multiple microfabrication approaches to create complexity in microfluidic devices, Leanna M. Levine, ALine, Inc. (United States) [7207-26]

Sensitivity evaluation of a love wave sensor with multilayer structure for biochemical application, Haekwan Oh, Wen Wang, Kee-Keun Lee, Sang Sik Yang, Ajou Univ. (Korea, Republic of) [7207-27]

Red blood cell quantification microfluidic chip using polyelectrolytic gel electrodes, Kwang Bok Kim, Seoul National Univ. Hospital (Korea, Republic of) [7207-28]

Measurement of flow structure in a wavy falling liquid film using Fourier-domain Doppler optical coherence tomography, Yeh-Chan Ahn, Univ. of California, Irvine (United States); Sang-Won Lee, Yonsei Univ. (Korea, Republic of); Woonggyu Jung, Univ. of California, Irvine (United States); Beop-Min Kim, Yonsei Univ. (Korea, Republic of); Zhongping Chen, Univ. of California, Irvine (United States) [7207-29]

High-resolution surface interferometric profilometry during and after laser ablation, Gereon Hüttmann, Univ. zu Lübeck (Germany) [7207-30]

Development of pH sensor module for wireless sensor-network system, Ho Jeong Shon, Sunghyun Kim, Dongwoo Han, Sekwang Park, Kyungpook National Univ. (Korea, Republic of) [7207-31]

Simultaneous and wireless measurement of CO₂ and humidity using a saw reflective delay line, Chunbae Lim, Wen Wang, Kee-Keun Lee, Haekwan Oh, Sang Sik Yang, Ajou Univ. (Korea, Republic of) [7207-32]

Wednesday 28 January

PANEL DISCUSSION

Room: Fairmont Hotel, Gold Room Wed. 7:00 to 8:30 pm

Progress and Prospects in Microfluidics

Moderators: **Albert K. Henning**, Nanolnk, Inc. (United States); **Wanjun Wang**, Louisiana State Univ. (United States)

In the past decade, microfluidics has rapidly emerged and become main stream. Some of the microfluidic products have becoming commercially available with many more to come in the near future. Most microfluidic devices today are made of glass and polymer materials. The main reason for this trend is that the biomedical researchers and analytical chemists have been using these materials for many years and accumulated enough know-how and knowledge. As a matter of fact, this rapid development of microfluidics has been driven by compelling applications in analytical chemistry and biomedical sciences, with enormous potential in developing new technologies and reducing costs. Recent years have seen a number of microfluidic chips brought to market, including those by Agilent and Fluidigm. One little-addressed aspect of microfluidics, however, is on-chip synthesis of microfluidics with optical detection techniques. Another important trend in the recent years is the integration of nanosensing technologies with the MEMS technologies for enhanced system performances. This panel discussion will provide an overview of microfluidics over the past decade, with particular emphasis on progress related to the integration of optical detection and nanosensing technologies in microfluidic systems.

Conference 7208 · Hilton Hotel, Almaden Ballroom II

Tuesday-Wednesday 27-28 January 2009 • Proceedings of SPIE Vol. 7208

MOEMS and Miniaturized Systems VIII

Conference Chairs: **David L. Dickensheets**, Montana State Univ./Bozeman; **Harald Schenk**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Wibool Piyawattanametha**, NECTEC (Thailand) and Stanford Univ. (Thailand)

Program Committee: **Susanne Arney**, Lucent Technologies/Bell Labs.; **Jean-Christophe Eloy**, Yole Développement (France); **Sonia Garcia-Blanco**, Institut National d'Optique (Canada); **Jason C. Heikenfeld**, Univ. of Cincinnati; **Wilfried Noell**, Univ. de Neuchâtel (Switzerland); **Yong-Hwa Park**, Samsung Advanced Institute of Technology (South Korea)

Tuesday 27 January

SESSION 1

Room: Hilton Hotel, Almaden Ballroom II Tues. 8:30 to 10:00 am

MOEMS Components and Systems I

Session Chair: **Harald Schenk**,
Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

8:30 am: **Miniaturized UV/VIS spectrometer made by MOEMS technology** (*Invited Paper*), Katsumi Shibayama, Takafumi Yokino, Katsuro Hikita, Norihiro Iwasaki, Hamamatsu Photonics K.K. (Japan); Helmut Teichmann, Ulrich Starker, SPECTRO Solutions AG (Switzerland); Koei Yamamoto, Hamamatsu Photonics K.K. (Japan) [7208-01]

9:00 am: **Advances in SLM development for microlithography**, Ulrike A. Dauderstädt, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Peter B. Björnmängen II, Micronic Laser Systems AB (Sweden); Peter Dürr, Martin Friedrichs, Matthias List, Dirk Rudloff, Jan-Uwe Schmidt, Michael Müller, Michael Wagner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [7208-02]

9:20 am: **Linear micromirror array for broadband femtosecond pulse shaping in phase and amplitude**, Stefan M. Weber, Univ. de Genève (Switzerland); Severin Waldis, Wilfried Noell, Univ. de Neuchâtel (Switzerland); Denis Kiselev, Jérôme Extermann, Luigi Bonacina, Jean-Pierre Wolf, Univ. de Genève (Switzerland); Nicolaas F. de Rooij, Univ. de Neuchâtel (Switzerland) [7208-03]

9:40 am: **Large area transmissive modulator for a remotely interrogated MEMS-based optical tag**, Mark E. McNie, Andrew M. Scott, Nicola Price, Gilbert W. Smith, Kevin D. Ridley, Kevin M. Brunson, Keith L. Lewis, QinetiQ Ltd. (United Kingdom) [7208-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Hilton Hotel, Almaden Ballroom II . Tues. 10:30 am to 12:10 pm

MOEMS Components and Systems II

Session Chair: **Wibool Piyawattanametha**,
NECTEC (Thailand) and Stanford Univ.

10:30 am: **Fabrication of large-scale monocrystalline silicon micromirror arrays using adhesive wafer transfer bonding**, Fabian Zimmer, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Frank Niklaus, Martin Lapisa, KTH School of Electrical Engineering (Sweden); Martin Friedrichs, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Thor Bakke, SINTEF (Norway); Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Wouter van der Wijngaart, KTH School of Electrical Engineering (Sweden) [7208-05]

10:50 am: **Integrated position sensing for 2D microscanning mirrors using the SOI-device layer as the piezoresistive mechanical-elastic transformer**, Jan Grahmann, Holger Conrad, Thilo Sandner, Thomas Klose, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [7208-06]

11:10 am: **Thermally actuated microshutter for MOEMS applications**, Derrick Langley, Stanley Rogers, Air Force Research Lab. (United States); LaVern A. Starman, Air Force Institute of Technology (United States) [7208-07]

11:30 am: **Fabrication of 3D comb-drive microscanners by mechanically induced permanent displacement**, Denis Jung, David Kallweit, Christian Drabe, Thilo Sandner, Harald Schenk, Hubert K. Lakner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [7208-08]

11:50 am: **Micro-assembly of three-dimensional rotary MEMS mirrors**, Lidai Wang, James K. Mills, William L. Cleghorn, Univ. of Toronto (Canada) [7208-09]

Lunch Break 12:10 to 2:00 pm

SESSION 3

Room: Hilton Hotel, Almaden Ballroom II Tues. 2:00 to 3:00 pm

MOEMS Components and Systems III

Session Chair: **Harald Schenk**,
Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

2:00 pm: **Application of Si LED's (450nm-750nm) in CMOS integrated circuitry based-MOEMS: simulation and analysis**, Lukas W. Snyman, Kingsley Ogudo, Gustav Udahehema, Tshwane Univ. of Technology (South Africa); Monuko Du Plessis, Univ. of Pretoria (South Africa) [7208-11]

2:20 pm: **Novel MWIR microspectrometer based on a tunable detector**, Norbert Neumann, Martin Ebermann, InfraTec GmbH (Germany); Steffen Kurth, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Karla Hiller, Technische Univ. Chemnitz (Germany) [7208-12]

2:40 pm: **MEMS analyzer for fast determination of mixed gases**, Thomas Otto, Ray Saupe, Alexander Weiss, Fraunhofer-Einrichtung für Elektronische Nanosysteme (Germany); Volker Stock, COLOUR CONTROL Farbmestechnik GmbH (Germany); Wulf Graehler, Oliver Throl, Fraunhofer-Institut für Werkstoff- und Strahltechnik (Germany); Kurt Pietsch, SEMP Systems GmbH (Germany); Thomas Gessner, Fraunhofer-Einrichtung für Elektronische Nanosysteme (Germany) [7208-133]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Hilton Hotel, Almaden Ballroom II Tues. 3:30 to 4:30 pm

Waveguide Devices

Session Chair: **David L. Dickensheets**, Montana State Univ.

3:30 pm: **Integrated incandescent microlamp coupled to SiO₂/N_y waveguide**, Daniel Orquiza, Marcelo N. Carreño, Gustavo P. Rehder, Marco I. Alayo, Univ. de São Paulo (Brazil) [7208-14]

3:50 pm: **Silicon oxynitride-based integrated optical switch**, Gustavo P. Rehder, Mirele Stochero, Marco I. Alayo, Univ. de São Paulo (Brazil) . . [7208-15]

4:10 pm: **Low-voltage widely tunable multiwavelength channel drop filter for 2 Port Quasi colourless ROADMs**, Renil Kumar, Prita Nair, Sri Sivasubramaniya Nadar College of Engineering (India) [7208-17]

Wednesday 28 January

SESSION 5

Room: Hilton Hotel, Almaden Ballroom IIWed. 8:00 to 10:00 am

Special Session: Space and Astronomy Applications I

Session Chair: **Sonia Garcia-Blanco**,
Institut National d'Optique (Canada)

8:00 am: **Micro-interferometer with high throughput for remote sensing** (*Invited Paper*), Alan D. Scott, COM DEV Canada (Canada); Mirosław Florjańczyk, Pavel Cheben, Siegfried Janz, National Research Council Canada (Canada); Brian H. Solheim, York Univ. (Canada); Dan-Xia Xu, National Research Council Canada (Canada)[7208-18]

8:30 am: **Addressable microshutter array for a high-performance infrared miniature dispersive spectrometer** (*Invited Paper*), Samir Ilias, Francis Picard, Carl Larouche, INO (Canada); Roman V. Kruzelecky, Wes Jamroz, MPB Communications Inc. (Canada)[7208-19]

9:00 am: **New astronomical instrument using MOEMS-based programmable diffraction gratings**, Frederic Zamkotsian, Patrick Lanzoni, Lab. d'Astrophysique de Marseille (France); Thierry Viard, Christophe Buisset, Thales Alenia Space (France)[7208-20]

9:20 am: **Advanced microbolometer detectors for a next-generation uncooled FPA for space-based thermal remote sensing**, Fraser Williamson, Linda E. Marchese, Georges Baldenberger, Timothy D. Pope, Francois J. Châteauneuf, Institut National d'Optique (Canada); Linh Ngo-Phong, Canadian Space Agency (Canada)[7208-21]

9:40 am: **Large micromirrors array for multi-object spectroscopy in cryogenic environment**, Michael D. Canonica, Severin Waldis, Univ. de Neuchâtel (Switzerland); Frederic Zamkotsian, Lab. d'Astrophysique de Marseille (France); Patrick Lanzoni, Lab. d'Astrophysique de Marseille (France); Wilfried Noell, Nicolaas F. de Rooij, Univ. de Neuchâtel (Switzerland)[7208-22]

Coffee Break10:00 to 10:30 am

SESSION 6

Room: Hilton Hotel, Almaden Ballroom II . .Wed. 10:30 am to 12:10 pm

Special Session: Space and Astronomy Applications II

Session Chair: **Wilfried Noell**, Univ. de Neuchâtel (Switzerland)

10:30 am: **Nanosatellite Distributed Far Infrared Radiometers** (*Invited Paper*), Linh Ngo-Phong, Canadian Space Agency (Canada); Francois J. Châteauneuf, Institut National d'Optique (Canada)[7208-23]

11:00 am: **MEMS for micro/nano/pico-satellites** (*Invited Paper*), Herbert R. Shea, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[7208-24]

11:30 am: **Analysis of optical thin film thermal deformation based on MOEMS beam control unit of satellite-borne laser communication network**, Yujun Yuan, Univ. of Electronic Science and Technology of China (China)[7208-25]

11:50 am: **Hybrid microtransmitter for free-space optical spacecraft communication: design, manufacturing, and characterization**, Sara Lotfi, Kristoffer Palmer, Greger Thornell, Henrik Kratz, Uppsala Univ. (Sweden)[7208-26]

Lunch/Exhibition Break12:10 to 2:00 pm

SESSION 7

Room: Hilton Hotel, Almaden Ballroom IIWed. 2:00 to 3:10 pm

Display and Imaging I

Session Chair: **Wyatt O. Davis**, Microvision, Inc.

2:00 pm: **Scanning Photon Microscope based on a MEMS 2d Scanner Mirror** (*Invited Paper*), Heinrich Grueger, Jens Knobbe, Thomas Egloff, Marc Althaus, Michael Scholles, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany)[7208-27]

2:30 pm: **Liquid-filled varifocal lens on a chip**, Seung Tae Choi, Jeong Yub Lee, Jong Oh Kwon, Seungwan Lee, Woonbae Kim, Samsung Advanced Institute of Technology (Korea, Republic of)[7208-28]

2:50 pm: **Feedback stabilized large deflection deformable membrane mirrors for focus control**, Sarah J. Lukes, Phillip A. Himmer, Steven R. Shaw, David L. Dickensheets, Montana State Univ. (United States)[7208-29]

Coffee Break3:10 to 3:40 pm

SESSION 8

Room: Hilton Hotel, Almaden Ballroom IIWed. 3:40 to 4:50 pm

Display and Imaging II

Session Chair: **Ulrike A. Dauderstädt**,
Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

3:40 pm: **Design and fabrication of a MEMS mirror for miniature laser projection** (*Invited Paper*), Rene Sanders, Diederik van Lierop, Boudewijn de Jong, Herman Soemers, Philips Applied Technologies (Netherlands)[7208-31]

4:10 pm: **Empirical analysis of form drag damping for scanning micromirrors**, Wyatt O. Davis, Microvision, Inc. (United States)[7208-32]

4:30 pm: **Fine-pitch, high-efficiency spatial optical modulator for mobile display applications**, Hee Yeoun Kim, Jong Hyeong Song, Seungdo An, Heung Woo Park, Victor Yurlov, Anatolij S. Lapchuk, Chung Mo Yang, Sung Jun Lee, Jae Wook Jang, Ki Un Lee, El M. Bourim, Ki Suk Woo, Sang Kyeong Yun, Samsung Electro-Mechanics (Korea, Republic of)[7208-33]

MOEMS-MEMS

Conference 7209 · Hilton Hotel, San Carlos Rooms I/II

Tuesday-Thursday 27-29 January 2009 • Proceedings of SPIE Vol. 7209

MEMS Adaptive Optics III

Conference Chairs: **Scot S. Olivier**, Lawrence Livermore National Lab.; **Thomas G. Bifano**, Boston Univ.; **Joel A. Kubby**, Univ. of California/Santa Cruz

Program Committee: **William D. Cowan**, Sandia National Labs.; **Christopher J. Dainty**, National Univ. of Ireland/Galway (Ireland); **Donald T. Gavel**, Univ. of California Observatories; **Andreas Gehner**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Wenhan Jiang**, Institute of Optics and Electronics (China); **Alexis V. Kudryashov**, Moscow State Open Univ. (Russia); **Sergio R. Restaino**, Naval Research Lab.; **Ulrich Wittrock**, Univ. Münster (Germany)

SPIE and the organizers gratefully acknowledge the following conference cosponsors:



Tuesday 27 January

POSTERS-TUESDAY

Room: Civic Auditorium Tues. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Tuesday.

View Poster Setup Instructions on p. 311.

Liquid-crystal adaptive-optics system for unpolarized light, Dongmei Cai, Jun Yao, Wenhan Jiang, Institute of Optics and Electronics (China) [7209-24]

Optical efficiency of MEMS deformable mirror for adaptive optics, Dongmei Cai, Yao Jun, Wenhan Jiang, Institute of Optics and Electronics (China) [7209-25]

Wednesday 28 January

SESSION 1

Room: Hilton Hotel, San Carlos Rooms I/II Wed. 1:00 to 3:10 pm

MEMS AO for Bio-imaging

Session Chair: **Joel A. Kubby**, Univ. of California, Santa Cruz

1:00 pm: **A Shack-Hartmann wavefront sensor-based adaptive optics system for multiphoton microscopy** (*Invited Paper*), Peter T. So, Jae Won Cha, Massachusetts Institute of Technology (United States); Jérôme Ballesta, Imagine Optic (France) [7209-01]

1:30 pm: **Two-photon fluorescence microscopy with modulated aberration imaging** (*Invited Paper*), Kengyeh K. Chu, Thomas G. Bifano, Jerome Mertz, Boston Univ. (United States) [7209-02]

2:00 pm: **Optimum schemes for wavefront sensorless adaptive optics in microscopy** (*Invited Paper*), Martin J. Booth, Delphine Débarre, Tony Wilson, Univ. of Oxford (United Kingdom) [7209-03]

2:30 pm: **Performance of a MEMS-based AO-OCT system using Fourier reconstruction**, Julia W. Evans, Lawrence Livermore National Lab. (United States); Robert J. Zawadzki, Univ. of California, Davis Medical Ctr. (United States); Steve M. Jones, Scot S. Olivier, Lawrence Livermore National Lab. (United States); John S. Werner, Univ. of California, Davis Medical Ctr. (United States) [7209-04]

2:50 pm: **Implementation of a Shack-Hartmann wavefront sensor for the measurement of embryo-induced aberrations using fluorescent microscopy**, Oscar A. Azucena, Jr., Joel A. Kubby, William Sullivan, Jian Cao, Justin Crest, Univ. of California, Santa Cruz (United States); Peter A. Kner, Univ. of California, San Francisco (United States) [7209-05]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Room: Hilton Hotel, San Carlos Rooms I/II Wed. 3:40 to 6:20 pm

MEMS AO for Lasers and Communications

Session Chair: **Scot S. Olivier**, Lawrence Livermore National Lab.

3:40 pm: **Interferometric adaptive optics for high-power laser pointing, wavefront control and phasing** (*Invited Paper*), Kevin L. Baker, Lawrence Livermore National Lab. (United States); Doug C. Homoele, MIT Lincoln Lab. (United States); Eddy A. Stappaerts, Mark A. Hennesian, Lawrence Livermore National Lab. (United States) [7209-06]

4:10 pm: **Quantum control spectroscopy with a micro-electro-mechanical-system (MEMS)** (*Invited Paper*), Tiago Buckup, J. Möhring, M. Motzkus, Philipps-Univ. Marburg (Germany) [7209-07]

4:40 pm: **MEMS for femtosecond pulse shaping applications**, Ariana Rondi, Jérôme Extermann, Stefan M. Weber, Univ. de Genève (Switzerland); Jonathan D. Roslund, Matthias H. Roth, Princeton Univ. (United States); Luigi Bonacina, Univ. de Genève (Switzerland); Herschel A. Rabitz, Princeton Univ. (United States); Jean-Pierre Wolf, Univ. de Genève (Switzerland) [7209-08]

5:00 pm: **Novel construction of a deformable mirror for laser beam shaping**, Claudia Bruchmann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Ramona Eberhardt, Erik Beckert, Thomas Peschel, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Andreas Tünnermann, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Steffen Gramens, Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Sylvia E. Gebhardt, Fraunhofer-Institut für Keramische Technologien und Sinterwerkstoffe (Germany) [7209-09]

5:20 pm: **Secure optical communication system utilizing deformable MEMS mirrors** (*Invited Paper*), Leah Ziph-Schatzberg, Boston Univ. (United States); Thomas G. Bifano, Boston Univ. (United States) and Boston Micromachines Corp. (United States); Steven A. Cornelissen, Jason B. Stewart, Boston Micromachines Corp. (United States); Zvi Bleier, PLX Inc. (United States) [7209-10]

5:50 pm: **Deformable mirrors for lasers** (*Invited Paper*), Alexis V. Kudryashov, Vadim V. Samarkin, Moscow State Open Univ. (Russian Federation) [7209-11]

Thursday 29 January

SESSION 3

Room: Hilton Hotel, San Carlos Rooms I/IIThurs. 9:00 to 11:30 am

MEMS AO for Astronomy

Session Chair: Thomas G. Bifano, Boston Univ.

9:00 am: **MEMS devices in future astronomical telescope adaptive optics instruments** (*Invited Paper*), Donald T. Gavel, Univ. of California Observatories (United States).[7209-12]

9:30 am: **The Naval Research Laboratory MEMS adaptive optics program: an update** (*Invited Paper*), Sergio R. Restaino, Jonathan R. Andrews, Ty Martinez, Naval Research Lab. (United States); Don M. Payne, Narrascope, Inc. (United States); Freddie Santiago, Naval Reserach Lab. (United States); Christopher C. Wilcox, Naval Research Lab. (United States)[7209-13]

10:00 am: **Demonstration of a symmetric dark hole with a stroke-minimizing correction algorithm**, Jason D. Kay, Princeton Univ. (United States); Laurent A. Pueyo, Jet Propulsion Lab. (United States); N. Jeremy Kasdin, Princeton Univ. (United States)[7209-14]

Coffee Break10:20 to 10:50 am

10:50 am: **Adaptive modeling of deformable mirrors for high-contrast imaging**, Jason D. Kay, N. Jeremy Kasdin, Princeton Univ. (United States).[7209-15]

11:10 am: **Preliminary characterization of Boston Micromachines' 4096-actuator deformable mirror**, Andrew P. Norton, Univ. of California, Santa Cruz (United States); Julia W. Evans, Lawrence Livermore National Lab. (United States); Donald T. Gavel, Univ. of California Observatories (United States); Steven A. Cornelissen, Boston Micromachines Corp. (United States); Bruce A. Macintosh, David W. Palmer, Lawrence Livermore National Lab. (United States); Daren R. Dillon, Univ. of California, Santa Cruz (United States)[7209-16]

Lunch/Exhibition Break11:30 am to 1:00 pm

SESSION 4

Room: Hilton Hotel, San Carlos Rooms I/IIThurs. 1:00 to 1:30 pm

AO in China

Session Chair: Scot S. Olivier, Lawrence Livermore National Lab.

1:00 pm: **Adaptive optics in IOE, CAS** (*Invited Paper*), Wenhan Jiang, Yudong Zhang, Changhui Rao, Ning Ling, Chunlin Guan, Institute of Optics and Electronics (China).[7209-18]

SESSION 5

Room: Hilton Hotel, San Carlos Rooms I/IIThurs. 1:30 to 3:30 pm

MEMS AO Devices

Session Chair: Donald T. Gavel, Univ. of California Observatories

1:30 pm: **Design and analysis of repulsive electrostatic-driven MEMS actuators** (*Invited Paper*), Jun Yao, Fangrong Hu, Dongmei Cai, Wenhan Jiang, Institute of Optics and Electronics (China)[7209-19]

2:00 pm: **Scaling of the iris AO segmented MEMS DM to larger arrays** (*Invited Paper*), Michael A. Helmbrecht, Min He, Carl Kempf, Iris AO, Inc. (United States).[7209-20]

2:30 pm: **Advanced optical coatings of a segmented MEMS DM**, Michael A. Helmbrecht, Nathan Doble, Carl Kempf, Iris AO, Inc. (United States).[7209-21]

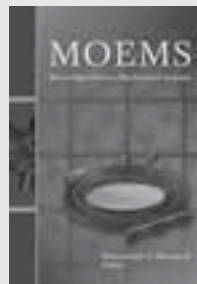
2:50 pm: **Novel unimorph deformable mirror for solid state laser resonators**, Sven Verpoort, Ulrich Wittrock, Petra Welp, Münster Univ. of Applied Sciences (Germany)[7209-22]

3:10 pm: **Initial performance results of high-aspect ratio gold deformable mirrors**, Bautista R. Fernandez, Joel A. Kubby, Univ. of California, Santa Cruz (United States).[7209-23]

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Conference 7210 · Hilton Hotel, Plaza Room

Wednesday 28 January 2009 • Proceedings of SPIE Vol. 7210

Emerging DMD-Based Systems and Applications

Conference Chairs: **Larry J. Hornbeck**, Texas Instruments Inc.; **Michael R. Douglass**, Texas Instruments Inc.

Program Committee: **Richard G. Baraniuk**, Rice Univ.; **Leigh A. Files**, Texas Instruments Inc.; **Mark T. Bolas**, Univ. of Southern California; **Patrick I. Oden**, Texas Instruments Inc.; **Joseph P. Rice**, National Institute of Standards and Technology

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Wednesday 28 January

INTRODUCTION AND WELCOME

Room: Hilton Hotel, Plaza Room. Wed. 8:00 to 8:10 am

Larry J. Hornbeck and Michael R. Douglass,
Texas Instruments Inc. (United States)

SESSION 1

Room: Hilton Hotel, Plaza Room. Wed. 8:10 to 10:10 am

Photomedical Applications for Advanced Research and Improved Patient Care

Session Chairs: **Leigh A. Files**, Texas Instruments Inc.;
Michael R. Douglass, Texas Instruments Inc.

8:10 am: **Dynamic high-resolution patterning for biomedical, materials, and semiconductor research** (*Invited Paper*), Harold R. Garner, Amruta Joshi, Michael L. Huebschman, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Surya Shandy, Lynntech, Inc. (United States); Sandhya N. Mitnala, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); Brandi Wallek, Season Wong, Lynntech, Inc. (United States) [7210-01]

8:40 am: **Ophthalmic applications of the Digital Micromirror Device (DMD)**, Daniel J. Reiley, Christian A. Sandstedt, Calhoun Vision, Inc. (United States) [7210-02]

9:00 am: **Force versus position profiles of HeLa cells trapped in phototransistor-based optoelectronic tweezers**, Steven L. Neale, Aaron T. Ohta, Hsan-Yin Hsu, Justin K. Valley, Arash Jamshidi, Ming C. Wu, Univ. of California, Berkeley (United States) [7210-03]

9:20 am: **Application of digital micromirror devices to vision science: shaping the spectrum of stimuli**, Michael A. Crognale, Michael A. Webster, Univ. of Nevada, Reno (United States); Alexandre Y. Fong, Optronic Labs., Inc. (United States) [7210-04]

9:40 am: **DLP® hyperspectral imaging for surgical and clinical utility** (*Invited Paper*), Karel J. Zuzak, Robert Francis, The Univ. of Texas at Arlington (United States); Jack C. Smith, Texas Instruments Inc. (United States); Maritoni Litorja, National Institute of Standards and Technology (United States); Edward H. Livingston, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States) [7210-05]

Coffee Break 10:10 to 10:30 am

SESSION 2

Room: Hilton Hotel, Plaza Room. Wed. 10:30 am to 12:20 pm

Hyperspectral Imaging and Multi-Object Sensing

Session Chairs: **Joseph P. Rice**, National Institute of Standards and Technology; **Larry J. Hornbeck**, Texas Instruments Inc.

10:30 am: **Programmable matched filter and Hadamard transform hyperspectral imagers based on micromirror arrays** (*Invited Paper*), Steven P. Love, Los Alamos National Lab. (United States) [7210-06]

11:00 am: **DMD-based adaptive spectral imagers for hyperspectral imagery and direct detection of spectral signatures**, Neil Goldstein, Pajo Vujkovic-Cvijin, Marsha J. Fox, Brian Gregor, Jaminee Lee, Jason Cline, Steven M. Adler-Golden, Spectral Sciences, Inc. (United States) [7210-07]

11:20 am: **DMD-based compressive imaging and spectroscopy**, Kevin Kelly, Rice Univ. (United States) [7210-08]

11:40 am: **Applications of DMDs for astrophysical research**, Massimo Robberto, Space Telescope Science Institute (United States); Andrea Cimatti, Univ. degli Studi di Bologna (Italy); Alfred Jacobsen, OpSys Project Consulting (Germany); Filippo M. Zerbi, Osservatorio Astronomico di Brera (Italy) [7210-09]

12:00 pm: **DMD-based hyperspectral augmentation for multi-object tracking systems**, Jonathan G. Neumann, Naval Research Lab. (United States) [7210-10]

Lunch Break 12:20 to 1:30 pm

SESSION 3

Room: Hilton Hotel, Plaza Room. Wed. 1:30 to 3:20 pm

Optical Techniques for 3D-Metrology, Calibration, and Microscopy

Session Chairs: **Patrick I. Oden**, Texas Instruments Inc.;
Michael R. Douglass, Texas Instruments Inc.

1:30 pm: **DLP-based 3D metrology by structured light and/or projected fringe technology for life sciences and industrial metrology** (*Invited Paper*), Gottfried J. Frankowski, GFMesstechnik GmbH (Germany) [7210-11]

2:00 pm: **Applications of mirror-array-based projectors for test and evaluation of multispectral and hyperspectral imaging sensors**, Joseph P. Rice, Jorge E. Neira, National Institute of Standards and Technology (United States) [7210-12]

2:20 pm: **Real-time 3D shape recording by DMD-based all-digital surface encoding**, Roland Höfling, Petra Aswendt, ViALUX GmbH (Germany) . [7210-13]

2:40 pm: **Optical calibration of a Digital Micromirror Device (DMD)-based compressive imaging system**, Yuehao Wu, Caihua Chen, Dennis W. Prather, Peng Ye, Zhongmin Wang, Gonzalo R. Arce, Univ. of Delaware (United States) [7210-14]

3:00 pm: **Compressive confocal microscopy**, Peng Ye, Caihua Chen, Yuehao Wu, Gonzalo R. Arce, Dennis W. Prather, Univ. of Delaware (United States) [7210-15]

Coffee Break 3:20 to 3:40 pm

SESSION 4

Room: Hilton Hotel, Plaza Room. Wed. 3:40 to 5:10 pm

Advanced Micromirror Projection Applications

Session Chairs: **Larry J. Hornbeck**, Texas Instruments Inc.;
Patrick I. Oden, Texas Instruments Inc.

3:40 pm: **Imaging and display applications using fast light** (*Invited Paper*), Ian E. McDowall, Fakespace Labs, Inc. (United States) [7210-16]

4:10 pm: **Dynamic infrared scene projectors based upon the DMD**, David B. Beasley, Optical Sciences Corp. (United States) [7210-17]

4:30 pm: **Two-band DMD-based infrared scene simulator**, Julia R. Dupuis, David J. Mansur, Robert M. Vaillancourt, Thomas Evans, David L. Carlson, Elizabeth Schundler, OPTRA, Inc. (United States) [7210-18]

4:50 pm: **Development of MOEMS technology in maskless lithography**, David R. Smith, Digital Light Innovations (United States); Dieter M. Klenk, CST GmbH (Germany) [7210-19]

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David J. Rogers, Nanovation SARL (France)
Laurence P. Sadwick, InnoSys, Inc.
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Symposium Chair



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Air Force Research Lab.
(United States)

Symposium Co-Chair



E. Fred Schubert
Rensselaer Polytechnic Institute
(United States)

Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab.

Photonic Integration

Program Chair: **Yakov Sidorin**, Bromberg Sunstein LLP

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ.

Semiconductor Lasers and LEDs

Program Chair: **E. Fred Schubert**, Rensselaer Polytechnic Institute

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ.

Optical Communications: Systems and Sub-systems

Program Chair: **Benjamin B. Dingel**, Nasfine Photonics, Inc.

Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
24 January	25 January	26 January	27 January	28 January	29 January

Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab.

		7211 Physics and Simulation of Optoelectronic Devices XVII (Osiriski, Witzigmann, Henneberger, Arakawa) p. 200			
		7212 Optical Components and Materials VI (Jiang, Digonnet, Glesener, Dries) p. 203			
			7213 Organic Photonic Materials and Devices XI (Nelson, Kajzar, Kaino) p. 206		
	7214 Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIII (Tsen, Song) p. 209				
				7215 Terahertz Technology and Applications II (Linden, Sadwick, O'Sullivan) p. 212	
			7216 Gallium Nitride Materials and Devices IV (Morkoç, Litton) p. 214		
	7217 Zinc Oxide Materials and Devices IV (Teherani, Litton, Rogers) p. 219				

Photonic Integration

Program Chair: **Yakov Sidorin**, Bromberg Sunstein LLP

		7218 Integrated Optics: Devices, Materials, and Technologies XIII (Broquin, Greiner) p. 221			
				7219 Optoelectronic Integrated Circuits XI (Eldada, Lee) p. 224	
		7220 Silicon Photonics IV (Kubby, Reed) p. 226			
		7221 Photonics Packaging, Integration, and Interconnects IX (Glebov, Chen) p. 229			

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology

	7222 Quantum Sensing and Nanophotonic Devices VI (Razeghi) p. 232				
			7223 Photonic and Phononic Crystal Materials and Devices VIII (Adibi, Lin, Scherer) p. 236		
	7224 Quantum Dots, Particles, and Nanoclusters VI (Eyink, Szmulowicz, Huffaker) p. 239				
			7205 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II (Suleski, Schoenfeld, Wang) p. 186		

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ.

				7225 Advanced Optical Concepts in Quantum Computing, Memory, and Communication II (Hasan, Craig, Hemmer) p. 241	
	7226 Advances in Slow and Fast Light II (Shahriar, Hemmer, Lowell) p. 243			7227 Complex Light and Optical Forces III (Galvez) p. 245	
				7228 Laser Refrigeration of Solids II (Epstein, Sheik-Bahae) p. 246	

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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Semiconductor Lasers and LEDs

Program Chair: **E. Fred Schubert**, Rensselaer Polytechnic Institute

				7229 Vertical-Cavity Surface-Emitting Lasers XIII (Choquette, Lei) p. 247	
		7230 Novel In-Plane Semiconductor Lasers VIII (Belyanin, Smowton) p. 249			
			7231 LEDs: Materials, Devices, and Applications for Solid State Lighting XIII (Streubel, Jeon) p. 253		
		7211 Physics and Simulation of Optoelectronic Devices XVII (Osiński, Witzigmann, Henneberger, Arakawa) p. 200			
		7216 Gallium Nitride Materials and Devices IV (Morkoç, Litton) p. 214			
	7217 Zinc Oxide Materials and Devices IV (Teherani, Litton, Rogers) p. 219				
		7198 High-Power Diode Laser Technology and Applications VII (Zediker) p. 167			

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ.

7232 Emerging Liquid Crystal Technologies IV (Chien) p. 256
7233 Practical Holography XXIII: Materials and Applications (Bjelkhagen, Kostuk) p. 259

Optical Communications: Systems and Sub-systems

Program Chair: **Benjamin B. Dingel**, Nasfinc Photonics, Inc.

				7234 Broadband Access Communication Technologies III (Dingel, Jain, Tsukamoto) p. 261	
					7235 Optical Metro Networks and Short-Haul Systems (Weiershausen, Dingel, Dutta, Srivastava) p. 262
				7236 Quantum Communications Realized II (Arakawa, Sasaki, Sotobayashi) p. 263	
		7221 Photonics Packaging, Integration, and Interconnects IX (Glebov, Chen) p. 229			
				7199 Free-Space Laser Communication Technologies XXI (Hemmati) p. 170	

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Physics and Simulation of Optoelectronic Devices XVII

Conference Chairs: **Marek Osirski**, Univ. of New Mexico; **Bernd Witzigmann**, ETH Zürich (Switzerland); **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany); **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan)

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Monday 26 January

OPENING REMARKS

Room: Conv. Ctr. Room M Mon. 1:55 to 2:00 pm
Marek Osirski, CHTM, Univ. of New Mexico (United States)

SESSION 1

Room: Conv. Ctr. Room M Mon. 2:00 to 3:00 pm
Wide-Bandgap LEDs and Thermoelectric Devices

Session Chair: **Hiroshi Amano**, Meijo Univ. (Japan)

2:00 pm: **Analysis of current injection efficiency and efficiency-droop in InGaN quantum wells light-emitting diodes**, Ronald A. Arif, Hongping Zhao, Nelson Tansu, Lehigh Univ. (United States) [7211-01]

2:20 pm: **Analysis of thermoelectric characteristics of InGaN semiconductors**, Hua Tong, Hongping Zhao, Nelson Tansu, Lehigh Univ. (United States) [7211-02]

2:40 pm: **Modelling of a LED using ASAP**, Luis Acevedo, Marc P. Desmulliez, Heriot-Watt Univ. (United Kingdom) [7211-03]

Coffee Break 3:00 to 3:30 pm

SESSION 2

Room: Conv. Ctr. Room M Mon. 3:30 to 5:40 pm
Physics of Semiconductor Lasers with Optical Injection and Optical Feedback, and Diode Laser Frequency Stabilization

Session Chair: **Bernd Witzigmann**, ETH Zürich (Switzerland)

3:30 pm: **Sensitivity of semiconductor lasers to coherent and noisy optical injection: towards instability-based laser sensors** (*Invited Paper*), Sebastian M. Wieczorek, The Univ. of Exeter (United Kingdom) [7211-04]

4:00 pm: **Characteristics of the frequency-locked states generated by a semiconductor laser under periodical optical injection and their applications in frequency conversion**, Yu-Shan Juan, Yi-Huan Liao, Fan-Yi Lin, National Tsing Hua Univ. (Taiwan) [7211-05]

4:20 pm: **Analysis of the modulation response of an injection locked quantum-dash Fabry Perot laser at 1.55 μ m**, Mike C. Pochet, Nader A. Naderi, Frederic Grillot, The Univ. of New Mexico (United States); Nathan B. Terry, Vassilios I. Kovanis, Air Force Research Lab. (United States); Luke F. Lester, The Univ. of New Mexico (United States) [7211-06]

4:40 pm: **Systematic investigation of the alpha parameter influence on the critical feedback level in QD lasers**, Frederic Grillot, Nader A. Naderi, Mike C. Pochet, Chang-Yi Lin, Luke F. Lester, The Univ. of New Mexico (United States) [7211-07]

5:00 pm: **Pulse compression and pedestal rejection of pulsed diode laser sources with nonlinear amplifying loop mirror (NALM)**, Cristina de Dios Fernandez, Horacio R. Lamela, Univ. Carlos III de Madrid (Spain) [7211-08]

5:20 pm: **Oscillation frequency stabilization of a semiconductor laser by an indirect modulation method using the Faraday effect**, Sato Akira, Niigata Univ. (Japan) [7211-09]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 3

Room: Conv. Ctr. Room M Tues. 10:30 am to 12:00 pm

Minisymposium on Single Photon Emitters I

Session Chair: **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany)

10:30 am: **Theory of chip-based cavity-QED using planar photonic crystals: opportunities and limitations for single photon sources** (*Invited Paper*), Stephen Hughes, Queen's Univ. (Canada) [7211-10]

11:00 am: **Entangled photon emission from semiconductor quantum dots** (*Invited Paper*), Andrew J. Shields, Toshiba Research Europe Ltd. (United Kingdom) [7211-11]

11:30 am: **Quantum dots in photonic crystals: from single photon sources to single photon nonlinear optics** (*Invited Paper*), Jelena Vuckovic, Dirk R. Englund, Andrei Faraon, Ilya Fushman, Arka Majumdar, Stanford Univ. (United States) [7211-12]

Lunch/Exhibition Break 12:00 to 1:40 pm

SESSION 4

Room: Conv. Ctr. Room M Tues. 1:40 to 3:00 pm

Minisymposium on Single Photon Emitters II

Session Chair: **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany)

1:40 pm: **A high-temperature single-photon source from nanowire quantum dots** (*Invited Paper*), Kuntheak Kheng, Univ. Joseph Fourier (France); Henri Mariette, Ctr. National de la Recherche Scientifique (France) [7211-13]

2:10 pm: **Measuring one and few photons: superconducting nanowire photon number resolving detectors** (*Invited Paper*), Andrea Fiore, F. Marsili, David Bitauld, Technische Univ. Eindhoven (Netherlands); A. Gaggero, R. Leoni, F. Mattioli, Istituto di Fotonica e Nanotecnologie del CNR (Italy); Alexander Divochiy, Alexander A. Korneev, Gregory N. Goltsman, Moscow State Pedagogical Univ. (Russian Federation) [7211-14]

2:40 pm: **Electrically driven room temperature operation of a single quantum dot emitter**, Tilmar Kümmell, Robert Arians, Univ. Duisburg-Essen (Germany); Arne Gust, Carsten Kruse, Detlef Hommel, Univ. Bremen (Germany); Gerd Bacher, Univ. Duisburg-Essen (Germany) [7211-15]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: Conv. Ctr. Room M Tues. 3:30 to 5:30 pm

Minisymposium on Single Photon Emitters III

Session Chair: Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany)

- 3:30 pm: **Deterministic single InAs/InP quantum dot structures for single and entangled photon pair generation** (*Invited Paper*), Dan Dalacu, National Research Council Canada (Canada); M. Reimer, National Research Council Canada (Canada) and Univ. of Ottawa (Canada); Jean Lapointe, Philip J. Poole, Geof C. Aers, National Research Council Canada (Canada); Robin L. Williams, National Research Council Canada (Canada) and Univ. of Ottawa (Canada); Ross McKinnon, M. Korkusinski, Pawel Hawrylak, National Research Council Canada (Canada) [7211-16]
- 4:00 pm: **Spatial and spectral control of quantum dot structures by unconventional techniques** (*Invited Paper*), O. G. Schmidt, Leibniz-Institut für Festkörper- und Werkstofforschung Dresden (Germany) [7211-17]
- 4:30 pm: **Advances in GaN-based quantum dots for single photon emitters** (*Invited Paper*), Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [7211-18]
- 5:00 pm: **One-by-one coupling of single photon emitters to high-Q modes of optical microresonators** (*Invited Paper*), Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [7211-19]

Wednesday 28 January

SESSION 6

Room: Conv. Ctr. Room M Wed. 8:50 to 10:00 am

Photovoltaic Devices

Session Chair: Shun Lien Chuang, Univ. of Illinois at Urbana-Champaign

- 8:50 am: **Physics of quantum well solar cells** (*Invited Paper*), Nicholas Ekins-Daukes, Toyota Technological Institute (Japan) [7211-20]
- 9:20 am: **Dilute nitride-based III-V heterostructures for unhindered carrier transport in quantum-confined p-i-n solar cells**, Andenet Alemu, Alexandre Freundlich, Univ. of Houston (United States) [7211-21]
- 9:40 am: **Raytracing techniques applied to the modeling of fluorescent solar collectors**, Thomas J. J. Meyer, Tom Markvart, Univ. of Southampton (United Kingdom); Edward R. Freniere, Lambda Research Corp. (United States); Linda A. Smith, Peloton Diagnostics Corp. (United States) [7211-22]
- Coffee Break 10:00 to 10:30 am

SESSION 7

Room: Conv. Ctr. Room M Wed. 10:30 to 11:50 am

Physics of Low-Dimensional Structures and Devices

Session Chair: Nikolay N. Ledentsov, VI Systems GmbH (Germany)

- 10:30 am: **Electroluminescence in nanostructures of different dimensionalities: a comparative simulation study**, Sebastian Steiger, Ratko Veprek, Bernd Witzigmann, ETH Zürich (Switzerland) [7211-23]
- 10:50 am: **Optical logic using regular and quantum dot semiconductor optical amplifier**, Shaozhen Ma, Hongzhi Z. Sun, Zhe Chen, Niloy K. Dutta, Univ. of Connecticut (United States) [7211-24]
- 11:10 am: **Fringing field effects in semiconductor nanowire based double heterostructures**, Jun Hu, Univ. of California, Santa Cruz (United States); Yang Liu, Stanford Univ. (United States); Cun-Zheng Ning, Arizona State Univ. (United States); Robert Dutton, Stanford Univ. (United States); Sung-Mo Kang, Univ. of California, Merced (United States) [7211-25]
- 11:30 am: **Evolution of near-field electromagnetic interference by metallic nano structures**, Jae-Hyuk Kim, Kew-Seung Lee, Hong-Gyu An, Eun-Hee Jeang, Dae-Geun Kim, Seung-Han Park, Yonsei Univ. (Korea, Republic of) [7211-26]
- Lunch/Exhibition Break 11:50 pm to 1:30 am

SESSION 8

Room: Conv. Ctr. Room M Wed. 1:30 to 3:00 pm

Ring Cavity Lasers and Nonlinear Dynamics of Semiconductor Lasers

Session Chair: Marek Osinski, The Univ. of New Mexico

- 1:30 pm: **Microring-based devices for telecommunication applications** (*Invited Paper*), Dimitris Syvridis, Hercules A. Simos, Spiros S. Mikroulis, Alexandros Kapsalis, Univ. of Athens (Greece) [7211-27]
- 2:00 pm: **Synchronization of semiconductor laser on picosecond pulses**, Pascal Besnard, Olivier Vaudel, Jean-Francois Hayau, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [7211-28]
- 2:20 pm: **Spatial mode analysis of nonlinear phenomena in lateral coupled diode lasers (LCDL)**, Rui Santos, Horacio R. Lamela, Univ. Carlos III de Madrid (Spain) [7211-29]
- 2:40 pm: **Analysis of rectangular ring resonator sensor with photonic crystal microcavity**, Hong-Seung Kim, Doo-Gun Kim, Geum-Yoon Oh, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [7211-30]
- Coffee Break 3:00 to 3:30 pm

SESSION 9

Room: Conv. Ctr. Room M Wed. 3:30 to 5:20 pm

Physics of Quantum Dot Lasers and Amplifiers

Session Chair: Yasuhiko Arakawa, The Univ. of Tokyo (Japan)

- 3:30 pm: **Influence of the inhomogeneous size distribution on the threshold characteristics of quantum dot lasers** (*Invited Paper*), Peter Blood, Cardiff Univ. (United Kingdom) [7211-31]
- 4:00 pm: **Modeling of supercontinuum laser linewidth and derivative characteristics of InGaAs quantum dot broadband laser**, Chee-Loon Tan, Lehigh Univ. (United States); Yang Wang, OptiComp Corp. (United States); Hery S. Djie, JDSU (United States); Clara E. Dimas, Yun-Hsiang Ding, Vitchanetra Hongpinyo, C. Chen, Boon-Siew Ooi, Lehigh Univ. (United States) [7211-32]
- 4:20 pm: **Theoretical analysis of 1.55- μ m InAs/InP (311B) quantum dot lasers based on a Multi-population rate equation model**, Frederic Grillot, The Univ. of New Mexico (United States) and Institut National des Sciences Appliquées de Rennes (France); Kiril Veselinov, Institut National des Sciences Appliquées de Rennes (France); Mariangela Gioannini, Politecnico di Torino (Italy); Jacky Even, Slimane Loualiche, Institut National des Sciences Appliquées de Rennes (France); Ivo Montrosset, Politecnico di Torino (Italy) [7211-33]
- 4:40 pm: **Gain dynamics in p-doped InGaAs quantum dot amplifiers from room to cryogenic temperatures**, Paola Borri, Valentina Cesari, Cardiff Univ. (United Kingdom); Marco Rossetti, Andrea Fiore, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Wolfgang W. Langbein, Cardiff Univ. (United Kingdom) [7211-34]
- 5:00 pm: **Small signal analysis of four-wave mixing in InAs/GaAs quantum-dot semiconductor optical amplifiers**, Shaozhen Ma, Zhe Chen, Niloy K. Dutta, Univ. of Connecticut (United States) [7211-35]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

- Numerical simulation of 405-nm InGaN laser diodes with polarization-matched AlGaIn electron-blocking layer and barrier layer**, Yen-Kuang Kuo, Miao-Chan Tsai, Sheng-Hong Yen, Ying-Chung Lu, National Changhua Univ. of Education (Taiwan) [7211-47]
- Numerical study on optimization of InGaN multi-quantum-well laser diodes with polarization-matched AlInGa barrier layers**, Jun-Rong Chen, Tsung-Shine Ko, Po-Yuan Su, Tien-Chang Lu, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan); Yen-Kuang Kuo, National Changhua Univ. of Education (Taiwan); Shing-Chung Wang, National Chiao Tung Univ. (Taiwan) [7211-48]

Conference 7211

Numerical investigation of blue InGaN light-emitting diodes with staggered quantum wells, Bo-Ting Liou, Hsiuping Institute of Technology (Taiwan); Miao-Chan Tsai, Sheng-Horng Yen, Yen-Kuang Kuo, National Changhua Univ. of Education (Taiwan)[7211-49]

Multilayer design for optimization of ohmic contact in InGaAs/GaAs high power diode Laser, Marziyeh Nazari, Sharif Univ. of Technology (Iran, Islamic Republic of); Hassan Ghazi Asadi, Islamic Azad Univ. (Iran, Islamic Republic of)[7211-50]

Novel configurations of dispersion-compensating photonic crystal fiber Raman/EDFA hybrid amplifiers, Maria Adelaide P. M. Andrade, Jose Manuel M. M. Almeida, Univ. de Trás-os-Montes e Alto Douro (Portugal)[7211-52]

IR light emission from variable-gap HgCdTe solid solutions excited by Lorentz force, Bogdan S. Sokolovsky, Ivan Franko National Univ. of L'viv (Ukraine)[7211-53]

Thursday 29 January

SESSION 10

Room: Conv. Ctr. Room MThurs. 9:00 to 9:50 am

Quantum Cascade Lasers

Session Chair: Stephan W. Koch, Philipps-Univ. Marburg (Germany)

9:00 am: **Auger recombination, internal loss, and other processes in interband cascade lasers** (*Invited Paper*), Jerry R. Meyer, Igor Vurgaftman, Mijin Kim, Chul Soo Kim, William W. Bewley, Chadwick L. Canedy, J. Ryan Lindle, Naval Research Lab. (United States)[7211-36]

9:30 am: **Efficient nonequilibrium Green's function simulation of transport in quantum cascade lasers**, Tim Schmielau, Mauro F. Pereira, Sheffield Hallam Univ. (United Kingdom)[7211-37]

Coffee Break9:50 to 10:30 am

SESSION 11

Room: Conv. Ctr. Room MThurs. 10:30 to 11:50 am

Physics and Simulation of VCSELs and DFB Lasers

Session Chair: Cun-Zheng Ning, Arizona State Univ.

10:30 am: **Modeling of tunnel junctions for current injection in VCSELs**, Grigore Adrian Iordachescu, Supélec (France); Joel Jacquet, Supélec (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Paul Verlaine-Metz (France)[7211-39]

10:50 am: **20Gb/s error free transmission in an 850 nm quantum dot VCSEL**, James Lott, Vitaly A. Shchukin, Holger Quast, Nikolay N. Ledentsov, VI Systems GmbH (Germany); Friedhelm Hopfer, Alex Mutig, Gerrit Fiol, Dieter Bimberg, Technische Univ. Berlin (Germany); S. A. Blokhin, Russian Academy of Sciences for Research and Education (Russian Federation); Mikhail V. Maximov, A.F. Ioffe Physico-Technical Institute (Russian Federation); Andreas Stinz, The Univ. of New Mexico (United States); Nikolai D. Zakharov, Peter Werner, Max-Planck-Institut für Mikrostrukturphysik (Germany)[7211-40]

11:10 am: **Efficient 3D simulation of photonic crystal VCSELs**, Aditya Kulkarni, Benjamin Klein, Michael Povolosky, Georgia Institute of Technology (United States)[7211-41]

11:30 am: **Time-dynamic simulations of DFB lasers in 2D**, Britta C. Heubeck, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany)[7211-42]

Lunch/Exhibition Break11:50 am to 1:30 pm

SESSION 12

Room: Conv. Ctr. Room MThurs. 1:30 to 3:00 pm

Ultrafast and Terahertz Nanophotonics, and Fiber Amplifiers

Session Chair: Vassillios I. Kovanis, Air Force Research Lab.

1:30 pm: **Ultrahigh-speed nanophotonics** (*Invited Paper*), Dieter Bimberg, Gerrit Fiol, Christian Meuer, Y. Kim, Technische Univ. Berlin (Germany)[7211-43]

2:00 pm: **Monolithic 1.58-micron InAs/InP quantum dash passively mode-locked lasers**, Chang-Yi Lin, Yongchun Xin, Luke F. Lester, Univ. of New Mexico (United States)[7211-44]

2:20 pm: **Graphene under optical pumping: nonequilibrium distributions, population inversion, and terahertz lasing**, Akira Satou, Maxim Ryzhii, Univ. of Aizu (Japan); Fedir T. Vasko, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine); Taiichi Otusji, Tohoku Univ. (Japan); Victor Ryzhii, Univ. of Aizu (Japan)[7211-45]

2:40 pm: **self-similar pulses in optical fiber amplifiers and transmission**, Zhe Chen, Shaozhen Ma, Niloy K. Dutta, Univ. of Connecticut (United States)[7211-46]

Optical Components and Materials VI

Conference Chairs: **Shibin Jiang**, AdValue Photonics Inc.; **Michel J. F. Digonnet**, Stanford Univ.; **John W. Glesener**, L-3 Electro-Optical Systems; **J. Christopher Dries**, CeeK Systems

Program Committee: **Jean-Luc Adam**, Univ. de Rennes I (France); **Robert P. Dahlgren**, Silicon Valley Photonics, Ltd.; **Leonid B. Glebov**, Univ. of Central Florida; **Min Gu**, Swinburne Univ. of Technology (Australia); **Seppo K. Honkanen**, Helsinki Univ. of Technology (Finland); **Jacques Lucas**, Univ. de Rennes I (France); **John R. Marciante**, Univ. of Rochester; **Yasutake Ohishi**, Toyota Technological Institute (Japan); **Aydogan Ozcan**, Univ. of California/Los Angeles; **Barrett G. Potter, Jr.**, The Univ. of Arizona; **Giancarlo C. Righini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Stan M. Smith**, U.S. Army Space and Missile Defense Command; **Feng Song**, Nankai Univ. (China); **Setsumi Tanabe**, Kyoto Univ. (Japan); **Ji Wang**, Corning Inc.; **John M. Zavada**, U.S. Army Research Office

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room D Mon. 8:30 to 10:00 am

Gain Materials I

Session Chair: **Shibin Jiang**, AdValue Photonics, Inc.

- 8:30 am: **Bi-doped glasses for broadband fiber light source** (*Invited Paper*), Yasushi Fujimoto, Osaka Univ. (Japan) [7212-01]
- 9:00 am: **Development of bismuth doped lead-aluminum-zinc-germanate glass as a broadband optical gain medium**, Mark A. Hughes, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [7212-02]
- 9:20 am: **Fabrication and characterization of heavily rare-earth doped tellurite glasses for two micron fiber lasers**, Daniel Milanese, Hrvoje Gebavi, Quiping Chen, Monica Ferraris, Politecnico di Torino (Italy); Masud Taher, Stefano Taccheo, Swansea Univ. (United Kingdom) [7212-03]
- 9:40 am: **Broadband emission of Tm³⁺-Er³⁺ codoped TeO₂-WO₃-PbO glasses**, Rolindes Balda, Joaquín M. Fernández, Univ. del País Vasco (Spain); Jose M. Fernandez-Navarro, David Muñoz-Martin, Consejo Superior de Investigaciones Científicas (Spain); Mohammad Al-Saleh, Univ. del País Vasco (Spain) [7212-04]
- Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room D Mon. 10:30 am to 12:00 pm

Gain Materials II

Session Chair: **Jean-Luc Adam**, Univ. de Rennes I (France)

- 10:30 am: **Rare-earth doped halide crystals for laser applications: recent advances and future trends** (*Invited Paper*), Patrice Camy, Jean Louis Doualan, A. Benayad, V. Ménard, Alban Ferrier, M. Velázquez, Richard Moncorgé, ENSICAEN (France) [7212-05]
- 11:00 am: **SiO₂-SnO₂ glass-ceramics planar waveguides activated by rare earth ions**, B. N. Shivakiran Bhaktha, Univ. degli Studi di Trento (Italy) and Univ. des Sciences et Technologies de Lille (France); Cristina Armellini, Univ. degli Studi di Trento (Italy); Franck Beclin, Mohamed Bouazaoui, Bruno Capoen, Univ. des Sciences et Technologies de Lille (France); Andrea Chiappini, Alessandro Chiasera, Maurizio Ferrari, Yoann Jestin, Univ. degli Studi di Trento (Italy); Christophe Kinowski, Univ. des Sciences et Technologies de Lille (France); Enrico Moser, Univ. degli Studi di Trento (Italy); D. Narayana Rao, Univ. of Hyderabad (India); Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) and Consiglio Nazionale delle Ricerche (Italy); Sylvia Turrell, Univ. des Sciences et Technologies de Lille (France) [7212-06]
- 11:20 am: **Optical and electrical properties of Mg²⁺ and Li⁺ doped Eu³⁺:SnO₂ nanoparticles**, Piotr Psuja, Dariusz Hreniak, Wieslaw Streck, Polska Akademia Nauk (Poland) [7212-07]
- 11:40 am: **Modeling inversion in ytterbium-doped fibers**, Aarni T. Iho, Mikko J. Söderlund, Joan J. Montiel i Ponsoda, Helsinki Univ. of Technology (Finland); Joona J. Koponen, Liekki OY (Finland); Seppo K. Honkanen, Helsinki Univ. of Technology (Finland) [7212-08]
- Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room D Mon. 1:30 to 3:20 pm

Fiber Devices

Session Chair: **Shibin Jiang**, AdValue Photonics, Inc.

- 1:30 pm: **Continuous wave stimulated Brillouin scattering phase conjugation and beam cleanup in optical fiber** (*Invited Paper*), Steven M. Massey, Air Force Institute of Technology (United States); Justin B. Spring, U.S. Air Force Academy (United States); Timothy H. Russell, Air Force Institute of Technology (United States) [7212-09]
- 2:00 pm: **Green light source by single-pass second harmonic generation with laser and crystal in a tilted butt joint setup**, Jörg Wiedmann, Friedemann Scholz, eagleyard Photonics GmbH (Germany); Tolga Tekin, Sebastian Marx, Günter Lang, Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Olaf Brox, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7212-10]
- 2:20 pm: **Liquid level sensor utilising a long period fiber grating**, Steven J. Grice, Wei Zhang, Kate Sugden, Ian Bennion, Aston Univ. (United Kingdom) [7212-11]
- 2:40 pm: **PANDA-based chiral in-fiber polarizer**, Sheng Zhang, Victor I. Kopp, Victor M. Churikov, Guoyin Zhang, Chiral Photonics, Inc. (United States); Azriel Z. Genack, Queens College/CUNY (United States) and Chiral Photonics, Inc. (United States) [7212-12]
- 3:00 pm: **Study of high temperature stable FBGs fabricated in H₂ loaded and unloaded SMF-28 fiber**, Christopher W. Smelser, Dan Grobnic, Stephen J. Mihailov, Communications Research Ctr. Canada (Canada) [7212-13]
- Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Conv. Ctr. Room D Mon. 3:50 to 5:20 pm

Passive Fibers

Session Chair: **Robert P. Dahlgren**, Silicon Valley Photonics, Ltd.

- 3:50 pm: **Recent progress on the realization of chalcogenides photonic crystal fibres** (*Invited Paper*), Laurent Brilland, PERFOS (France); Johann Troles, Univ. de Rennes I (France) [7212-14]
- 4:20 pm: **Sensitivity of various D-shaped fibers to external refractive index change depending on coupling strength of the evanescent field**, Hyun-Joo Kim, Oh-Jang Kwon, Young-Geun Han, Hanyang Univ. (Korea, Republic of) [7212-16]
- 4:40 pm: **Dual fiber helical long period gratings**, Victor M. Churikov, Victor I. Kopp, Chiral Photonics, Inc. (United States) [7212-17]
- 5:00 pm: **Design and performances of trench-assisted G657A&B fibre optimized towards more space savings and miniaturization of components**, David Boivin, Marianne Astruc, Louis-Anne De Montmorillon, Lionel Provost, Pierre Sillard, Aurelien Bergonzo, Draka Comteq France (France) [7212-18]

OPTO

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room D Tues. 10:30 am to 12:00 pm

Active Devices

Session Chair: Michel J. F. Digonnet, Stanford Univ.

10:30 am: **New approaches to supercontinuum control (Invited Paper)**, Goëry Genty, Tampere Univ. of Technology (Finland) [7212-19]

11:00 am: **Real-time spectroscopy of a novel solid-state random laser**, Sara Garcia-Revilla, Joaquín M. Fernández, Rolindes Balda, Univ. del País Vasco (Spain); Marcos Zayat, David Levy, Instituto de Ciencia de Materiales de Madrid (Spain) [7212-20]

11:20 am: **Lasing-wavelength switchable multiwavelength erbium-doped fiber laser based on a nonlinear optical loop mirror with a photonic crystal fiber**, Young-Geun Han, Hyun-Joo Kim, Oh-Jang Kwon, Suho Chu, Min-Seok Kim, Hanyang Univ. (Korea, Republic of) [7212-21]

11:40 am: **Mechanical stress in rare-Earth doped laser fibers**, Florian Just, Hans R. Müller, Stephan Grimm, Hartmut Bartelt, IPHT Jena (Germany) [7212-22]

Lunch/Exhibition Break 12:00 to 1:10 pm

SESSION 6

Room: Conv. Ctr. Room D Tues. 1:10 to 3:00 pm

Photonic Devices I

Session Chair: Aydogan Ozcan, Univ. of California, Los Angeles

1:10 pm: **Ultrafast all-optical photonic integrate circuits: nonlinear optics on a chip (Invited Paper)**, Benjamin J. Eggleton, The Univ. of Sydney (Australia) [7212-23]

1:40 pm: **Comparison of an Yb-doped fiber and a semiconductor taper for amplification of picosecond laser pulses**, Sina Riecke, Rainer Erdmann, Kristian Lauritsen, PicoQuant GmbH (Germany); Hendrick Thiem, Katrin Paschke, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7212-24]

2:00 pm: **A novel optical component for the development of an integrated interferometric system**, Alison Gracias, Natalya Tokranova, James Castracane, Univ. at Albany (United States) [7212-25]

2:20 pm: **Photorefractive splicing device with double phase conjugate mirror using Sn₂P₂S₆:Sb crystals**, Yuta Wakayama, Atsushi Okamoto, Kohei Shimayabu, Hokkaido Univ. (Japan); Alexander A. Grabar, Uzhgorod National Univ. (Ukraine) [7212-26]

2:40 pm: **Effect of dye on the band gap in 3D polystyrene photonic crystal**, Kamanoor S. Alee, Maruthi M. Brundavanam, Univ. of Hyderabad (India); B. N. Shivakiran Bhaktha, Andrea Chiappini, Maurizio Ferrari, Univ. degli Studi di Trento (Italy); Narayana Rao Desai, Univ. of Hyderabad (India) [7212-15]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: Conv. Ctr. Room D Tues. 3:30 to 5:40 pm

Photonic Devices II

Session Chair: Seppo K. Honkanen, Helsinki Univ. of Technology (Finland)

3:30 pm: **1 mm by 1 mm SOI etched diffraction grating with 0.5 micron waveguide aperture and 0.62 nm channel spacing**, Yingyan Huang, OptoNet Inc. (United States); Qian Zhao, Fang Ou, Yongming Tu, Seng-Tiong Ho, Northwestern Univ. (United States) [7212-27]

3:50 pm: **Silicon slot waveguides for nonlinear optics**, Antti Säynätjoki, Lasse Karvonen, Amit Khanna, Ari Tervonen, Seppo K. Honkanen, Helsinki Univ. of Technology (Finland) [7212-28]

4:10 pm: **Silicon based optical pulse shaping and characterization (Invited Paper)**, Ozdal Boyraz, Xinzhu Sang, En-Kuang Tien, Univ. of California, Irvine (United States) [7212-29]

4:40 pm: **Polarization converters on double hetero structures containing strained quantum wells**, Uzma Khaliq, Jos J. van der Tol, Richard Nötzel, Meint K. Smit, Eindhoven Univ. of Technology (Netherlands) [7212-30]

5:00 pm: **High sensitive and efficient photorefractive tunable optical wavelength filter with applied external field**, Katsuhito Suzuki, Atsushi Okamoto, Masanori Takabayashi, Hokkaido Univ. (Japan); Satoshi Honma, Univ. of Yamanashi (Japan) [7212-31]

5:20 pm: **Magneto-optic Kerr effect in ferromagnetic semiconductors**, Alexander Umnov, Takao Naito, Fujitsu Labs. of America (United States); Chanyuan Sun, Junichiro Kono, Rice Univ. (United States) [7212-32]

Wednesday 28 January

SESSION 8

Room: Conv. Ctr. Room D Wed. 8:20 to 10:30 am

Detector Technologies

Session Chair: John W. Glesener, L-3 Electro-Optical Systems

8:20 am: **Integrated amplification and passivation nano-layers for ultra-high sensitivity photodetector arrays (Invited Paper)**, Jie Yao, Sean Wang, Jack Zhou, Ken Li, B&W Tek, Inc. (United States); Michael J. Lange, Dolce Technologies (United States); Patrick J. Gardner, Weiguo Yang, Western Carolina Univ. (United States); Leora Peltz, Robert Frampton, Jeffrey H. Hunt, The Boeing Co. (United States) [7212-33]

8:50 am: **Exceptionally large area photodetection**, Jonathaon R. Howorth, Nigel Hay, Brian Cant, Photek Ltd. (United Kingdom); Misha Monastyrskiy, A.M. Prokhorov General Physics Institute (Russian Federation); Charles L. Joseph, Rutgers Univ. (United States) [7212-34]

9:10 am: **Low noise optical receiver using silicon APD**, Frederic Laforce, PerkinElmer Optoelectronics (Canada) [7212-35]

9:30 am: **Nitride-based image intensifiers**, John W. Glesener, L-3 Electro-Optical Systems (United States); Amir M. Dabiran, SVT Associates, Inc. (United States); Joseph P. Estrera, L-3 Electro-Optical Systems (United States) [7212-36]

9:50 am: **High-resolution image intensifiers**, John W. Glesener, Joseph P. Estrera, L-3 Electro-Optical Systems (United States) [7212-37]

10:10 am: **Direct deposition of high-performance GaN-based photocathodes on microchannel plates**, Amir M. Dabiran, Andrew M. Wowchak, Peter P. Chow, SVT Associates, Inc. (United States) [7212-38]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

New approach to noise factor measurement on microchannel plate of optoelectronic detector, Lei Liu, Yunsheng Qian, Yafeng Qiu, Nanjing Univ. of Science & Technology (China) [7212-39]

Sensitivity of an IR photodiode based on HgCdTe variable-gap solid solution, Bogdan S. Sokolovsky, Volodymyr K. Pysarevsky, Roman M. Kovtun, Anna V. Shevchenko, Ivan Franko National Univ. of L'viv (Ukraine) [7212-40]

The effect of photo-polymerization initiator on the photo-heat microcapsule material image density, Shuangshuang Meng, Hebei Univ. (China) [7212-41]

Surface roughness effect on the performance of a subwavelength grating based wire-grid polarizer, Hojeong Ryu, Soon Joon Yoon, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7212-42]

Optical investigation of Tutton salts mixed crystals, Ihor Polovynko, Serhiy Rykhlyuk, Volodymyr Koman, Ivan Franko National Univ. of L'viv (Ukraine) [7212-43]

Spectroscopic properties of Tb³⁺-doped borosilicate glasses for new green laser media, Yasutake Ohishi, Tatsuya Yamashita, Takenobu Suzuki, Toyota Technological Institute (Japan) [7212-44]

Study on the displacement sensor based on FBG, He Jun, Zhi Zhou, Huijuan Dong, Harbin Institute of Technology (China) [7212-45]

Influence of aluminium-phosphorus codoping on optical properties of ytterbium-doped laser fibers, Sonja Unger, Anka Schwuchow, Sylvia Jetschke, Volker Reichel, Martin Leich, Andy Scheffel, Johannes Kirchhof, IPHT Jena (Germany) [7212-46]

Fabrication and properties of nanocomposite ITO layers containing terbium doped yttrium aluminum garnet nanoparticles, Piotr Psuja, Dariusz Hreniak, Wieslaw Strek, Polska Akademia Nauk (Poland); Dimitry Kovalenko, Vladimir E. Gaishun, Gomel State Univ. (Belarus) [7212-47]

The luminescent properties of europium-doped tin dioxide nanoparticles, Piotr Psuja, Dariusz Hreniak, Wieslaw Strek, Polska Akademia Nauk (Poland) [7212-48]

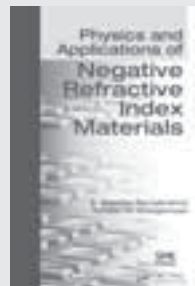
Synthesis, spectroscopic studies and AFM analysis of Ho³⁺ doped zirconium oxide nanoparticles, Darayas N. Patel, Newton King, Courtney Mingo, Oakwood Univ. (United States) [7212-49]

Preparation, fluorescence spectroscopy and afm analysis of erbium oxide nanocolloid, Darayas N. Patel, Oakwood Univ. (United States); Sergey S. Sarkisov, SSS Optical Technologies, LLC (United States) [7212-50]

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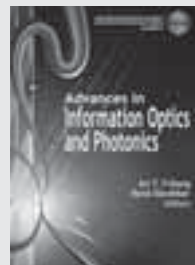
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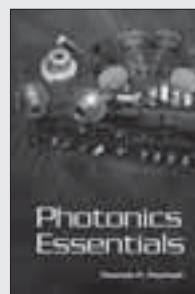
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OPTO

Organic Photonic Materials and Devices XI

Conference Chairs: **Robert L. Nelson**, Air Force Research Lab.; **François Kajzar**, Univ. d'Angers (France); **Toshikuni Kaino**, Tohoku Univ. (Japan)

Program Committee: **Chantal Andraud**, École Normale Supérieure de Lyon (France); **Werner J. Blau**, Trinity College Dublin (Ireland); **Christoph Bubeck**, Max-Planck-Institut für Polymerforschung (Germany); **Darnell E. Diggs**, Air Force Research Lab.; **Alain F. Fort**, Institut de Physique et Chimie des Matériaux de Strasbourg (France); **James G. Grote**, Air Force Research Lab.; **F. Kenneth Hopkins**, Air Force Research Lab.; **Alex K. -Y. Jen**, Univ. of Washington; **Michael H. Jin**, The Univ. of Texas at Arlington; **Eunyoung Kim**, Yonsei Univ. (Korea, Republic of); **Jang-Joo Kim**, Seoul National Univ. (Korea, Republic of); **Nakjoong Kim**, Hanyang Univ. (Korea, Republic of); **Junya Kobayashi**, Nippon Telegraph and Telephone Corp. (Japan); **Isabelle N. Ledoux-Rak**, École Normale Supérieure de Cachan (France); **Charles Y. C. Lee**, Air Force Office of Scientific Research; **Kwang-Sup Lee**, Hannam Univ. (Korea, Republic of); **Misoon Mah**, Air Force Research Lab.; **Seth R. Marder**, Georgia Institute of Technology; **Antoni Cz. Mitus**, Wroclaw Univ. of Technology (Poland); **Robert A. Norwood**, College of Optical Sciences/The Univ. of Arizona; **Jean-Michel Nunzi**, Queen's Univ. (Canada); **Susanna Orlic**, Technische Univ. Berlin (Germany); **Ileana Rau**, Univ. Politehnica Bucuresti (Romania); **Kenneth D. Singer**, Case Western Reserve Univ.; **Don J. Smith**, U.S. Air Force (United Kingdom); **Rebecca E. Taylor**, Lockheed Martin Corp.; **Toshiyuki Watanabe**, Tokyo Univ. of Agriculture and Technology (Japan)

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: Conv. Ctr. Room C1 Tues. 10:30 am to 12:00 pm

Photovoltaic and Display Materials I

Session Chair: **Robert L. Nelson**, Air Force Research Lab.

10:30 am: **Synthesis, properties and applications of amorphous molecular materials** (*Keynote Presentation*), Yasuhiko Shirota, Fukui Univ. of Technology (Japan); Hiroshi Kageyama, Osaka Univ. (Japan) [7213-01]

11:10 am: **Electrical doping for high performance organic light emitting diodes** (*Invited Paper*), Jang-Joo Kim, Seoul National Univ. (Korea, Republic of); Dong-Seok Leem, Seoul National Univ. (Korea, Republic of) and Imperial College of London (United Kingdom); Jae-Hyun Lee, Seoul National Univ. (Korea, Republic of) [7213-02]

11:40 am: **Hybrid fluorescent nanopigments: quantitative assessment of the quantum yield**, Rolando Ferrini, Olivier Nicolet, Stefan Huber, Libero Zuppiroli, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Sabrina Chappellet, Caroline Lovey, Juliette Perrenoud, Marc Pauchard, ILFORD Imaging Switzerland GmbH (Switzerland) [7213-03]

Lunch/Exhibition Break 12:00 to 1:00 pm

SESSION 2

Room: Conv. Ctr. Room C1 Tues. 1:00 to 3:00 pm

Photovoltaic and Display Materials II

Session Chair: **Yasuhiko Shirota**, Fukui Univ. of Technology (Japan)

1:00 pm: **Some advantages of using the lanthanide compounds in organic matrices** (*Invited Paper*), Lada Puntus, Institute of Radio-engineering and Electronics (Russian Federation) [7213-04]

1:30 pm: **SF-PTVs as electron acceptors in all-polymer solar cells**, Sam-Shajing Sun, Jianyuan Sun, Cheng Zhang, Thuong H. Nguyen, Rui Li, Norfolk State Univ. (United States) [7213-05]

1:50 pm: **High refractive index and photo-patternable sol-gel materials for electro-optic (EO) applications**, Mohanalingam Kathaperumal, Joshua Tillema, Wan-Yun Hsieh, Shuangxi Wang, Weiping Lin, Michiharu Yamamoto, Nitto Denko Technical Corp. (United States); Robert A. Norwood, Nasser N. Peyghambarian, The Univ. of Arizona (United States) [7213-06]

2:10 pm: **Communication and photonic information handling in self organizing photochromic thin films** (*Invited Paper*), Jean-Michel Nunzi, Queen's Univ. (Canada) [7213-07]

2:40 pm: **C12-PTV with controlled regioregularity for photovoltaic application**, Cheng Zhang, Eric Annihi, Rui Li, Sam-Shajing Sun, Norfolk State Univ. (United States) [7213-08]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: Conv. Ctr. Room C1 Tues. 3:30 to 5:10 pm

Specialty Materials for Photonics

Session Chair: **Robert A. Norwood**, College of Optical Sciences/The Univ. of Arizona

3:30 pm: **Monte Carlo study of tunable negative-zero-positive index of refraction in nanosphere dispersed liquid crystals** (*Invited Paper*), Antoni C. Mitus, Grzegorz Pawlik, Politechnika Wroclawska (Poland); François Kajzar, Univ. d'Angers (France) [7213-09]

4:00 pm: **Organic/inorganic polyimide nanohybrid materials for advanced opto-electronic applications** (*Invited Paper*), Shinji Ando, Tokyo Institute of Technology (Japan) [7213-10]

4:30 pm: **spectral-domain measurement of photo-induced birefringence in polymer**, Lino Misoguti, Marcos R. Cardoso, Cleber R. Mendonca, Univ. de São Paulo (Brazil) [7213-11]

4:50 pm: **Synthesis and investigation of third order NLO and light emitting properties of novel poly(3,4-diphenyl thiophene)**, Airoyd V. Adhikari, National Institute of Technology Karnataka (India) [7213-12]

Wednesday 28 January

SESSION 4

Room: Conv. Ctr. Room C1 Wed. 8:00 to 10:00 am

Nano- and Biomaterials

Session Chair: François Kajzar, Univ. d'Angers (France)

- 8:00 am: **Bioapplication of plasmonic nanosheet** (*Invited Paper*), Kaoru Tamada, Tohoku Univ. (Japan) [7213-13]
- 8:30 am: **Stability of DNA and collagen-based thin films** (*Invited Paper*), Ileana Rau, Roxana Popescu, Gratiela Tihan, Univ. Politehnica Bucuresti (Romania); Amandine Boumard, Univ. Politehnica Bucuresti (Romania) and Univ. d'Angers (France); Antoine Mesmin, Univ. Politehnica Bucuresti (Romania) and Univ. de Poitiers (France); Viorica Trandafir, National R&D Institute for Textile and Leather (Romania); Ioana Demetrescu, Aurelia Meghea, Univ. Politehnica Bucuresti (Romania); James G. Grote, Air Force Research Lab. (United States); François Kajzar, Univ. d'Angers (France) [7213-14]
- 9:00 am: **Photo-patterning of conductive polymer films by side chain reaction** (*Invited Paper*), Eunyoung Kim, Jeonghun Kim, Jungmok Yoo, Yonsei Univ. (Korea, Republic of) [7213-15]
- 9:30 am: **DNA-based photonic materials** (*Invited Paper*), James G. Grote, Air Force Research Lab. (United States) [7213-16]
- Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room C1 Wed. 10:30 am to 12:00 pm

Applications

Session Chair: Ileana Rau, Univ. Politehnica Bucuresti (Romania)

- 10:30 am: **Applications of the DNA-based material for lasing and dynamic holography** (*Invited Paper*), Jaroslaw Mysliwiec, Andrzej Miniewicz, Grzegorz Pawlik, Antoni C. Mitus, Politechnika Wroclawska (Poland); Bouchta Sahraoui, François Kajzar, Univ. d'Angers (France) [7213-17]
- 11:00 am: **ZEONEX F52R: a new high performance cyclo-olefin polymer (COP)**, Yoshimasa Tagata, Zeon Corp. (Japan); Aaron Grau, Zeon Chemicals L.P. (United States) [7213-18]
- 11:20 am: **Microfluidic switchable diffraction grating**, Carl V. Brown, Gary Wells, Glen McHale, Mike Newton, Nottingham Trent Univ. (United Kingdom) [7213-19]
- 11:40 am: **Application of polymer graded-index materials for aberration correction of progressive addition lenses**, Yuki Shitanoki, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) [7213-20]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 6

Room: Conv. Ctr. Room C1 Wed. 1:30 to 3:00 pm

Nonlinear Optics I

Session Chair: Toshikuni Kaino, Tohoku Univ. (Japan)

- 1:30 pm: **Organic nonlinear optics: from new materials to commercial technology** (*Keynote Presentation*), Robert A. Norwood, Nasser N. Peyghambarian, The Univ. of Arizona (United States) [7213-21]
- 2:10 pm: **Roll-to-roll manufacture of active photonic crystals** (*Invited Paper*), Kenneth D. Singer, Case Western Reserve Univ. (United States) [7213-22]
- 2:40 pm: **Recent progress in technology and application of electro-optic polymers**, François Kajzar, Univ. d'Angers (France) [7213-23]
- Coffee Break 3:00 to 3:30 pm

SESSION 7

Room: Conv. Ctr. Room C1 Wed. 3:30 to 5:40 pm

Nonlinear Optics II

Session Chair: Kenneth D. Singer, Case Western Reserve Univ.

- 3:30 pm: **Molecular design for multiphoton absorption: from the visible to telecommunications wavelengths** (*Invited Paper*), Chantal Andraud, Ecole Normale Supérieure de Lyon (France) [7213-24]
- 4:00 pm: **Two-photon absorption spectroscopy of corroles**, Aleksander K. Rebane, Mikhail A. Drobizhev, Nikolay S. Makarov, Montana State Univ., Bozeman (United States); Beata Koszarna, Mariusz Tasiar, Daniel T. Gryko, Institute of Organic Chemistry (Poland) [7213-25]
- 4:20 pm: **Quantitative characterization of linear and nonlinear absorption of fluorescent proteins**, Mikhail A. Drobizhev, Shane Tillo, Nikolay S. Makarov, Thomas E. Hughes, Aleksander K. Rebane, Montana State Univ., Bozeman (United States) [7213-26]
- 4:40 pm: **Vibronic intensity redistribution results in a blue shift of two-photon absorption peak with respect to one-photon maximum**, Nikolay S. Makarov, Mikhail A. Drobizhev, Erich Beuerman, Aleksander K. Rebane, Montana State Univ., Bozeman (United States) [7213-27]
- 5:00 pm: **Nonlinear forms of laser beam propagation in a photopolymerisable medium**, Ana B. Villafranca, Kalaichelvi Saravanamuttu, McMaster Univ. (Canada) [7213-28]
- 5:20 pm: **Novel hybrid electro-optic polymer/sol-gel waveguide structure for Mach-Zehnder modulators and directional coupler switches**, Yasufumi Enami, M. Mathine, Christopher T. DeRose, Robert A. Norwood, College of Optical Sciences/The Univ. of Arizona (United States); J. Luo, Alex K. Y. Jen, Univ. of Washington (United States); Nasser N. Peyghambarian, College of Optical Sciences/The Univ. of Arizona (United States) [7213-29]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

- Preparation and characterization of phosphorescence organic light emitting diodes using PVK:Ir(ppy)₃ emission layer**, Hak Min Lee, Su Cheol Gong, Ji Geun Chang, Myoung Sun Gong, Sang Ouk Ryu, Jun Yeop Lee, Dankook Univ. (Korea, Republic of); Young Chul Chang, Korea Univ. of Technology and Education (Korea, Republic of); Ho Jung Chang, Dankook Univ. (Korea, Republic of) and Korea Univ. of Technology and Education (Korea, Republic of) [7213-46]
- One dimensional polymeric photonic crystals with electro-optic defect layers**, Azusa Inoue, Shin-ichiro Inoue, Shiyoshi Yokoyama, Kyushu Univ. (Japan); Kei Yasui, Masaaki Ozawa, Nissan Chemical Industries, Ltd. (Japan) [7213-47]
- Synthesis and characterization of water-soluble s-triazine bridged poly(phenylenevinylene)**, Junmok Yoo, Seogjae Seo, Jeonghun Kim, Eunyoung Kim, Yonsei Univ. (Korea, Republic of) [7213-49]
- High luminance efficiency and low voltage organic light-emitting diodes with NPB/LiF multiple layers**, Chin-Hsiang Chen, Cheng Shiu Univ. (Taiwan) [7213-50]
- Visible amplification of rare-earth doped polymeric gain media**, Paula Russell-Hill, Trinity College Dublin (Ireland); Takeyuki Kobayashi, Dublin City Univ. (Ireland); Werner J. Blau, Trinity College Dublin (Ireland) [7213-51]
- Biophotonic DNA thin-films for polymer bulk heterojunction solar cells**, Yi Yang, Hou-Kuan Lee, Michael H. Jin, The Univ. of Texas at Arlington (United States) [7213-52]
- Fluorescent polymeric structure generated by holographic method**, Hyunjin Oh, Jaekwon Do, Yunjung Kim, Sehwan Kim, Jaeyon Choi, Eunyoung Kim, Yonsei Univ. (Korea, Republic of) [7213-53]
- Enhancing the two-photon excited fluorescence by two-dimensional nonlinear optical-polymer photonic crystals**, Shin-ichiro Inoue, Shiyoshi Yokoyama, Kyushu Univ. (Japan) [7213-54]
- Numerical simulation on white OLEDs with dotted-line doped emitting layers**, Yen-Kuang Kuo, Shu-Hsuan Chang, Chien-Yang Wen, Yi-Hsiang Huang, National Changhua Univ. of Education (Taiwan) [7213-55]

Conference 7213

Surface plasmon enhanced visible light active photocatalytic activities of hybrid Pt/TiO₂ nanomaterials fabricated by self-assembly processes, Dong-Ha Kim, Yu-Jin Jang, Ewha Womans Univ. (Korea, Republic of) .[7213-56]

Localized surface plasmon resonance based biosensing using Au nanoarrays fabricated by block copolymer self-assembly, Dong-Ha Kim, Jieun Lee, Ewha Womans Univ. (Korea, Republic of); King-Hang A. Lau, Max-Planck-Institut für Polymerforschung (Germany)[7213-57]

Localized surface plasmon resonance based sensing on DNA hybridization using arrays of Au nanoparticle multilayers fabricated by block copolymer micellar films, Dong-Ha Kim, Ji-Yong Lee, Ewha Womans Univ. (Korea, Republic of); King-Hang A. Lau, Max-Planck-Institut für Polymerforschung (Germany)[7213-58]

Dispersion of single-walled carbon nanotubes using polyelectrolytes, Gabriela Aldea, Queen's Univ. (Canada) and Petru Poni Institute of Macromolecular Chemistry (Romania); Jean-Michel Nunzi, Queen's Univ. (Canada)[7213-59]

Thursday 29 January

SESSION 8

Room: Conv. Ctr. Room C1Thurs. 8:00 to 10:10 am

Waveguide Materials

Session Chair: Charles Y. C. Lee,
Air Force Office of Scientific Research

8:00 am: **PMT connectors for multi-channel film waveguides** (*Invited Paper*), Yutaka Hatakeyama, NTT Advanced Technology Corp. (Japan)[7213-30]

8:30 am: **Birefringence analysis of a photonics polymer doped with a birefringent crystal**, Yukiko Yamada, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan)[7213-31]

8:50 am: **Dopant designing for thermally stable graded index plastic optical fiber**, Yasushi Yamaki, Atsushi Kondo, Yasuhiro Koike, Keio Univ. (Japan)[7213-32]

9:10 am: **Fabrication and characterisation of waveguide and grating structures induced by ultraviolet radiation in polymers with a shortened writing process**, Michael Koerd, Bremer Institut für Angewandte Strahltechnik (Germany)[7213-33]

9:30 am: **EO polymer activated silicon photonic crystal waveguide devices**, Ray T. Chen, The Univ. of Texas at Austin (United States)[7213-34]

9:50 am: **Reduction of orientational birefringence of polymer using nanoparticles**, Takeshi Otani, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan)[7213-35]

Coffee Break10:10 to 10:40 am

SESSION 9

Room: Conv. Ctr. Room C1Thurs. 10:40 am to 12:20 pm

Miscellaneous I

Session Chair: Jean-Michel Nunzi, Queen's Univ. (Canada)

10:40 am: **AFOSR program in photonic polymers** (*Invited Paper*), Charles Y. C. Lee, Air Force Office of Scientific Research (United States)[7213-36]

11:10 am: **The impact of radical cation and π -electron delocalization on the two-photon absorption cross-section of ladder-type pentaphenylene and spirofluorene derivatives** (*Invited Paper*), Namchul Cho, Hannam Univ. (Korea, Republic of); Gang Zhou, Max-Planck-Institut für Polymerforschung (Germany); Ran-Hee Kim, Hannam Univ. (Korea, Republic of); Kenji Kamada, National Institute of Advanced Industrial Science and Technology (Japan); Klaus Muellen, Max-Planck-Institut für Polymerforschung (Germany); Kwang-Sup Lee, Hannam Univ. (Korea, Republic of)[7213-37]

11:40 am: **Dielectric and pyroelectric properties of LiTaO₃:P(VDF-TrFE) composite films**, Ashok K. Batra, John C. Corda, Padmaja Guggilla, Mohan D. Aggarwal, Matthew E. Edwards, Alabama A&M Univ. (United States)[7213-38]

12:00 pm: **Interface effects on the defect state formation in organic devices**, Thien-Phap Nguyen, Ce Renaud, Univ. de Nantes (France)[7213-39]

Lunch/Exhibition Break12:20 to 1:50 pm

SESSION 10

Room: Conv. Ctr. Room C1Thurs. 1:50 to 3:50 pm

Miscellaneous II

Session Chair: Kwang-Sup Lee, Hannam Univ. (Korea, Republic of)

1:50 pm: **Photoconductive gain in photodetectors based on soluble functionalized pentacene**, Jianbo Gao, Dan Lehnerr, Rik R. Tykwinski, Frank A. Hegmann, Univ. of Alberta (Canada)[7213-40]

2:10 pm: **Updatable three-dimensional image reconstruction using panchromatic photorefractive polymer devices**, Peng Wang, Weiping Lin, Gu Tao, Zongcheng Jiang, Donald Flores, Richard Bychowski, Michiharu Yamamoto, Nitto Denko Technical Corp. (United States); Robert A. Norwood, Nasser N. Peyghambarian, The Univ. of Arizona (United States)[7213-41]

2:30 pm: **Excitonic coupling in layered organic/inorganic semiconductor hybrid structures**, Sylke Blumstengel, Sergey Sadofev, Joachim Puls, Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany)[7213-42]

2:50 pm: **Power flow equation analysis of graded-index polymer optical fiber**, Kazuma Nehashi, Yasuhiro Koike, Keio Univ. (Japan)[7213-43]

3:10 pm: **Properties improvement of biopolymers: chromophore silica based thin films**, Maria Mihaly, Luisa Stanomir, Roxana Popescu, Univ. Politehnica Bucuresti (Romania); Viorica Trandafir, National R&D Institute for Textile and Leather (Romania); Aurelia Meghea, Univ. Politehnica Bucuresti (Romania); James G. Grote, Air Force Research Lab. (United States); Ileana Rau, Univ. Politehnica Bucuresti (Romania)[7213-44]

3:30 pm: **Simple evaluation of multimode polymer optical waveguide**, Okihito Sugihara, Cai Bin, Toshikuni Kaino, Tohoku Univ. (Japan)[7213-45]

Ultrafast Phenomena in Semiconductors and Nanostructure Materials XIII

Conference Chairs: **Kong-Thon Tsen**, Arizona State Univ.; **Jin-Joo Song**, Univ. of California/San Diego

Conference Co-Chairs: **Markus Betz**, Technische Univ. München (Germany); **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

Program Committee: **Serge Bidnyk**, Enablence Inc. (Canada); **Mischa Bonn**, FOM Institute for Atomic and Molecular Physics (Netherlands); **Majed Chergui**, École Polytechnique Fédérale de Lausanne (Switzerland); **Yujie J. Ding**, Lehigh Univ.; **Jan A. Gaj**, Univ. Warszawski (Poland); **Michael D. Gerhold**, U.S. Army Research Office; **Costas P. Grigoropoulos**, Univ. of California/Berkeley; **Rupert Huber**, Univ. Konstanz (Germany); **Robert A. Kaindl**, Lawrence Berkeley National Lab.; **Christoph Lienau**, Carl von Ossietzky Univ. Oldenburg (Germany); **Torsten Meier**, Univ. Paderborn (Germany); **Chi-Kuang Sun**, National Taiwan Univ. (Taiwan); **Fabrice Vallee**, Univ. Claude Bernard Lyon 1 (France); **Chih-Chung Yang**, National Taiwan Univ. (Taiwan)

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Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room K Sun. 8:00 to 9:52 am

Carrier and Exciton Dynamics I

Session Chair: **Kong-Thon Tsen**, Arizona State Univ.

8:00 am: **Cavity quantum electrodynamics in the ultrastrong coupling regime** (*Invited Paper*), Cristiano Ciuti, Univ. Paris 7-Denis Diderot (France) [7214-01]

8:28 am: **High-resolution temporal and spatial photoluminescence measurement of quantum well structure** (*Invited Paper*), Hong-Gyu Ahn, Jae-Hyuk Kim, Dae-Kyu Kim, Eung-Jang Lee, Seung-Han Park, Yonsei Univ. (Korea, Republic of) [7214-02]

8:56 am: **Excitonic effects on optically induced ultrafast currents in GaAs quantum wells** (*Invited Paper*), Mark Bieler, Shekhar Priyadarshi, Klaus Pierz, Uwe Siegner, Physikalisches Technische Bundesanstalt (Germany); Philip Dawson, The Univ. of Manchester (United Kingdom) [7214-03]

9:24 am: **Carrier dynamics and photoexcited emission efficiency of ZnO:Zn phosphor powders** (*Invited Paper*), John V. Foreman, Henry O. Everitt, U.S. Army Aviation and Missile Research, Development and Engineering Ctr. (United States) and Duke Univ. (United States); Jianqiu Yang, Jie Liu, Duke Univ. (United States) [7214-04]

Coffee Break :9:52 to 10:15 am

SESSION 2

Room: Conv. Ctr. Room K Sun. 10:15 am to 12:07 pm

Phonons

Session Chair: **Yujie J. Ding**, Lehigh Univ.

10:15 am: **Imaging carrier and phonon transport in Si using ultrafast optical pulses** (*Invited Paper*), David H. Hurley, Idaho National Lab. (United States); Oliver B. Wright, Osamu Matsuda, Hokkaido Univ. (Japan); Brian McCandless, Univ. of Delaware (United States) [7214-05]

10:43 am: **Ultrafast high strain rate acoustic wave measurements at high static pressure in a diamond anvil cell** (*Invited Paper*), Michael R. Armstrong, Jonathan C. Crowhurst, Evan J. Reed, Joseph M. Zaugg, Lawrence Livermore National Lab. (United States) [7214-06]

11:11 am: **Picosecond shear waves in nano-sized solids and liquids** (*Invited Paper*), Thomas T. P. Pezeril, Univ. du Maine (France) [7214-07]

11:39 am: **Dynamics of photoexcited coherent phonon in Bi₂Te₃, Sb₂Te₃, and Bi₂Te₃/Sb₂Te₃ superlattice** (*Invited Paper*), Xianfan Xu, Yaguo Wang, Purdue Univ. (United States) [7214-08]

Lunch Break :12:07 to 1:20 pm

SESSION 3

Room: Conv. Ctr. Room K Sun. 1:20 to 3:40 pm

Nanostructures and Nanophotonics I

Session Chair: **Jin-Joo Song**, Univ. of California, San Diego

1:20 pm: **Ultrafast far-infrared optics of carbon nanotubes** (*Invited Paper*), Christian Frischkorn, Freie Univ. Berlin (Germany) [7214-09]

1:48 pm: **Ultrafast adaptive nanooptics** (*Invited Paper*), Walter Pfeiffer, Univ. Bielefeld (Germany); Tobias Brixner, Dmitri V. Voronine, Univ. Würzburg (Germany); F. Javier Garcia de Abajo, Consejo Superior de Investigaciones Científicas (Spain); Martin Aeschlimann, Univ. Kaiserslautern (Germany); Michael K. Bauer, Christian-Albrechts-Univ. zu Kiel (Germany) [7214-10]

2:16 pm: **Ultrafast optical and terahertz spectroscopy of carrier relaxation and recombination dynamics in graphene** (*Invited Paper*), Farhan Rana, Cornell Univ. (United States) [7214-11]

2:44 pm: **Multiphoton absorption and nonlinear optical phenomena in semiconductor nanocrystals** (*Invited Paper*), Gregory D. Scholes, Univ. of Toronto (Canada) [7214-12]

3:12 pm: **Ultrafast semiconductor quantum optics** (*Invited Paper*), Rudolf Bratschitsch, Univ. Konstanz (Germany) [7214-13]

Coffee Break :3:40 to 4:00 pm

SESSION 4

Room: Conv. Ctr. Room K Sun. 4:00 to 5:44 pm

Nanostructures and Nanophotonics II

Session Chair: **Markus Betz**, Technische Univ. München (Germany)

4:00 pm: **Photoinduced ultrafast structural dynamics of nanomaterials** (*Invited Paper*), Jau Tang, Pying Yu, Po-Tze Tai, Sheng-Hsien Lin, Academia Sinica (Taiwan) [7214-14]

4:28 pm: **Studies of intraband carrier relaxation in self-assembled quantum dots for mid-infrared and terahertz device applications** (*Invited Paper*), Luke R. Wilson, Evgeny A. Zibik, The Univ. of Sheffield (United Kingdom); Thomas Grange, Ecole Normale Supérieure (France); Nathan Porter, The Univ. of Sheffield (United Kingdom); Robson Ferreira, Gerald Bastard, Ecole Normale Supérieure (France); Stephan Winnerl, Manfred Helm, Forschungszentrum Dresden-Rossendorf e. V. (Germany); Maurice S. Skolnick, Mark Hopkinson, Nicholas Lambert, The Univ. of Sheffield (United Kingdom) [7214-15]

4:56 pm: **Electromagnetic wave funneling through nano-gaps and nano-antennas** (*Invited Paper*), Dai-sik Kim, Seoul National Univ. (Korea, Republic of) [7214-16]

5:24 pm: **Magnetically active random metamaterial**, Corey A. Baron, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [7214-17]

Conference 7214

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room K Mon. 8:00 to 9:52 am

Applications I

Session Chair: **Markus Betz**, Technische Univ. München (Germany)

8:00 am: **Laser ablation of organic and biological materials for discrimination of bacteria and detection of trace elements in vegetables** (*Invited Paper*), Jin Yu, Matthieu Baudalet, Myriam Boueri, Univ. de Claude Bernard Lyon I (France) [7214-18]

8:28 am: **Control of ultrafast pulse propagation in semiconductor components** (*Invited Paper*), Mike van der Poel, Per L. Hansen, Yaohui Chen, Kresten Yvind, Jesper Mørk, Danmarks Tekniske Univ. (Denmark) [7214-19]

8:56 am: **Planar plasmonic terahertz guided-wave devices** (*Invited Paper*), Ajay Nahata, Wenqi Zhu, Amit K. Agrawal, The Univ. of Utah (United States) [7214-20]

9:24 am: **Four-dimensional visualization of ultrafast nuclear motion by electron diffraction** (*Invited Paper*), Peter N. Baum, Ludwig-Maximilians-Univ. München (Germany) and California Institute of Technology (United States) [7214-21]

Coffee Break 9:52 to 10:15 am

SESSION 6

Room: Conv. Ctr. Room K Mon. 10:15 am to 12:07 pm

THz Spectroscopy and Applications I

Session Chair: **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

10:15 am: **Terahertz conductivity of magnetoexcitons and electrons in semiconductor nanostructures** (*Invited Paper*), James Lloyd-Hughes, ETH Zürich (Switzerland); Harvey E. Beere, David A. Ritchie, Univ. of Oxford (United Kingdom); Lilian Sirbu, Ion M. Tiginyanu, National Ctr. for Materials Study and Testing (Moldova); Suzannah K. E. Merchant, Michael B. Johnston, Univ. of Oxford (United Kingdom) [7214-22]

10:43 am: **Chirality and optical activity: a terahertz time-domain spectroscopy investigation** (*Invited Paper*), Abdulhakem Y. Elezzabi, Matthew S. B. Sederberg, Univ. of Alberta (Canada) [7214-23]

11:11 am: **A new mechanism for observation of THz acoustic waves: coherent THz radiation emission** (*Invited Paper*), Evan J. Reed, Michael R. Armstrong, Lawrence Livermore National Lab. (United States); Ki-Yong Kim, James M. Glowina, Los Alamos National Lab. (United States) [7214-24]

11:39 am: **Photo-induced insulator-metal phase transition observed by the terahertz pump-probe spectroscopy** (*Invited Paper*), Makoto Nakajima, Naoko Takubo, Zenji Hiroi, Yutaka Ueda, Tohru Suemoto, The Univ. of Tokyo (Japan) [7214-25]

Lunch/Exhibition Break 12:07 to 1:20 pm

SESSION 7

Room: Conv. Ctr. Room K Mon. 1:20 to 3:40 pm

Applications II

Session Chair: **Kong-Thon Tsen**, Arizona State Univ.

1:20 pm: **Latest developments of ultrafast fiber laser and its material applications** (*Invited Paper*), Gyu Cheon Cho, Bing Liu, Lawrence Shah, Zhenlin Liu, Yong Che, Jingzhou Xu, IMRA America, Inc. (United States) [7214-26]

1:48 pm: **Monitoring of microplasma formation and filamentation of tightly focused femtosecond laser pulses in dielectrics** (*Invited Paper*), Saulius Juodkazis, Vygantas Mizeikis, Hokkaido Univ. (Japan); Hiroaki Misawa, Hokkaido Univ. (Japan); Sergey I. Kudryashov, Vladimir D. Zvyorkin, Andrei A. Ionin, P.N. Lebedev Physical Institute (Russian Federation) [7214-27]

2:16 pm: **Soft x-ray source for nanostructure imaging using femtosecond-laser-irradiated clusters** (*Invited Paper*), Yuji Fukuda, Japan Atomic Energy Agency (Japan) [7214-28]

2:44 pm: **Sub-GHz operation of single-photon emitting diode at 1.55 μm** (*Invited Paper*), Toshiyuki Miyazawa, Toshihiro Nakaoka, The Univ. of Tokyo (Japan); Shigekazu Okumura, Shinnichi Hirose, Kazuya Takemoto, Motomu Takatsu, Fujitsu Labs., Ltd. (Japan); Tatsuya Usuki, The Univ. of Tokyo (Japan); Naoki Yokoyama, Fujitsu Labs., Ltd. (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [7214-29]

3:12 pm: **Pulse and amplifier dynamics in high-energy fiber optic laser systems** (*Invited Paper*), Michael M. Mielke, Raydiance, Inc. (United States) [7214-30]

Coffee Break 3:40 to 4:00 pm

SESSION 8

Room: Conv. Ctr. Room K Mon. 4:00 to 5:52 pm

THz Spectroscopy and Applications II

Session Chair: **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

4:00 pm: **Nonlinear THz response of n-type GaAs** (*Invited Paper*), Michael Woerner, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [7214-31]

4:28 pm: **Time-resolved THz spectroscopy of metal and semiconductor single walled carbon nanotube films** (*Invited Paper*), Matthew C. Beard, Jeffery L. Blackburn, Michael J. Heben, National Renewable Energy Lab. (United States) [7214-32]

4:56 pm: **THz emission from coherent plasmons in InAs nanowires** (*Invited Paper*), Denis V. Seletskiy, Michael P. Hasselbeck, Mansoor Sheik-Bahae, The Univ. of New Mexico (United States); Jeffrey Cederberg, Alec Tallin, Sandia National Labs. (United States) [7214-33]

5:24 pm: **Terahertz spectroscopy of two-dimensional subwavelength plasmonic structures** (*Invited Paper*), Weili Zhang, Abul K. Azad, Jianguang Han, Xinchao Lu, Oklahoma State Univ. (United States) [7214-34]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:20 am

SESSION 9

Room: Conv. Ctr. Room K Tues. 10:20 to 11:56 am

Keynote Presentation and Spintronics

Session Chair: **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

10:20 am: **Multiphoton ionization and attosecond science inside transparent dielectrics** (*Keynote Presentation*), Paul B. Corkum, National Research Council Canada (Canada) and Univ. of Ottawa (Canada); Marina Gertsyov, D. Grojo, National Research Council Canada (Canada); S. Golin, Univ. of Ottawa (Canada); S. Lei, Kansas State Univ. (United States); David M. Rayner, National Research Council Canada (Canada) [7214-35]

11:00 am: **Electrical control of spin coherence in ZnO** (*Invited Paper*), Sayantani Ghosh, Univ. of California, Merced (United States); David W. Stuermer, Univ. of California, Santa Barbara (United States); H. G. Xu, Keita Ohtani, Hideo Ohno, Tohoku Univ. (Japan); David D. Awschalom, Univ. of California, Santa Barbara (United States) [7214-36]

11:28 am: **Memory effects in femtosecond collective spin rotation in ferromagnetic semiconductors** (*Invited Paper*), Jigang Wang, Lawrence Berkeley National Lab. (United States) [7214-37]

Lunch/Exhibition Break 11:56 am to 1:00 pm

SESSION 10

Room: Conv. Ctr. Room K Tues. 1:00 to 2:52 pm

Carrier and Exciton Dynamics II

Session Chair: Chih-Chung Yang, National Taiwan Univ. (Taiwan)

- 1:00 pm: **Ultrafast carrier dynamics and laser action in ZnO nanowires** (*Invited Paper*), Marijn A. M. Versteegh, Ruben E. C. van der Wel, Benjamin J. M. Brenny, Bas Zegers, Wouter Ensing, Jaap I. Dijkhuis, Univ. Utrecht (Netherlands) [7214-38]
- 1:28 pm: **Picosecond scale dynamics of excitons in CdTe-based quantum wells and quantum dots** (*Invited Paper*), Andrzej Golnik, Artur Trajnerowicz, Tomasz Kazimierczuk, Piotr Kossacki, Univ. Warszawski (Poland) [7214-39]
- 1:56 pm: **Investigating coherent response of individual excitons by heterodyne spectral interferometry: vectorial four-wave mixing, biexcitonic features, and coherent coupling** (*Invited Paper*), Jacek Kasprzak, Wolfgang W. Langbein, Cardiff Univ. (United Kingdom) [7214-40]
- 2:24 pm: **Ultrafast electronic transport and relaxation dynamics in low-dimensional semiconductor nanostructures** (*Invited Paper*), Hyunyoung Choi, Lawrence Berkeley National Lab. (United States) and Univ. of California, Berkeley (United States); Theodore B. Norris, Univ. of Michigan (United States); Jerome Faist, ETH Zürich (Switzerland); Federico Capasso, Harvard Univ. (United States) [7214-41]
- Coffee Break :2:52 to 3:20 pm

SESSION 11

Room: Conv. Ctr. Room K Tues. 3:20 to 4:44 pm

THz Spectroscopy and Applications III

Session Chair: Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada)

- 3:20 pm: **Terahertz metamaterials** (*Invited Paper*), Antoinette J. Taylor, John F. O'Hara, Hou-tong Chen, Abul K. Azad, Los Alamos National Lab. (United States); Willie J. Padilla, Boston College (United States); Richard D. Averitt, Boston Univ. (United States) [7214-42]
- 3:48 pm: **Trapped rainbow storage of light in a graded grating structure** (*Invited Paper*), Qiaoqiang Gan, Zhan Fu, Yujie J. Ding, Filbert J. Bartoli, Lehigh Univ. (United States) [7214-44]
- 4:16 pm: **Transient behaviors of surface plasmon coupling with a light emitter** (*Invited Paper*), Wen-Hung Chuang, Jyh-Yang Wang, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [7214-45]

Wednesday 28 January

SESSION 12

Room: Conv. Ctr. Room K Wed. 8:00 to 9:52 am

Carrier and Exciton Dynamics III

Session Chair: Markus Betz, Technische Univ. München (Germany)

- 8:00 am: **Hole confinement in quantum islands in Ga(AsSb)/GaAs/(AlGa)As heterostructures** (*Invited Paper*), Swantje Horst, Sangam Chatterjee, Philipps-Univ. Marburg (Germany); Kristian Hantke, Max-Planck-Institut für Dynamik und Selbstorganisation (Germany); Peter J. Klar, Justus-Liebig-Univ. Giessen (Germany); Igor Németh, Wolfgang Stolz, Kerstin Volz, Christina Bückers, Angela D. Thränhardt, Stephan W. Koch, Wolfgang W. Rühle, Philipps-Univ. Marburg (Germany); Shane R. Johnson, Jiangbo Wang, Yong-Hang Zhang, Arizona State Univ. (United States) [7214-46]
- 8:28 am: **Ultrafast exciton dynamics of highly excited bulk ZnO** (*Invited Paper*), Tina Shih, Harvard Univ. (United States); Jan-Peter Richters, Tobias Voss, Univ. Bremen (Germany); Eric D. Mazur, Harvard Univ. (United States) [7214-47]
- 8:56 am: **Analyzing ultrafast carrier and spin dynamics in III-V semiconductors with optical orientation methods** (*Invited Paper*), Markus Betz, Christine Hautmann, Florian Jaworek, Markus Wesseli, Technische Univ. München (Germany) [7214-48]
- 9:24 am: **Excess carrier dynamics of InGaN/GaN multiple-quantum-well light-emitting diodes with various silicon barrier doping profiles** (*Invited Paper*), Yun-Chorng Chang, National Cheng Kung Univ. (Taiwan); Yun-Li Li, National Taiwan Univ. (Taiwan); Wei-Chih Lai, National Cheng Kung Univ. (Taiwan) [7214-49]
- Coffee Break :9:52 to 10:15 am

SESSION 13

Room: Conv. Ctr. Room K Wed. 10:15 am to 12:07 pm

Carrier and Exciton Dynamics IV

Session Chair: Kong-Thon Tsen, Arizona State Univ.

- 10:15 am: **Energy transfer dynamics between excitons and plasmons in semiconductor-metal nanocrystal heterostructures** (*Invited Paper*), Yoshihiko Kanemitsu, Kyoto Univ. (Japan) [7214-50]
- 10:43 am: **Exciton-exciton interactions in doped colloidal semiconductor quantum dots** (*Invited Paper*), Dan Oron, Assaf Avidan, Weizmann Institute of Science (Israel) [7214-51]
- 11:11 am: **Femtosecond carrier dynamics in quasi-one-dimensional topological compounds** (*Invited Paper*), Yasunori Toda, Hokkaido Univ. (Japan) [7214-52]
- 11:39 am: **Ultrafast dynamics of InN thin films** (*Invited Paper*), Der-Jun Jang, Guan-Tin Lin, Ching-Lien Hsiao, Li-Wei Tu, National Sun Yat-sen Univ. (Taiwan); Meng-En Lee, National Kaoshiung Normal Univ. (Taiwan) [7214-53]
- Lunch/Exhibition Break :12:07 to 1:20 pm

SESSION 14

Room: Conv. Ctr. Room K Wed. 1:20 to 3:12 pm

Carrier and Exciton Dynamics V

Session Chair: Markus Betz, Technische Univ. München (Germany)

- 1:20 pm: **Ultrafast electron-phonon and phonon-phonon scattering in highly doped semiconductors** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (United States) [7214-54]
- 1:48 pm: **Time-resolved photoluminescence characterization on the two-photon pumped stimulation emission in ZnO nanowires** (*Invited Paper*), Jian Xu, Chunfeng Zhang, Fan Zhang, Ting Zhu, The Pennsylvania State Univ. (United States) [7214-55]
- 2:16 pm: **Two-photon photocurrent spectroscopy of quantum well intersubband relaxation and dephasing** (*Invited Paper*), Harald Schneider, Forschungszentrum Dresden-Rossendorf e. V. (Germany); Hui Chun Liu, National Research Council Canada (Canada); Thomas Maier, Martin Walther, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [7214-56]
- 2:44 pm: **Charge dynamics in semiconductors and quantum wells from THz emission** (*Invited Paper*), James N. Heyman, Macalester College (United States); Laura C. Bell, The Univ. of Utah (United States) [7214-57]
- Coffee Break :3:12 to 3:40 pm

SESSION 15

Room: Conv. Ctr. Room K Wed. 3:40 to 4:36 pm

Carrier and Exciton Dynamics VI

Session Chair: Markus Betz, Technische Univ. München (Germany)

- 3:40 pm: **Ultrafast carrier dynamics on Si surfaces studied by time-resolved two-photon photoemission spectroscopy** (*Invited Paper*), Katsumi Tanimura, Osaka Univ. (Japan) [7214-59]
- 4:08 pm: **Two-color pump-probe studies of intraband relaxation in doped GaAs/AlGaAs superlattices** (*Invited Paper*), Dominik Stehr, Univ. of California, Santa Barbara (United States) and Forschungszentrum Dresden-Rossendorf e. V. (Germany); Martin Wagner, Harald Schneider, Manfred Helm, Forschungszentrum Dresden-Rossendorf e. V. (Germany); Aaron M. Andrews, Tomas Roch, Gottfried Strasser, Technische Univ. Wien (Austria) [7214-60]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

- Analysis of confinement loss for circular/elliptical four /five layers of air holes in Photonic crystal fiber**, Ritu Sharma, Navneet K. Arya, Vijay Janyani, Malaviya National Institute of Technology (India) [7214-61]
- Controlled interference effects of spatial reproduction for electron waves in semiconductor 2D nanostructures with parabolic quantum wells**, Victor A. Petrov, Andrey V. Nikitin, Institute of Radio-Engineering and Electronics (Russian Federation) [7214-63]

Conference 7215 · Convention Center Room D

Wednesday-Thursday 28-29 January 2009 • Proceedings of SPIE Vol. 7215

Terahertz Technology and Applications II

Conference Chairs: **Kurt J. Linden**, Spire Corp.; **Laurence P. Sadwick**, InnoSys, Inc.; **Creidhe M. M. O'Sullivan**, National Univ. of Ireland/Maynooth (Ireland)

Program Committee: **Antao Chen**, Univ. of Washington; **Robert H. Giles**, Univ. of Massachusetts/Lowell; **R. Jennifer Hwu**, InnoSys, Inc.; **John Anthony Murphy**, National Univ. of Ireland/Maynooth (Ireland); **Konstantin L. Vodopyanov**, Stanford Univ.; **Michael C. Wanke**, Sandia National Labs.

Wednesday 28 January

SESSION 1

Room: Conv. Ctr. Room D Wed. 1:00 to 3:10 pm

THz Sources, Generation and Detection

Session Chairs: **Kurt J. Linden**, Spire Corp.;
Antao Chen, Univ. of Washington

1:00 pm: **Terahertz radiation coherently generated by acoustic waves**, Michael R. Armstrong, Evan J. Reed, Lawrence Livermore National Lab. (United States); Ki-Yong Kim, Los Alamos National Lab. (United States); James H. Glowina, Dept. of Energy (United States); Edwin L. Piner, John C. Roberts, Nitronex Corp. (United States) [7215-01]

1:20 pm: **A narrowband plasmonic terahertz detector with a monolithic hot electron bolometer**, Gregory C. Dyer, Jess D. Crossno, Univ. of California, Santa Barbara (United States); Gregory Aizin, CUNY/Kingsborough Community College (United States); Eric A. Shaner, Sandia National Labs. (United States) [7215-02]

1:40 pm: **THz quantum cascade laser integration with on-chip micromachined rectangular waveguides**, Michael C. Wanke, Christopher D. Nordquist, Mike J. Cich, Mark Lee, Adam M. Rowen, Christian L. Arrington, Chuck T. Fuller, Albert D. Grine, Erik W. Young, Sandia National Labs. (United States) [7215-03]

2:00 pm: **Multi-channel detection of ultrashort THz-pulses based on photoconductive antennas**, Wiebke Freese, Boris Pradarutti, Stefan Riehemann, Gunther Notni, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Andreas Tünnermann, Friedrich-Schiller-Universität Jena (Germany) [7215-04]

2:20 pm: **tunable narrowband terahertz generation based on photoconductive radiation beam-forming**, Mona Jarrahi, Univ. of Michigan (United States) [7215-05]

2:40 pm: **Recent advances in photonic terahertz technology** (*Invited Paper*), René Beigang, Fraunhofer-Institut für Physik Messtechnik (Germany) [7215-06]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Room: Conv. Ctr. Room D Wed. 3:40 to 5:00 pm

THz Materials and Configurations

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc.;
R. Jennifer Hwu, InnoSys, Inc.

3:40 pm: **Terahertz Schottky-diode balanced mixers**, Neal R. Erickson, Univ. of Massachusetts Amherst (United States) [7215-07]

4:00 pm: **Terahertz absorption by resonant plasmon excitations in grating-gated quantum wells**, Todd A. Barrick, Kevin M. Fortier, Albert D. Grine, John L. Reno, Eric A. Shaner, Sandia National Labs. (United States) [7215-08]

4:20 pm: **THz photonic crystal based polarization rotator**, Khadijeh Bayat, Sujeet K. Chaudhuri, Saffiedin Safavi-Naeini, Univ. of Waterloo (Canada) [7215-09]

4:40 pm: **Characterization of subwavelength plastic fiber utilizing terahertz time-domain spectroscopy**, Borwen You, National Cheng Kung Univ. (Taiwan); Tze-An Liu, Jin-Long Peng, Industrial Technology Research Institute (Taiwan); Ci-Ling Pan, National Chiao Tung Univ. (Taiwan); Ja-Yu Lu, National Cheng Kung Univ. (Taiwan) [7215-11]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

True single-mode photonic quasicrystal fiber for terahertz applications, Soan Kim, Chul-Sik Kee, Jongmin Lee, Gwangju Institute of Science and Technology (Korea, Republic of); Chung Ghiu Lee, Chosun Univ. (Korea, Republic of) [7215-10]

Quasioptical system design, Christian am Weg, Wolff von Spiegel, Fabian Friederich, Bernd Hils, Torsten Loeffler, Hartmut G. Roskos, Johann Wolfgang Goethe-Universität Frankfurt am Main (Germany) [7215-17]

Thursday 29 January

SESSION 3

Room: Conv. Ctr. Room D Thurs. 8:30 to 10:30 am

THz Imaging, Spectroscopy and Instrumentation I

Session Chairs: **Creidhe M. M. O'Sullivan**, National Univ. of Ireland/Maynooth (Ireland); **Michael C. Wanke**, Sandia National Labs.

8:30 am: **Prospects for quantum cascade lasers as transmitters and local oscillators in short-range coherent THz transmitter/receiver systems** (*Invited Paper*), Jerry Waldman, Univ. of Massachusetts Lowell (United States) [7215-12]

9:00 am: **Active gas sensing with a highly-sensitive sub-terahertz receiver utilizing a superconductor-insulator-superconductor mixer and a photonics-based local oscillator**, Kyoung-Hwan Oh, Ho-Jin Song, Naofumi Shimizu, NTT Microsystem Integration Labs. (Japan); Satoshi Kohjiro, National Institute of Advanced Industrial Science and Technology (Japan); Tomofumi Furuta, Atsushi Wakatsuki, NTT Photonics Labs. (Japan); Ken'ichi Kikuchi, National Institute of Advanced Industrial Science and Technology (Japan); Koji Suizu, Nagoya Univ. (Japan); Tadao Nagatsuma, Naoya Kukutsu, Yuichi Kado, NTT Microsystem Integration Labs. (Japan) [7215-13]

9:20 am: **THz spectroscopic techniques for the study of proteins in aqueous solutions**, Erik Bründermann, Ruhr-Universität Bochum (Germany) [7215-14]

9:40 am: **Fast active THz camera with range detection by frequency modulation**, Christian am Weg, Wolff von Spiegel, Bernd Hils, Torsten Loeffler, Johann Wolfgang Goethe-Universität Frankfurt am Main (Germany); Ralf Henneberger, Ralph Zimmermann, Radiometer Physics GmbH (Germany); Hartmut G. Roskos, Johann Wolfgang Goethe-Universität Frankfurt am Main (Germany) [7215-15]

10:00 am: **Terahertz pulsed imaging for the identification of abnormal pathology in excised colon tissue** (*Invited Paper*), Vincent P. Wallace, The Univ. of Western Australia (Australia); George Reese, Imperial College London (United Kingdom); Caroline Reid, Univ. College London (United Kingdom); Robert D. Goldin, Paris P. Tekkis, Imperial College London (United Kingdom) [7215-16]

Coffee Break 10:30 to 11:00 am

SESSION 4

Room: Conv. Ctr. Room DThurs. 11:00 am to 12:30 pm

THz Imaging, Spectroscopy and Instrumentation II*Session Chairs:* **Robert H. Giles**, Univ. of Massachusetts Lowell;
Konstantin L. Vodopyanov, Stanford Univ.11:00 am: **Simulation and experiment of terahertz stand-off detection**, Sabine Wohnsiedler, Michael Theuer, Michael Herrmann, Shany Islam, Joachim Jonuscheit, René Beigang, Fraunhofer Institute for Physical Measurement Techniques (Germany); Frank Hase, Forschungszentrum Karlsruhe (Germany)[7215-18]11:20 am: **Terahertz spectroscopy and reflection imaging of non-melanoma skin cancers at 1.56 THz**, Cecil S. Joseph, Univ. of Massachusetts Lowell (United States); Anna N. Yaroslavsky, Munir Al-Arashi M.D., Wellman Ctr. for Photomedicine (United States); Thomas M. Goyette, Jason C. Dickinson, Andrew J. Gatesman, Brian W. Soper, Christopher M. Forgione, Thomas M. Horgan, Elizabeth J. Ehasz-Slingerland, Robert H. Giles, Univ. of Massachusetts Lowell (United States)[7215-19]11:40 am: **Terahertz imaging with Si MOSFET focal-plane arrays**, Alvydas Lisauskas, Diana Glaab, Hartmut G. Roskos, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany); Erik Ójefors, Ullrich R. Pfeiffer, Bergische Univ. Wuppertal (Germany)[7215-20]12:00 pm: **Advanced nanoelectronic architectures for THz-based biological agent detection (Invited Paper)**, Dwight L. Woolard, U.S. Army Research Office (United States); James O. Jensen, U.S. Army Edgewood Chemical Biological Ctr. (United States)[7215-21]

Lunch/Exhibition Break12:30 to 2:00 pm

SESSION 5

Room: Conv. Ctr. Room DThurs. 2:00 to 3:40 pm

Simulation and Modeling*Session Chairs:* **John Anthony Murphy**, National Univ. of Ireland/ Maynooth (Ireland); **Laurence P. Sadwick**, InnoSys, Inc.2:00 pm: **Electrical standing waves in the HIFI HEB mixer amplifier chain**, Ronan D. Higgins, National Univ. of Ireland Maynooth (Ireland); Jacob W. Kooi, California Institute of Technology (United States)[7215-22]2:20 pm: **Finite element characterisation of terahertz quantum cascade laser waveguides**, Huda M. Tanvir, B. M. Azizur Rahman, Christos Themistos, Kejalakshmy Namassivayane, The City Univ. (United Kingdom); Tarapasad Chattopadhyay, VVISA-Bharati Univ. (India); Kenneth T. V. Grattan, The City Univ. (United Kingdom)[7215-23]2:40 pm: **Measurement and modeling of dielectric tube waveguides for terahertz pulses**, Samuel C. Henry, Rick Campbell, Lisa Zurk, Portland State Univ. (United States); Peter Hanaway, Cascade Microtech, Inc. (United States)[7215-24]3:00 pm: **Plasmonic THz transmission lines: a platform for THz integrated components and circuits**, Behnood G. Ghamsari, A. Hamed Majedi, Univ. of Waterloo (Canada)[7215-25]3:20 pm: **Optical modelling using Gaussian beam modes for the terahertz band**, Creidhe M. M. O'Sullivan, John A. Murphy, Marcin L. Gradziel, John Lavelle, Tully Peacocke, Neil A. Trappe, National Univ. of Ireland Maynooth (Ireland); David White, Institute of Technology Tallaght (Ireland); Stafford Withington, Univ. of Cambridge (United Kingdom)[7215-26]

Gallium Nitride Materials and Devices IV

Conference Chairs: **Hadis Morkoç**, Virginia Commonwealth Univ.; **Cole W. Litton**, Air Force Research Lab. - retired

Conference Co-Chairs: **Jen-Inn Chyi**, National Central Univ. (Taiwan); **Yasushi Nanishi**, Ritsumeikan Univ. (Japan); **Joachim Piprek**, NUSOD Institute LLC; **Euijoon Yoon**, Seoul National Univ. (Korea, Republic of)

Program Committee: **Hiroshi Amano**, Meijo Univ. (Japan); **Alison A. Baski**, Virginia Commonwealth Univ.; **Tzer-Perng Chen**, Epistar Corp. (Taiwan); **Hiroshi Fujioka**, The Univ. of Tokyo (Japan); **Nicolas Grandjean**, École Polytechnique Fédérale de Lausanne (Switzerland); **Shangri Gwo**, National Tsing Hua Univ. (Taiwan); **Toshihide Kikkawa**, Fujitsu Co. (Japan); **Katsumi Kishino**, Sophia Univ. (Japan); **Narihiko Maeda**, NTT Photonics Labs. (Japan); **Hideto Miyake**, Mie Univ. (Japan); **Yong-Tae Moon**, LG Innotek (Korea, Republic of); **Takashi Mukai**, Nichia Corp. (Japan); **Ok-Hyun Nam**, Korea Polytechnic Univ. (Korea, Republic of); **Kitt C. Reinhardt**, Air Force Office of Scientific Research; **Donald J. Silversmith**, Air Force Office of Scientific Research; **Cheolsoo Sone**, Samsung Electro-Mechanics Co., Ltd. (Korea, Republic of); **Yan-Kuin Su**, National Cheng Kung Univ. (Taiwan); **Chien-Jen Sun**, Industrial Technology Research Institute (Taiwan)

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room A4 Mon. 8:00 to 11:25 am

FETs

Session Chair: **Yasushi Nanishi**, Ritsumeikan Univ. (Japan)

This session dedicated to the memory of S. Yoshida.

8:00 am: **High-power AlGaIn/GaN HFETs on Si substrates for power-switching applications** (*Invited Paper*), Nariaki Ikeda, Jiang Li, Shuusuke Kaya, Masayuki Iwami, Sadahiro Kato, Takehiko Nomura, Furukawa Electric Co., Ltd. (Japan) [7216-01]

8:25 am: **Predicting the performance of an AlGaIn/GaN HFET power amplifier with large-signal circuit simulations** (*Invited Paper*), Griff L. Billbro, Robert J. Trew, Hong Yin, Danqiong Hou, North Carolina State Univ. (United States) [7216-02]

8:50 am: **Recent advances of GaN power devices for automotive applications** (*Invited Paper*), Kachi Tetsu, Toyota Central Research and Development Labs., Inc. (Japan) [7216-03]

9:15 am: **Design of insulator/AlGaIn structures in MIS AlGaIn/GaN HFETs for higher device performance** (*Invited Paper*), Narihiko Maeda, Masanobu Hiroki, Takatomo Enoki, Takashi Kobayashi, NTT Photonics Labs. (Japan) [7216-04]

9:40 am: **Recent advances of high voltage AlGaIn/GaN power HFETs** (*Invited Paper*), Yasuhiro Uemoto, Tetsuzo Ueda, Tsuyoshi Tanaka, Daisuke Ueda, Panasonic Semiconductor Discrete Devices Co., Ltd. (Japan) [7216-05]

Coffee Break 10:05 to 10:35 am

10:35 am: **The effect of the mechanical stress on GaN-based HFET characteristics** (*Invited Paper*), Edward Yi Chang, Chia-Ta Chang, Shih-Kuang Hsiao, Jui-Chien Huang, Chung-Yu Lu, National Chiao Tung Univ. (Taiwan) [7216-06]

11:00 am: **Hot phonons in InN-contained heterostructure 2DEG channels** (*Invited Paper*), Arvydas Matulionis, Puslaidininkiu Fizikos Institutas (Lithuania); Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-07]

SESSION 2

Room: Conv. Ctr. Room A4 Mon. 11:25 am to 12:55 pm

Growth I

Session Chair: **Cole W. Litton**, Air Force Research Lab.

11:25 am: **Advantages of HVPE-GaN substrates for growth of group III nitrides** (*Invited Paper*), Tanya Paskova, Andrew D. Hanser, Edward A. Preble, Keith R. Evans, Kyma Technologies, Inc. (United States) [7216-08]

11:50 am: **GaN single crystals of different habit grown from solution at near atmospheric pressure** (*Invited Paper*), Boris N. Feigelson, Naval Research Lab. (United States) and SAIC (United States); Jennifer Hite, Madhu Gowda, Jaime A. Freitas, Jr., Joseph G. Tischler, Paul Klein, Marko Tadjer, Naval Research Lab. (United States) [7216-09]

12:15 pm: **Growth of high-quality large GaN crystal by Na flux LPE method** (*Invited Paper*), Yusuke Mori, Osaka Univ. (Japan) [7216-10]

12:40 pm: **High pressure growth of Al_xGa_{1-x}N crystals**, Andrey Belousov, Sergiy Katrych, Jan Jun, ETH Zürich (Switzerland); Jin Zhang, Univ. of Rochester (United States); Kathrin Hametner, Detlef Günther, ETH Zürich (Switzerland); Roman Sobolewski, Univ. of Rochester (United States); Janusz Karpinski, Bertram Batlogg, ETH Zürich (Switzerland) [7216-11]

Lunch Break 12:55 to 1:55 pm

SESSION 3

Room: Conv. Ctr. Room A4 Mon. 1:55 to 3:25 pm

Growth II

Session Chair: **Euijoon Yoon**, Seoul National Univ. (Korea, Republic of)

1:55 pm: **Ammonothermal growth of bulk gallium nitride crystals** (*Invited Paper*), Dirk Ehrentraut, Tsuguo Fukuda, Tohoku Univ. (Japan) [7216-12]

2:20 pm: **Wurtzite semiconductors heterostructures grown on (hk) oriented substrates: the interplay between spontaneous and piezoelectric polarization fields, elastic energy and the modification of quantum confined Stark effect** (*Invited Paper*), Bernard Gil, Univ. de Montpellier II (France) [7216-13]

2:45 pm: **Proposal and achievement of novel visible-range optoelectronic devices based on single and double monolayer-thick InN QWs in GaN matrix** (*Invited Paper*), Akihiko Yoshikawa, Song-Bek Che, Chiba Univ. (Japan) [7216-14]

3:10 pm: **Improvement of a-plane GaN quality based on flow modulation epitaxy on r-plane sapphire substrate**, Jeng-Jie Huang, Kun-Ching Shen, Wen-Yu Shiao, Yung-Sheng Chen, Tzu-Chi Liu, Tsung-Yi Tang, Chi-Feng Huang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [7216-15]

Coffee Break 3:25 to 3:55 pm

SESSION 4

Room: Conv. Ctr. Room A4 Mon. 3:55 to 5:20 pm

Growth III

Session Chair: **Jen-Inn Chyi**, National Central Univ. (Taiwan)

3:55 pm: **Low temperature epitaxial growth of group III nitrides by pulsed excitation deposition** (*Invited Paper*), Hiroshi Fujioka, Jitsuo Ohta, Atsushi Kobayashi, The Univ. of Tokyo (Japan) [7216-16]

4:20 pm: **Growth of high quality AlN on sapphire by using a low-temperature AlN interlayer**, Hsueh-Hsing Liu, Guan-Ting Chen, Ruo-Syuan Lin, National Central Univ. (Taiwan); Sheng-Rui Jian, I-Shou Univ. (Taiwan); Jen-Inn Chyi, National Central Univ. (Taiwan) [7216-17]

4:35 pm: **HVPE growth of AlN on trench patterned sapphire**, Hideto Miyake, Yusuke Katagiri, Kazuteru Okuura, Kazumasa Hiramatsu, Mie Univ. (Japan) [7216-18]

4:50 pm: **Growth and defect analysis of m-plane GaN-based layers on (100) LiAlO₂ grown by MOVPE**, Mitch M. C. Chou, D. R. Hang, Liuwen Chang, National Sun Yat-Sen Univ. (Taiwan); Michael Heuken, RWTH Aachen (Germany) [7216-19]

5:05 pm: **Characteristics of narrow-bandgap InN semiconductors grown on Ga-Polar and N-polar GaN templates by pulsed metalorganic vapor phase epitaxy**, Hongping Zhao, Hua Tong, Alexandra M. Driscoll, Muhammad Jamil, Gen-Sheng Huang, Nelson Tansu, Lehigh Univ. (United States) [7216-20]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

- 8:00 am: **Introduction and Opening Remarks**
- 8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)
- 8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)
- 9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room A4 Tues. 10:30 to 11:30 am

Nanotechniques/Devices I

Session Chair: Li-Chyong Chen, National Taiwan Univ. (Taiwan)

- 10:30 am: **Comparative investigation of InGaN-based quantum structures grown on various substrates**, Yong-Hoon Cho, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7216-21]
- 10:45 am: **Fabrication of position-controlled InN nanocolumns by ECR-MBE**, Tsutomu Araki, Daisuke Fukuoka, Hidetoshi Tamiya, Satoshi Harui, Yasushi Nanishi, Ritsumeikan Univ. (Japan); Hideto Miyake, Kazumasa Hiramatsu, Mie Univ. (Japan) [7216-22]
- 11:00 am: **AlGaIn deep ultraviolet avalanche photodiodes on free-standing bulk substrates grown by MOCVD**, Russell D. Dupuis, Jae-Hyun Ryou, Hee Jin Kim, Suk Choi, Yun Zhang, Bravishma Narayan, Zachary Lochner, Shyh-Chiang Shen, P. Douglas Yoder, Georgia Institute of Technology (United States) [7216-23]
- 11:15 am: **Correlation of optical and vibrational properties of AlN grown on sapphire**, Ronny Kirste, Technical Univ. Berlin (Germany); Christian Nienstiel, Axel G. Hoffmann, Technische Univ. Berlin (Germany); Barbara Bastek, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Outi Reentilä, Frank Brunner, Markus Weyers, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7216-24]
- Lunch/Exhibition Break 11:30 am to 1:15 pm

SESSION 6

Room: Conv. Ctr. Room A4 Tues. 1:15 to 2:00 pm

Nanotechniques/Devices II

Session Chair: Bernard Gil, Univ. de Montpellier II (France)

- 1:15 pm: **Quantum wire behavior in "wrinkled" quantum wells deposited on textured GaN**, Spiros Riyopoulos, SAIC (United States); Theodore D. Moustakas, Boston Univ. (United States) [7216-26]
- 1:30 pm: **Piezoelectric quantum 1/f noise in AlGaIn HFETs and reliability**, Hadis Morkoç, Virginia Commonwealth Univ. (United States); Peter H. Handel, Univ. of Missouri (United States) [7216-77]
- 1:45 pm: **Investigation of current-voltage characteristics of Al(Ga)N/GaN RTD structures**, Jaesoong Lee, Qian Fan, Xianfeng Ni, Ümit Özgür, Virginia Commonwealth Univ. (United States); Vladimir I. Litvinov, WaveBand Corp. (United States); Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-28]

SESSION 7

Room: Conv. Ctr. Room A4 Tues. 2:00 to 3:15 pm

Advanced Techniques I

Session Chair: Akihiko Yoshikawa, Chiba Univ. (Japan)

- 2:00 pm: **Terahertz emission and spectroscopy on InN epilayer and nanostructure** (*Invited Paper*), Hyeoung Ahn, Ci-Ling Pan, National Chiao Tung Univ. (Taiwan); Shangir Gwo, National Tsing Hua Univ. (Taiwan) [7216-29]
- 2:25 pm: **Surface control of GaN alloys for photonic and electronic devices** (*Invited Paper*), Tamotsu Hashizume, Hokkaido Univ. (Japan) [7216-30]
- 2:50 pm: **Current spreading and its related issues in GaN-based light emitting diodes** (*Invited Paper*), Jong-In Shim, Hanyang Univ. (Korea, Republic of) [7216-31]
- Coffee Break 3:15 to 3:45 pm

SESSION 8

Room: Conv. Ctr. Room A4 Tues. 3:45 to 5:00 pm

Advanced Techniques II

Session Chair: Akihiko Yoshikawa, Chiba Univ. (Japan)

- 3:45 pm: **Trap characterization in GaN/AlGaIn HFETs using GTLM structures** (*Invited Paper*), Mehdi Anwar, Univ. of Connecticut (United States); Richard T. Webster, Air Force Research Lab. (United States); James M. Sattler, U.S. Air Force (United States) [7216-32]
- 4:10 pm: **Photoconductivity, electrochemical and photo-electrochemical properties of GaN nanowires** (*Invited Paper*), Li-Chyong Chen, National Taiwan Univ. (Taiwan); Reui-San Chen, Academia Sinica (Taiwan); Abhijit Ganguly, National Taiwan Univ. (Taiwan); Kuei-Hsien Chen, Academia Sinica (Taiwan) [7216-33]
- 4:35 pm: **Surface charge lithography for GaN micro- and nanostructuring** (*Invited Paper*), Ion M. Tiginyanu, National Ctr. for Materials Study and Testing (Moldova); Veaceslav Popa, Technical Univ. of Moldova (Moldova); Andrei Sarua, Peter J. Heard, Univ. of Bristol (United Kingdom); Olesea Volciuc, Technical Univ. of Moldova (Moldova); Martin Kuball, Univ. of Bristol (United Kingdom) [7216-34]

Wednesday 28 January

SESSION 9

Room: Conv. Ctr. Room A4 Wed. 8:00 to 10:15 am

Advanced Methods

Session Chairs: Oliver Ambacher, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Tamotsu Hashizume, Hokkaido Univ. (Japan)

- 8:00 am: **Spectrally and time resolved cathodoluminescence spectroscopy of AlN grown on sapphire by high-temperature MOVPE**, Barbara Bastek, Jürgen Christen, Martin von Kurnatowsky, Olga August, Otto-von-Guericke-Univ. Magdeburg (Germany); Ronny Kirste, Axel G. Hoffmann, Technische Univ. Berlin (Germany); Outi Reentilä, Frank Brunner, Markus Weyers, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7216-35]
- 8:15 am: **Investigation of the electrical activity of V-defects in GaN using scanning force microscopy**, André Lochthofen, Wolfgang Mertin, Gerd Bacher, Univ. Duisburg-Essen (Germany); Lutz Hoeppele, Stefan Bader, Jürgen Off, Berthold Hahn, OSRAM Opto Semiconductors GmbH (Germany) [7216-36]
- 8:30 am: **Nano-scale luminescence properties of InGaIn MQWs on {1-101} GaN facets**, Sebastian Metzner, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Thomas Wunderer, Ferdinand Scholz, Univ. Ulm (Germany) [7216-37]
- 8:45 am: **Improved hydrogen detection sensitivity of a Pt/Ga₂O₃/GaN Schottky diode**, Jheng-Tai Yan, Ching-Ting Lee, National Cheng Kung Univ. (Taiwan) [7216-38]
- 9:00 am: **Low resistance ohmic contacts formation and mechanism of current transport through p-GaN and p-AlGaIn**, Indra Chary, Boris Borisov, Anilkumar Chandolu, Vladimir Kuryatkov, Sergey A. Nikishin, Mark Holtz, Texas Tech Univ. (United States) [7216-39]
- 9:15 am: **Effect of ambient on electrical and optical properties of GaN**, Michael A. Reshchikov, Michael A. Foussekis, Alison A. Baski, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-40]

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9:30 am: **Measurements of current spreading area in InGaN/GaN light emitting diodes**, June-Sik Park, Sangsu Hong, Donghoun Kang, Dong-Yul Lee, Bae-Kyun Kim, SAMSUNG Electro-Mechanics Co., Ltd. (Korea, Republic of) [7216-41]

9:45 am: **Excitonic transport in GaN: suppression of ionized impurity scattering**, Martin Noltemeyer, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Tim Wernicke, Christian Hennig, Markus Weyers, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7216-42]

10:00 am: **Carrier relaxation in semi-polar InGaN/GaN Quantum Wells investigated by picosecond-time resolved cathodoluminescence spectroscopy**, Frank Bertram, Sebastian Metzner, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Thomas Wunderer, Ferdinand Scholz, Univ. Ulm (Germany) [7216-43]

Coffee Break 10:15 to 10:45 am

SESSION 10

Room: Conv. Ctr. Room A4 Wed. 10:45 am to 12:55 pm

Lasers

Session Chair: Russell D. Dupuis, Georgia Institute of Technology

10:45 am: **Nitride laser diode arrays (Invited Paper)**, Piotr Perlin, Katarzyna A. Komorowska, Przemek Wisniewski, Instytut Wysokich Cisnien (Poland); Robert Czernecki, Szymon Grzanka, TopGaN Ltd. (Poland); Michal Leszczynski, Tadek Suski, Izabella Grzegory, Sylwester A. Porowski, Instytut Wysokich Cisnien (Poland) [7216-44]

11:10 am: **Room temperature polariton lasing and condensation effects in III-nitride microcavities (Invited Paper)**, Raphaël Butté, Gabriel Christmann, Eric Feltn, Antonino Castiglia, Jacques Levrat, Gatien Cosendey, Alexei Altoukhov, Jean-Francois Carlin, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7216-45]

11:35 am: **Blue GaN-based vertical cavity surface emitting lasers by CW current injection at 77K (Invited Paper)**, Hao-chung Kuo, Shih-Wei Chen, Tsung-Ting Kao, Chih-Chiang Kao, Jun-Rong Chen, Tien-chang Lu, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan) [7216-46]

12:00 pm: **Challenge for short wavelength semiconductor UV laser diodes (Invited Paper)**, Hiroshi Amano, Meijo Univ. (Japan) [7216-47]

12:25 pm: **Temperature dependence of blue InGaN lasers**, Stefanie Brünigshoff, Matthias Sabathil, Sönke Tautz, Désirée Queren, Stephan Lutgen, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [7216-48]

12:40 pm: **Electrically pumped InGaN/GaN laser diodes including a lattice-matched Al_{0.83}In_{0.17}N bottom cladding layer**, Antonino Castiglia, Gatien Cosendey, Alexei Altoukhov, Eric Feltn, Jean-Francois Carlin, Raphaël Butté, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7216-49]

Lunch/Exhibition Break 12:55 to 2:25 pm

SESSION 11

Room: Conv. Ctr. Room A4 Wed. 2:25 to 3:00 pm

Poster Highlights I

Session Chair: Hadis Morkoç, Virginia Commonwealth Univ.

2:25 pm: **Growth and characterization of isotopic (nat)Ga(15)N by molecular-beam epitaxy**, Yongzhao Yao, Takeshi Ohgaki, Kenji Matsumoto, Isao Sakaguchi, Yoshiki Wada, Hajime Haneda, Takashi Sekiguchi, Naoki Ohashi, National Institute for Materials Science (Japan) [7216-71]

2:30 pm: **Realization of the efficiency droop reduction by the thin GaN layer inserted quaternary quantum barriers**, Soo-Min Lee, Hun-Jae Chung, Young-Min Park, Cheolsoo Sone, Yongjo Park, Samsung Electro-Mechanics (Korea, Republic of); Jong Kyu Kim, E. Fred Schubert, Rensselaer Polytechnic Institute (United States) [7216-72]

2:35 pm: **GaN-based vertical cavities on highly reflective and crack-free nitride distributed Bragg reflectors**, Xianfeng Ni, Ryoko Shimada, T. D. Kang, Jacob H. Leach, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-73]

2:40 pm: **Carrier screening effect in AlGaIn quantum-well avalanche diode**, Sheng-kun Zhang, New York City College of Technology/CUNY (United States); Wubao B. Wang, Robert R. Alfano, City College/CUNY (United States); Amir Dabiran, Andrei V. Osinsky, Andrew M. Wowchak, Brian Hertog, Peter P. Chow, SVT Associates, Inc. (United States) [7216-74]

2:45 pm: **Nitride-based p-i-n photodetectors with Ni catalyst processing**, Chin-Hsiang Chen, Cheng Shiu Univ. (Taiwan) [7216-75]

2:50 pm: **Output power enhancement of GaN-based light emitting diodes on a SiO₂ nanorod-array patterned sapphire template by nanoscale epitaxial lateral overgrowth**, Ching-Hua Chiu, Z. Y. Li, Peichen Yu, Hao-Chung Kuo, T. C. Lu, National Chiao Tung Univ. (Taiwan); Kei May Lau, Hong Kong Univ. of Science and Technology (China); Shin-Chung Wang, National Chiao Tung Univ. (Taiwan) [7216-76]

2:55 pm: **Electroluminescence of a surface plasmon mediated InGaN/GaN based green light-emitting diode**, Ki-Young Choi, Jaewoong Yoon, Seok-Ho Song, Hanyang Univ. (Korea, Republic of); Moo Youn Park, Jin-Ha Kim, Samsung Electro-Mechanics (Korea, Republic of) [7216-78]

Coffee Break 3:00 to 3:30 pm

SESSION 12

Room: Conv. Ctr. Room A4 Wed. 3:30 to 4:10 pm

Poster Highlights II

Session Chair: Hadis Morkoç, Virginia Commonwealth Univ.

3:30 pm: **Employment of III-nitride/silicon heterostructures for dual-band UV/IR photodiodes**, Rajeev R. Pillai, Univ. of Houston (United States) . [7216-79]

3:35 pm: **Transient current spectroscopy of lattice matched InAlN/AlN/GaN HFETs for identification of traps resulting in gate lag**, Jacob H. Leach, Jinqiao Xie, Qian Fan, Mo Wu, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-80]

3:40 pm: **A ferroelectric field effect transistor with double-gate structure based on AlGaIn/GaN heterostructure**, Bo Xiao, Jinqiao Xie, Vitaliy Avrutin, Qian Fan, Mo Wu, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-81]

3:45 pm: **Two dimensional electron gas in GaN heterojunction field effect transistors structures with AlN spacer**, Qian Fan, Jacob H. Leach, Jinqiao Xie, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-82]

3:50 pm: **Reduction in the strain at the surfaces of GaN thin films**, Amal Elgawadi, Oklahoma State Univ. (United States) [7216-83]

3:55 pm: **Improved surface morphology and edge definition for ohmic contacts to AlGaIn/GaN heterostructures**, Yung-Ling Lan, Hung-Cheng Lin, Geng-Yen Lee, National Central Univ. (Taiwan); Fan Ren, Stephen J. Pearton, Univ. of Florida (United States); Jen-Inn Chyi, National Central Univ. (Taiwan) [7216-84]

4:00 pm: **Light extraction improvement of GaN-based light-emitting diodes using patterned undoped GaN bottom reflection gratings**, Simeon Trieu, Xiaomin Jin, California Polytechnic State Univ. (United States); Bei Zhang, Tao Dai, Kui Bao, Xiang-Ning Kang, Guo-Yi Zhang, Peking Univ. (China) . . [7216-85]

4:05 pm: **Point defects in AlGaIn and InAlN**, Daniel K. Johnstone, SEMETROL (United States); Jing Nie, Jinqiao Xie, Qian Fan, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-86]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Growth and characterization of isotopic (nat)Ga(15)N by molecular-beam epitaxy, Yongzhao Yao, Takeshi Ohgaki, Kenji Matsumoto, Isao Sakaguchi, Yoshiki Wada, Hajime Haneda, Takashi Sekiguchi, Naoki Ohashi, National Institute for Materials Science (Japan) [7216-71]

Realization of the efficiency droop reduction by the thin GaN layer inserted quaternary quantum barriers, Soo-Min Lee, Hun-Jae Chung, Young-Min Park, Cheolsoo Sone, Yongjo Park, Samsung Electro-Mechanics (Korea, Republic of); Jong Kyu Kim, E. Fred Schubert, Rensselaer Polytechnic Institute (United States) [7216-72]

GaN-based vertical cavities on highly reflective and crack-free nitride distributed Bragg reflectors, Xianfeng Ni, Ryoko Shimada, T. D. Kang, Jacob H. Leach, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States) [7216-73]

Carrier screening effect in AlGaIn quantum-well avalanche diode, Sheng-kun Zhang, New York City College of Technology/CUNY (United States); Wubao B. Wang, Robert R. Alfano, City College/CUNY (United States); Amir Dabiran, Andrei V. Osinsky, Andrew M. Wowchak, Brian Hertog, Peter P. Chow, SVT Associates, Inc. (United States)[7216-74]

Nitride-based p-i-n photodetectors with Ni catalyst processing, Chin-Hsiang Chen, Cheng Shiu Univ. (Taiwan)[7216-75]

Output power enhancement of GaN-based light emitting diodes on a SiO₂ nanorod-array patterned sapphire template by nanoscale epitaxial lateral overgrowth, Ching-Hua Chiu, Z. Y. Li, Peichen Yu, Hao-Chung Kuo, T. C. Lu, National Chiao Tung Univ. (Taiwan); Kei May Lau, Hong Kong Univ. of Science and Technology (China); Shin-Chung Wang, National Chiao Tung Univ. (Taiwan)[7216-76]

Electroluminescence of a surface plasmon mediated InGaIn/GaN based green light-emitting diode, Ki-Young Choi, Jaewoong Yoon, Seok-Ho Song, Hanyang Univ. (Korea, Republic of); Moo Youn Park, Jin-Ha Kim, Samsung Electro-Mechanics (Korea, Republic of)[7216-78]

Employment of III-nitride/silicon heterostructures for dual-band UV/IR photodiodes, Rajeev R. Pillai, Univ. of Houston (United States)[7216-79]

Transient current spectroscopy of lattice matched InAlIn/AlIn/GaN HFETs for identification of traps resulting in gate lag, Jacob H. Leach, Jinqiao Xie, Qian Fan, Mo Wu, Hadis Morkoç, Virginia Commonwealth Univ. (United States)[7216-80]

A ferroelectric field effect transistor with double-gate structure based on AlGaIn/GaN heterostructure, Bo Xiao, Jinqiao Xie, Vitaliy Avrutin, Qian Fan, Mo Wu, Hadis Morkoç, Virginia Commonwealth Univ. (United States)[7216-81]

Two dimensional electron gas in GaN heterojunction field effect transistors structures with AlN spacer, Qian Fan, Jacob H. Leach, Jinqiao Xie, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States)[7216-82]

Reduction in the strain at the surfaces of GaN thin films, Amal Elgawadi, Oklahoma State Univ. (United States)[7216-83]

Improved surface morphology and edge definition for ohmic contacts to AlGaIn/GaN heterostructures, Yung-Ling Lan, Hung-Cheng Lin, Geng-Yen Lee, National Central Univ. (Taiwan); Fan Ren, Stephen J. Pearton, Univ. of Florida (United States); Jen-Inn Chyi, National Central Univ. (Taiwan)[7216-84]

Light extraction improvement of GaN-based light-emitting diodes using patterned undoped GaN bottom reflection gratings, Simeon Trieu, Xiaomin Jin, California Polytechnic State Univ. (United States); Bei Zhang, Tao Dai, Kui Bao, Xiang-Ning Kang, Guo-Yi Zhang, Peking Univ. (China)[7216-85]

Point defects in AlGaIn and InAlIn, Daniel K. Johnstone, SEMETROL (United States); Jing Nie, Jinqiao Xie, Qian Fan, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States)[7216-86]

Thursday 29 January

SESSION 13

Room: Conv. Ctr. Room A4Thurs. 8:00 to 10:00 am

LEDs I

Session Chair: Takashi Mukai, Nichia Corp. (Japan)

8:00 am: **Improvement in light extraction efficiency of high brightness InGaIn-based light emitting diodes** (Invited Paper), Ta-Cheng Hsu, Tzer-Perng Chen, Chuan-yu Luo, Ming-Chi Hsu, Epistar Corp. (Taiwan)[7216-50]

8:25 am: **Emission of biased green quantum wells in time and space domain** (Invited Paper), Ulrich T. Schwarz, Univ. Regensburg (Germany)[7216-51]

8:50 am: **Polarization-matching in GaInN light emitting diodes: a new concept for reducing efficiency droop and enhancing performance** (Invited Paper), E. Fred Schubert, Jong Kyu Kim, Min Ho Kim, Martin F. Schubert, Rensselaer Polytechnic Institute (United States)[7216-52]

9:15 am: **Reduction of efficiency droop in InGaIn MQW blue LEDs using p-type doped quantum well barriers**, Xianfeng Ni, Jinqiao Xie, Qian Fan, Ryoko Shimada, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (United States)[7216-53]

9:30 am: **Making a direct electrical contact to InGaIn/GaN nanorod LEDs: high output power density**, Shawn-Yu Lin, Ya-Ju Lee, Rensselaer Polytechnic Institute (United States)[7216-54]

9:45 am: **Employment of III-nitride/silicon heterostructures for dual-band UV/IR photodiodes**, Rajeev R. Pillai, Univ. of Houston (United States)[7216-55]

Coffee Break10:00 to 10:30 am

SESSION 14

Room: Conv. Ctr. Room A4Thurs. 10:30 am to 12:15 pm

LEDs II

Session Chair: Chuong Anh Tran, SemiLEDs Corp.

10:30 am: **Recent development of nitride LEDs and LDs** (Invited Paper), Takashi Mukai, Atsuo Michiue, Takashi Miyoshi, Tomoya Yanamoto, Tokuya Kozaki, Shinichi Nagahama, Yukio Narukawa, Masahiko Sano, Takao Yamada, Nichia Corp. (Japan)[7216-56]

10:55 am: **Advances in GaN-based quantum dots and photonic crystals** (Invited Paper), Yasuhiko Arakawa, The Univ. of Tokyo (Japan)[7216-57]

11:20 am: **222-282 nm AlGaIn and InAlGaIn based deep-UV LEDs fabricated on high-quality AlN template** (Invited Paper), Hideki Hirayama, The Institute of Physical and Chemical Research (RIKEN) (Japan) and JST CREST (Japan); Norimichi Noguchi, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Saitama Univ. (Japan) and JST CREST (Japan); Sachie Fujikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) and JST CREST (Japan); Jun Norimatsu, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Saitama Univ. (Japan) and JST CREST (Japan); Norihiko Kamata, Saitama Univ. (Japan) and JST CREST (Japan); Takayoshi Takano, Kenji Tsubaki, Matsushita Electric Works, Ltd. (Japan)[7216-58]

11:45 am: **Green light emission from selectively grown InGaIn MQW stripes oriented along the <11-20> direction**, Wen Feng, Vladimir Kuryatkov, Sergey A. Nikishin, Mark Holtz, Texas Tech Univ. (United States)[7216-59]

12:00 pm: **Femtosecond pump-probe characterization of high-pressure grown Al_xGa_{1-x}N single crystals**, Roman Sobolewski, Jie Zhang, Univ. of Rochester (United States); Andrey Belousov, Jan Jun, Kathrin Hametner, Detlef Günther, Janusz Karpinski, Bertram Batlogg, ETH Zürich (Switzerland)[7216-60]

Lunch/Exhibition Break12:15 to 1:30 pm

SESSION 15

Room: Conv. Ctr. Room A4Thurs. 1:30 to 3:30 pm

LEDs III

Session Chair: Ta-Cheng Hsu, Epistar Corp. (Taiwan)

1:30 pm: **Multi-color light-emitting diodes based on GaIn micro-structures** (Invited Paper), Mitsuru Funato, Yoichi Kawakami, Kyoto Univ. (Japan); Yukio Narukawa, Takashi Mukai, Nichia Corp. (Japan)[7216-61]

1:55 pm: **Recent progress in AlN deep-UV light-emitting diodes: physics and device structure** (Invited Paper), Yoshitaka Taniyasu, Makoto Kasu, Nippon Telegraph and Telephone Corp. (Japan)[7216-62]

2:20 pm: **Characteristics of ideal solid-state light sources for general illumination** (Invited Paper), Jeffrey Y. Tsao, Sandia National Labs. (United States)[7216-63]

2:45 pm: **Multiple functional UV devices based on InGaIn/GaN, InGaIn/AlGaIn and Al_xGa_{1-x}N/Al_yGa_{1-y}N quantum wells for biological warfare agents detections**, Qin Wang, Susan Savage, Sirpa Person, Bertrand Noharet, Stéphane Junique, Jan Y. Andersson, Acreo AB (Sweden); Vytautas Liuliola, Saulius Marcinkevicius, Royal Institute of Technology (Sweden)[7216-64]

3:00 pm: **Fabrication technique for Moth-Eye structure using low-energy electron-beam projection lithography for high-performance blue-light-emitting diode on SiC substrate**, Tomoyo Seko, Sho Mabuchi, Meijo Univ. (Japan); Fumiharu Teramae, EL-SEED Corp. (Japan); Ryosuke Kawai, Meijo Univ. (Japan); Atsushi Suzuki, Yukio Kaneko, EL-SEED Corp. (Japan); Satoshi Kamiyama, Motoaki Iwaya, Hiroshi Amano, Isamu Akasaki, Meijo Univ. (Japan)[7216-65]

3:15 pm: **Array of GaIn-based transverse junction blue light-emitting-diodes (LEDs)**, Shi-Hao Guol, National Taiwan Univ. (Taiwan); Jin-Wei Shi, C. S. Lin, J.-K. Sheu, National Central Univ. (Taiwan); M. L. Lee, Southern Taiwan Univ. (Taiwan); Kuo-Hui Chang, W. C. Lai, National Cheng Kung Univ. (Taiwan); C. H. Kuo, C. J. Tun, Jen-Inn Chyi, National Central Univ. (Taiwan)[7216-66]

Coffee Break3:30 to 4:00 pm

Conference 7216

SESSION 16

Room: Conv. Ctr. Room A4Thurs. 4:00 to 5:15 pm

Novel Devices

Session Chair: **Joachim Piprek**, NUSOD Institute LLC

4:00 pm: **AlGaIn/GaN HEMT And ZnO nanorod-based sensors for chemical and bio-applications** (*Invited Paper*), Fan Ren, Univ. of Florida (United States)[7216-67]

4:25 pm: **Extremely sensitive GaN-based sensors for monitoring of bioreactions** (*Invited Paper*), Oliver Ambacher, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Volker Cimalla, B. Lübbbers, Irina Cimalla, A. Schober, Technische Univ. Ilmenau (Germany)[7216-69]

4:50 pm: **Design, fabrication and characterization of high-performance solar-blind AlGaIn photodetectors** (*Invited Paper*), Ekmel Ozbay, Bilkent Univ. (Turkey)[7216-70]

Zinc Oxide Materials and Devices IV

Conference Chairs: **Ferechteh Hosseini Teherani**, Nanovation SARL (France); **Cole W. Litton**, Air Force Research Lab. - retired; **David J. Rogers**, Nanovation SARL (France)

Program Committee: **Emilio Bellingeri**, Consiglio Nazionale delle Ricerche (Italy); **Jean-Jacques Delaunay**, The Univ. of Tokyo (Japan); **Elvira M. C. Fortunato**, Univ. Nova de Lisboa (Portugal); **Hiroshi Fujioka**, The Univ. of Tokyo (Japan); **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany); **Masashi Kawasaki**, Tohoku Univ. (Japan); **Jianlin Liu**, Univ. of California/Riverside; **David C. Look**, Wright State Univ.; **Rodrigo Ferrão de Paiva Martins**, UNINOVA (Portugal); **Tatsuo Okada**, Kyushu Univ. (Japan); **Thierry Pauporté**, Ecole Nationale Supérieure de Chimie de Paris (France); **Manijeh Razeghi**, Northwestern Univ.; **Donald J. Silversmith**, Air Force Office of Scientific Research; **Jin-Joo Song**, Univ. of California/San Diego; **Severin Waldis**, Carl Zeiss AG (Germany); **Zhonglin L. Wang**, Georgia Institute of Technology

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room E Sun. 9:00 to 10:15 am

ZnO Emitting Devices

Session Chairs: **Naoki Ohashi**, National Institute for Materials Science (Japan); **David C. Look**, Wright State Univ.

9:00 am: **Ultraviolet ZnO light emitting diodes and quantum well laser diodes** (*Invited Paper*), Jianlin Liu, Sheng Chu, Jieying Kong, Lin Li, Zheng Yang, Univ. of California, Riverside (United States) [7217-01]

9:25 am: **ZnO-based quantum well structures for light-emitting applications** (*Invited Paper*), Sergey Sadofev, Sascha Kalusniak, Joachim Puls, Sylke Blumstengel, Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany) [7217-02]

9:50 am: **White electroluminescence from ZnO(N)/n-Si diodes** (*Invited Paper*), Jose Luis Pau Vizcaino, Northwestern Univ. (United States); David J. Rogers, Ferechteh Hosseini Teherani, Nanovation SARL (France); Can Bayram, Ryan P. McClintock, Manijeh Razeghi, Northwestern Univ. (United States) [7217-03]

Coffee Break 10:15 to 10:35 am

SESSION 2

Room: Conv. Ctr. Room E Sun. 10:35 am to 12:15 pm

ZnO Nano Based Devices I

Session Chairs: **Jianlin Liu**, Univ. of California, Riverside; **Cole W. Litton**, Air Force Research Lab.

10:35 am: **ZnO nanogenerators and nanopiezotronics** (*Invited Paper*), Zhonglin L. Wang, Georgia Institute of Technology (United States) . . . [7217-04]

11:05 am: **ZnO nanowires: recent developments in growth, characterization and energy harvesting** (*Invited Paper, Presentation Only*), Ulrich M. Gösele, Marin Alexe, Stephan Senz, Dietrich Hesse, Markus Andreas Schubert, Dong Sik Kim, Max-Planck-Institut für Mikrostrukturphysik (Germany) [7217-05]

11:35 am: **Low operation voltage UV-light emitting device based on ZnO nanoparticles**, Ekaterina Neshataeva, Tilmar Kümmell, Univ. Duisburg-Essen (Germany); Andre Ebbers, Evonik Degussa GmbH (Germany); Gerd Bacher, Univ. Duisburg-Essen (Germany) [7217-06]

11:55 am: **Growth mechanisms and applications of ZnO nanostructures fabricated using pulsed laser deposition**, Vinod E. Sandana, Nanovation SARL (France) [7217-07]

Lunch Break 12:15 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room E Sun. 1:30 to 3:10 pm

ZnO Properties

Session Chairs: **Axel G. Hoffmann**, Technische Univ. Berlin (Germany); **Elvira M. C. Fortunato**, Univ. Nova de Lisboa (Portugal)

1:30 pm: **Electrical and optical activity of point defects in implanted ZnO** (*Invited Paper*), David C. Look, Gary C. Farlow, Wright State Univ. (United States); Faisal Yaqoob, Lakshmanan Vanamurthy, Mengbing Huang, Univ. at Albany (United States) [7217-08]

2:10 pm: **Optical and vibrational properties of high quality ZnO substrates under uniaxial pressure** (*Invited Paper*), Axel G. Hoffmann, Markus R. Wagner, Ronny Kirste, Gordon Callsen, Martin Kaiser, Enno Malguth, Wolfgang Gehlhoff, Technische Univ. Berlin (Germany); Stefan Lautenschläger, Joachim Sann, Bruno K. Meyer, Justus-Liebig-Univ. Giessen (Germany) [7217-09]

2:40 pm: **Role of order and disorder in covalent semiconductors and ionic oxides used to produce thin film transistors** (*Invited Paper*), Rodrigo Ferrão de Paiva Martins, Uninova/CEMOP (Portugal) [7217-10]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room E Sun. 3:30 to 5:10 pm

ZnO Substrates and Devices Preparation

Session Chairs: **Masashi Kawasaki**, Tohoku Univ. (Japan); **David J. Rogers**, Nanovation SARL (France)

3:30 pm: **ZnO ultraviolet light emitting diodes and two dimensional electron gas in ZnO/MgZnO heterostructures made by molecular beam epitaxy** (*Invited Paper*), Masashi Kawasaki, Tohoku Univ. (Japan) [7217-11]

3:55 pm: **High quality group III nitrides grown on ZnO substrates**, Hiroshi Fujioka, Kohei Ueno, Astushi Kobayashi, Jistuo Ohta, The Univ. of Tokyo (Japan); Hidetaka Amanai, Satoru Nagao, Hideyoshi Horie, Mitsubishi Chemical Corp. (Japan) [7217-12]

4:20 pm: **Growth and characterization of (Zn,Mg)O bulk and film crystals**, Naoki Ohashi, National Institute for Materials Science (Japan); Jun Kobayashi, Hideyuki Sekiwa, Miyuki Miyamoto, Mitsubishi Gas Chemical Co., Inc. (Japan); Yutaka Adachi, Isao Sakaguchi, Yoshiki Wada, National Institute for Materials Science (Japan) [7217-13]

4:45 pm: **Comparison of ZnO thin films grown on various substrates by pulsed laser deposition and discussion of potential applications**, David J. Rogers, Nanovation SARL (France) [7217-14]

SESSION 5

Room: Conv. Ctr. Room E Sun. 5:10 to 5:50 pm

Keynote Session

5:10 pm: **Brief overview on the achievements on ZnO** (*Keynote Presentation*), Donald J. Silversmith, Air Force Office of Scientific Research (United States) . . . [7217-15]

Monday 26 January

SESSION 6

Room: Conv. Ctr. Room E Mon. 9:00 to 10:15 am

ZnO Nano Based Devices II

Session Chairs: **Jose Luis Pau Vizcaino**, Northwestern Univ.; **Michael Lorenz**, Univ. Leipzig (Germany)

9:00 am: **Growth direction control of ZnO nanowire by nanoparticle-assisted laser-ablation deposition**, Tatsuo Okada, Kyushu Univ. (Japan) [7217-16]

9:25 am: **Electrochemical growth of ZnO nanocolumn arrays and ZnO mesoporous films**, Thierry Pauporté, Ecole Nationale Supérieure de Chimie de Paris (France) [7217-17]

9:50 am: **High-speed and ultra-sensitive ZnO nanowire UV photodetectors by simple chemical vapor deposition method**, Jean-Jacques Delaunay, Yanbo Li, Florent Della Valle, Mathieu Simonet, Ichiro Yamada, The Univ. of Tokyo (Japan) [7217-18]

Coffee Break 10:15 to 10:40 am

SESSION 7

Room: Conv. Ctr. Room E Mon. 10:40 to 11:30 am

ZnO Thin Films and Devices Preparation

Session Chairs: **Rodrigo Ferrão de Paiva Martins**, Uninova/CEMOP (Portugal); **Karen J. Nordheden**, The Univ. of Kansas

10:40 am: **Paper field effect transistor** (*Invited Paper*), Elvira M. C. Fortunato, Univ. Nova de Lisboa (Portugal)[7217-19]

11:10 am: **Zinc oxide alloys for colloidal quantum dot LEDs**, Vanessa C. Wood, Matthew J. Panzer, Jean-Michel Caruge, Jonathan E. Halpert, Mounji G. Bawendi, Vladimir Bulovic, Massachusetts Institute of Technology (United States)[7217-21]

Lunch Break 11:30 am to 1:00 pm

SESSION 8

Room: Conv. Ctr. Room E Mon. 1:00 to 2:55 pm

ZnO Homoepitaxy and Thin Films Devices

Session Chairs: **Dirk Ehrentraut**, Tohoku Univ. (Japan); **David J. Rogers**, Nanovation SARL (France)

1:00 pm: **Progress in the Solvothermal Processing of ZnO** (*Invited Paper*), Dirk Ehrentraut, Tohoku Univ. (Japan)[7217-35]

1:35 pm: **Recent issues in ZnO homoepitaxy and ZnO-based nanostructures by PLD** (*Invited Paper*), Michael Lorenz, Univ. Leipzig (Germany)[7217-23]

2:00 pm: **Devices made with ZnO/BeZnO** (*Invited Paper*), Yungryel Ryu, Tae-Seok Lee, MOXtronics, Inc. (United States); Bong Jin Kim, Univ. of Missouri, Columbia (United States); Henry W. White, Univ. of Missouri, Columbia (United States) and MOXtronics, Inc. (United States)[7217-34]

2:35 pm: **Hybrid green LED based on nZnO/MQWInGaN/pGaN**, Can Bayram, Northwestern Univ. (United States)[7217-26]

Coffee Break 2:55 to 3:20 pm

SESSION 9

Room: Conv. Ctr. Room E Mon. 3:20 to 5:00 pm

ZnO Doping and Devices Preparation

Session Chairs: **Elvira M. C. Fortunato**, Univ. Nova de Lisboa (Portugal); **Emilio Bellingeri**, Consiglio Nazionale delle Ricerche (Italy)

3:20 pm: **ICP etching of ZnO in BCl₃/SF₆/Ar gas mixtures** (*Invited Paper*), Karen J. Nordheden, The Univ. of Kansas (United States)[7217-22]

3:50 pm: **Photovoltaic arrays incorporating ZnO**, Jeff Nause, Cermet, Inc. (United States)[7217-27]

4:15 pm: **The effect of free charge carrier density on magnetic behavior of (Zn,Co)O thin films** (*Invited Paper*), Emilio Bellingeri, Consiglio Nazionale delle Ricerche (Italy)[7217-24]

4:40 pm: **Magneto-optic and recombination dynamic of complex bound excitons in homoepitaxially grown ZnO epilayers**, Markus R. Wagner, Christian Rauch, Jan-Hindrik Schulze, Axel G. Hoffmann, Technische Univ. Berlin (Germany); Joachim Sann, Stefan Lautenschläger, Bruno K. Meyer, Justus-Liebig-Universität Giessen (Germany); Anna V. Rodina, A.F. Ioffe Physico-Technical Institute (Russian Federation)[7217-25]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Wednesday 28 January

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Compensation for oxygen vacancies in ZnO:Al and ZnO:Cu films grown by pulsed laser deposition, Hiroki Fukuoka, Tatsunori Sakano, Minoru Obara, Keio Univ. (Japan)[7217-28]

Properties of organic-inorganic hybrid thin film transistors with ZnO active layer on PES and glass substrates, Byung Chul Yoo, Su Cheol Gong, Ik Sub Shin, Dankook Univ. (Korea, Republic of); Hung Wei Liu, Univ. of California, Irvine (United States); Hyeonntag Jeon, Hanyang Univ. (Korea, Republic of); Hyung Ho Park, Yonsei Univ. (Korea, Republic of); Ho Jung Chang, Dankook Univ. (Korea, Republic of); Mark Bachman, Guann-pyng Li, Univ. of California, Irvine (United States)[7217-29]

Characteristics of ZnO thin films modified by various additives, Jin-Joo Joo, Young Ho Kim, Univ. of Suwon (Korea, Republic of); Dong Soo Paik, Korea Univ. (Korea, Republic of); Dong Heon Kang, Univ. of Suwon (Korea, Republic of)[7217-30]

Effect of thermal annealing on Cu-related green luminescence in ZnO, Vitaliy Avrutin, Michael A. Reshchikov, Natalia Izyumskaya, Ryoko Shimada, Virginia Commonwealth Univ. (United States); S. W. Novak, Evans Analytical Group (United States); Hadis Morkoç, Virginia Commonwealth Univ. (United States)[7217-31]

PLD growth of ZnO thin films and nanostructures, Ferechteh Hosseini Teherani, Nanovation SARL (France)[7217-32]

Integrated Optics: Devices, Materials, and Technologies XIII

Conference Chairs: **Jean-Emmanuel Broquin**, Institut de Microélectronique Électromagnétisme Photonique/Lab. d'Hyperfréquence et Caractérisation (France); **Christoph M. Greiner**, LightSmyth Technologies, Inc.

Conference Co-Chairs: **Yakov Sidorin**, Bromberg Sunstein LLP; **Christoph A. Wächter**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

Program Committee: **John V. Badding**, The Pennsylvania State Univ.; **Pierre Berini**, Univ. of Ottawa (Canada); **Pavel Cheben**, National Research Council Canada (Canada); **Xudong Fan**, Univ. of Missouri/Columbia; **Helmut Heidrich**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Andrea Melloni**, Politecnico di Milano (Italy); **Robert L. Nelson**, Air Force Research Lab.; **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy) and Centro Studi e Ricerche Enrico Fermi (Italy); **Frank Schmidt**, Zuse Institut Berlin (Germany)

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room B1 Mon. 8:00 to 10:10 am

Waveguide Engineering

Session Chair: **Jean-Emmanuel Broquin**, Institut de Microélectronique Électromagnétisme et Photonique (France)

8:00 am: **Chalcogenide films for infrared integrated optics** (*Invited Paper*), Caroline Vigreux, Annie Pradel, Univ. Montpellier II (France) [7218-01]

8:30 am: **As₂S₃/Sr(Ti_{0.7}Co_{0.3})O₃ and As₂S₃/Sr(Ti_{0.6}Fe_{0.4})O₃ strip-loaded waveguides for integrated magneto-optical isolator applications**, Lei Bi, Hyun-Suk Kim, Juejun Hu, Lionel C. Kimerling, Caroline A. Ross, Massachusetts Institute of Technology (United States) [7218-02]

8:50 am: **New practical approach of integrated photonics based on biomimetic peptidic/silica self-assembled nanotubes**, Daphné Duval, Christophe Tarabout, Franck Artzner, Univ. de Rennes I (France); Etienne Gaviot, Univ. du Maine (France); Joseph Zyss, Ecole Normale Supérieure de Cachan (France); Anne Renault, Bruno Beche, Univ. de Rennes I (France) [7218-03]

9:10 am: **980nm-1550nm vertically integrated duplexer for hybrid erbium-doped waveguide amplifiers on glass**, Lydie Onestas, Thomas Nappes, Elise Ghibaudo, Ecole Nationale Supérieure d'Électronique et de Radioélectricité de Grenoble (France); Jean-Emmanuel Broquin, Institut de Microélectronique Électromagnétisme et Photonique (France) [7218-04]

9:30 am: **Waveguide optical amplifier for telecom applications**, Stefano Taccheo, Karin M. Ennser, Swansea Univ. (United Kingdom) [7218-05]

9:50 am: **Annealing effect on optical barrier in ion-implanted tellurite glass waveguides**, Simone Berneschi, Gualtiero Nunzi Conti, Ilaria Cacciari, Stefano Pelli, Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy); Istvan Banyasz, Research Institute for Solid State Physics and Optics (Hungary); Nguyen Quoc Khanh, Tivadar Lohner, Peter Petrik, Zsolt Zolnai, Research Institute for Technical Physics and Materials Science (Hungary); Marco Bettinelli, Adolfo Speghini, Univ. degli Studi di Verona (Italy); Luciano Mescia, Francesco Prudenzeno, Politecnico di Bari (Italy) [7218-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room B1 Mon. 10:40 am to 12:10 pm

Grating Couplers

Session Chair: **Christoph M. Greiner**, LightSmyth Technologies, Inc.

10:40 am: **Interfacing optical fibers and high refractive index contrast waveguide circuits using diffractive grating couplers** (*Invited Paper*), Günther Roelkens, Dirk Taillaert, Frederik Van Laere, Diedrik Vermeulen, Jonathan Schrauwen, Stijn Scheerlinck, Tom Claes, Wim Bogaerts, Pieter Dumon, Shankar Selvaraja, Dries Van Thourhout, Roel G. Baets, Univ. Gent (Belgium) [7218-07]

11:10 am: **Compact silicon diffractive components for integrated optics**, Zhiping Zhou, Peking Univ. (China) and Georgia Institute of Technology (United States); Junbo Feng, Huaxiang Yi, Huaming Wu, Huazhong Univ. of Science and Technology (China) [7218-08]

11:30 am: **Efficient small grating couplers for low-index difference waveguide systems**, Roman Bruck, Rainer Hainberger, Austrian Research Ctrs. GmbH (Austria) [7218-09]

11:50 am: **Polymer wedge for perfectly vertical light coupling to silicon**, Jonathan Schrauwen, Stijn Scheerlinck, Dries Van Thourhout, Roel G. Baets, Univ. Gent (Belgium) [7218-10]

Lunch Break 12:10 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room B1 Mon. 1:30 to 3:00 pm

Integrated Diffractive Photonics

Session Chair: **Pavel Cheben**, National Research Council Canada (Canada)

1:30 pm: **Developments in arrayed waveguide grating devices for photonic integrated circuits** (*Invited Paper*), Xaveer J. M. Leijtens, Meint K. Smit, Technische Univ. Eindhoven (Netherlands) [7218-11]

2:00 pm: **Bragg grating assisted filters using waveguide Mach-Zehnder interferometer**, Romanas Narevich, Calvin Ho, Nizar S. Kheraj, Anthony J. Ticknor, NeoPhotonics (United States); Christoph M. Greiner, Dmitri Iazikov, Thomas W. Mossberg, LightSmyth Technologies, Inc. (United States) [7218-12]

2:20 pm: **Long spiral planar-waveguide gratings**, Chunyan Lin, Everett W. Jacobs, J. Scott Rodgers, Space and Naval Warfare Systems Ctr., San Diego (United States) [7218-13]

2:40 pm: **Tunable spectral slicing filter utilizing sparse grating in Ti: LiNbO₃**, Renato C. Rabelo, Ohannes Eknoyan, Henry F. Taylor, Texas A&M Univ. (United States) [7218-14]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room B1 Mon. 3:30 to 5:40 pm

Modeling and Design

Session Chair: **Frank Schmidt**, JCMwave GmbH (Germany)

3:30 pm: **Linear and nonlinear modeling of light propagation in hollow-core photonic crystal fiber** (*Invited Paper*), Peter J. Roberts, Jesper Laegsgaard, Danmarks Tekniske Univ. (Denmark) [7218-15]

4:00 pm: **A unified theory for surface emitting chirped circular grating lasers**, Xiankai Sun, Amnon Yariv, California Institute of Technology (United States) [7218-16]

4:20 pm: **Coupling in dielectric-plasmonic waveguides based on proximity effects and velocity matching**, Behnood G. Ghamsari, A. Hamed Majedi, Univ. of Waterloo (Canada) [7218-17]

4:40 pm: **Analysis of surface plasmon resonance with Goos-Hanchen shift using FDTD method**, Geum-Yoon Oh, Doo-Gun Kim, Hong-Seung Kim, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [7218-18]

5:00 pm: **Impedance mismatch approach for a near-field superlens with intrinsic loss of absorption**, Kwangchil Lee, Kyoungsik Kim, Yonsei Univ. (Korea, Republic of) [7218-19]

5:20 pm: **M-ary signalling using binary voltages in a single Mach-Zehnder interferometer**, Yossef Ehrlichman, Ofer Amrani, Shlomo Ruschin, Tel Aviv Univ. (Israel) [7218-20]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room B1 Tues. 10:30 am to 12:30 pm

Photonic Integration

Session Chair: Andrea Melloni, Politecnico di Milano (Italy)

10:30 am: **Densely integrated high-index-contrast photonics circuits** (*Invited Paper*), Sai-Tak Chu, Brent E. Little, Wei Chen, John V. Hryniewicz, Fred G. Johnson, Wenlu Chen, Oliver King, David Gill, Roy Dividson, Kevin Donovan, Infinera Corp. (United States) [7218-21]

11:00 am: **Backscatter in integrated optical waveguides and circuits**, Antonio Canciamilla, Matteo Torreggiani, Carlo Ferrari, Francesco Morichetti, Andrea Melloni, Politecnico di Milano (Italy) [7218-22]

11:20 am: **Integration of InP-based optoelectronics with silicon waveguides** (*Invited Paper*), Timo Aalto, VTT Elektronikka (Finland); Markku Kapulainen, Mikko Harjanne, Sami Ylilinen, VTT Technical Research Ctr. of Finland (Finland); Jyrki Ollila, VTT Elektronikka (Finland) [7218-23]

11:50 am: **Wafer-level optics enables low cost camera phones**, Yehudit Dagan, Tessera North America (United States) [7218-24]

12:10 pm: **Near-field nano-imaging by nanophotodetector array**, Boyang Liu, Yingyan Huang, Ki-Young Kim, Seng-Tiong Ho, Northwestern Univ. (United States) [7218-25]

Lunch/Exhibition Break 12:30 to 1:40 pm

SESSION 6

Room: Conv. Ctr. Room B1 Tues. 1:40 to 3:30 pm

Plasmonics I

Session Chair: Pierre Berini, Univ. of Ottawa (Canada)

1:40 pm: **Surface plasmon photonics and opto-electronics** (*Invited Paper*), Alain Dereux, Jean-Claude Weeber, Univ. de Bourgogne (France) [7218-26]

2:10 pm: **Plasmonic spectral notch filter**, Robert L. Nelson, Air Force Research Lab. (United States) [7218-27]

2:30 pm: **Plasmonic optical transmission lines based on multilayer planar structures**, Behnood G. Ghamsari, A. Hamed Majedi, Univ. of Waterloo (Canada) [7218-28]

2:50 pm: **Surface plasmons-assisted optical propagation in active Schottky/super-Schottky optoelectronic waveguides**, Behnood G. Ghamsari, A. Hamed Majedi, Univ. of Waterloo (Canada) [7218-29]

3:10 pm: **Investigation of the transmission enhancement of long-range surface plasmon polaritons waveguide using linearly tapered structure**, Wook-Jae Lee, Jae-Eun Kim, Hae-Yong Park, Korea Advanced Institute of Science and Technology (Korea, Republic of); Suntak Park, Jong-Moo Lee, Jin-Tae Kim, Min-Su Kim, Jung-Jin Ju, Electronics and Telecommunications Research Institute (Korea, Republic of) [7218-30]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: Conv. Ctr. Room B1 Tues. 4:00 to 5:30 pm

Plasmonics II

Session Chair: Robert L. Nelson, Air Force Research Lab.

4:00 pm: **Guidewave surface plasmon-polariton sensors** (*Invited Paper*), Raman Kashyap, Galina Nemova, Ecole Polytechnique de Montréal (Canada) [7218-31]

4:30 pm: **Surface plasmon based real-time microfluid temperature sensor**, Lawrence J. Davis III, Miriam Deutsch, Univ. of Oregon (United States) [7218-32]

4:50 pm: **Large enhancement of second-harmonic generation in subwavelength metal-dielectric-metal plasmonic waveguides**, Georgios Veronis, Louisiana State Univ. (United States); Shanhui Fan, Stanford Univ. (United States) [7218-33]

5:10 pm: **Ultra-compact surface plasmon wavelength demultiplexer**, Satoshi Omodani, Minoru Obara, Keio Univ. (Japan) [7218-34]

Wednesday 28 January

SESSION 8

Room: Conv. Ctr. Room B1 Wed. 8:30 to 10:00 am

Micro Resonators

Session Chair: Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy)

8:30 am: **Crystalline whispering-gallery mode resonators in RF photonics applications** (*Invited Paper*), Vladimir S. Ilchenko, Andrey B. Matsko, David J. Seidel, Lute Maleki, OEwaves, Inc. (United States) [7218-36]

9:00 am: **Real-time monitoring of living cells with integrated microring-resonators chips**, Shaopeng Wang, Akhilesh Ramachandran, Shiou-Jyh Ja, ICX Nomadics, Inc. (United States) [7218-37]

9:20 am: **Ultra-compact silicon microring resonator**, Qianfan Xu, Rice Univ. (United States); David A. Fattal, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States) [7218-38]

9:40 am: **Signal enhancement in Er³⁺-activated silica glass millisphere**, Pascal Besnard, Ana Stoita, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Maurizio Ferrari, Univ. degli Studi di Trento (Italy); Patrice Féron, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [7218-39]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: Conv. Ctr. Room B1 Wed. 10:30 am to 12:20 pm

Sensing I

Session Chair: Christoph A. Wächter, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

10:30 am: **Ultrapact fully integrated megapixel multispectral imager** (*Invited Paper*), Jason M. Eichenholz, John Dougherty, Ocean Optics, Inc. (United States) [7218-40]

11:00 am: **Active resonant subwavelength grating devices for high speed spectroscopic sensing**, Aaron V. Gin, Shanayn A. Kemme, Robert R. Boye, David W. Peters, Sandia National Labs. (United States); Tony R. Carter, Sandia Staffing Alliance, LLC (United States) [7218-41]

11:20 am: **Multi-aperture Fourier spectrometers in planar waveguides**, Mirosław Florjanczyk, National Research Council Canada (Canada) and York Univ. (Canada); Pavel Cheben, Siegfried Janz, National Research Council Canada (Canada); Alan D. Scott, COM DEV International Ltd. (Canada); Kenneth Sinclair, Brian H. Solheim, York Univ. (Canada); Dan-Xia Xu, National Research Council Canada (Canada) [7218-42]

11:40 am: **Development of a ion-exchanged glass integrated optics DFB laser for a LIDAR application**, Lionel Bastard, Jean-Emmanuel Broquin, Ecole Nationale Supérieure d'Electronique et de Radioélectrique de Grenoble (France); Florent Gardillou, Cedric Cassagnettes, Teem Photonics SA (France); Jean-Pierre Schlotterbeck, Thales Avionics S.A. (France) [7218-43]

12:00 pm: **Refractive-index sensor incorporating a polymeric waveguide overlaid with TiO₂ thin films**, Geun-Sik Son, Kwangwoon Univ. (Korea, Republic of); Soon-Woo Kwon, Sungkyunkwan Univ. (Korea, Republic of); Woo-Kyung Kim, Woo-Seok Yang, Hyung-Man Lee, Han-Young Lee, Korea Electronics Technology Institute (Korea, Republic of); Sung-Dong Lee, Infopia Co., Ltd. (Korea, Republic of); Sang-Shin Lee, Kwangwoon Univ. (Korea, Republic of) [7218-44]
 lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 10

Room: Conv. Ctr. Room B1 Wed. 1:50 to 3:20 pm

Sensing II

Session Chair: Xudong Fan, Univ. of Missouri, Columbia

1:50 pm: **All-optical particle detection and control on an optofluidic chip** (*Invited Paper*), Sergei Kuehn, Philip Measor, Univ. of California, Santa Cruz (United States); Evan J. Lunt, Aaron R. Hawkins, Brigham Young Univ. (United States); Holger Schmidt, Univ. of California, Santa Cruz (United States) [7218-45]

2:20 pm: **Wavelength interrogation of optical waveguide biosensors in the input grating coupler configuration**, Sonia Grego, Brian R. Stoner, RTI International (United States) [7218-46]

2:40 pm: **Integrated acousto-optic polarization analyzer sensor: preliminary results**, Luiz Poffo, Philippe M. Benech, Ecole Nationale Supérieure d'Electronique et de Radioélectrique de Grenoble (France); Pierre Lemaître-Auger, Ecole Supérieure d'Ingénieurs en Systèmes Industriels Avancés Rhône-Alpes (France) [7218-47]

3:00 pm: **Hydrogen detection with subwavelength palladium hole arrays**, **Jean-Jacques Delaunay**, Koichi Endo, Sho Mikuriya, Masaki Shuzo, Ichiro Yamada, The Univ. of Tokyo (Japan) [7218-48]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Suppression sidelobes of AOTF with different weighting functions, Yuehong Zhu, Shijiazhuang Univ. of Economics (China); Hai Qi, Hebei Univ. of Science & Technology (China) [7218-49]

New type of stand-alone gas sensor based on dyes, thin films and subwavelength structures, Marc Schnieper, Laurent Davoine, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); Miguel Holgado, Rafael Casquel del Campo, Univ. Politécnica de Madrid (Spain); Angel Barranco, Consejo Superior de Investigaciones Científicas (Spain) [7218-50]

Path folding and path shifting system at 1550 nm using multiple Bragg holographic gratings, Phan-Anh Hoang, Nam Kim, Jae-Hyeung Park, Chungbuk National Univ. (Korea, Republic of); Kwon-Yeon Lee, Suncheon National Univ. (Korea, Republic of) [7218-51]

Double-layered surface-plasmonic crystal waveguides, Yutae Shim, Yang-Hyun Joo, Woo-Jae Park, Seok-Ho Song, Hanyang Univ. (Korea, Republic of) [7218-53]

Long-range surface plasmon-polariton waveguide sensors with asymmetric double-electrode structures, Yang-Hyun Joo, Yutae Shim, Woo-Jae Park, Seok-Ho Song, Hanyang Univ. (Korea, Republic of) [7218-54]



Conference 7219 · Convention Center Room C3

Wednesday-Thursday 28-29 January 2009 • Proceedings of SPIE Vol. 7219

Optoelectronic Integrated Circuits XI

Conference Chairs: **Louay A. Eldada**, HelioVolt Corp.; **El-Hang Lee**, Inha Univ. (Korea, Republic of)

Program Committee: **Yung-Jui Chen**, Univ. of Maryland/Baltimore County; **Larry A. Coldren**, Univ. of California/Santa Barbara; **Mario Dagenais**, Univ. of Maryland/College Park; **P. Daniel Dapkus**, Univ. of Southern California; **Yeshiahu Fainman**, Univ. of California/San Diego; **Alexei L. Glebov**, OptiGrate Corp.; **Hans Joachim Heider**, Technische Univ. Hamburg-Harburg (Germany); **Richard M. Osgood, Jr.**, Columbia Univ.; **Manijeh Razeghi**, Northwestern Univ.; **Giancarlo C. Righini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Robert Scarmozzino**, RSoft Design Group, Inc.

Wednesday 28 January

SESSION 1

Room: Conv. Ctr. Room C3 Wed. 10:30 am to 12:30 pm

Optical Interconnects I

Session Chair: **Alexei L. Glebov**, OptiGrate Corp.

Joint Session with Conference 7221: Photonics Packaging, Integration, and Interconnects IX

10:30 am: **Future compute interconnect challenges** (*Invited Paper*), Jerry R. Bautista, Intel Corp. (United States) [7221-34]

11:00 am: **On-chip optical interconnects: from architecture and network on chip to devices** (*Invited Paper*), Philippe M. Fauchet, Univ. of Rochester (United States) [7221-35]

11:30 am: **Optical proximity communication** (*Invited Paper*), John E. Cunningham, Xueze Zheng, Ivan N. Shubin, Ashok V. Krishnamoorthy, Sun Microsystems, Inc. (United States) [7219-01]

12:00 pm: **Chirped waveguide gratings for low-cost silicon photonic wire packaging and other applications** (*Invited Paper*), Chao Li, Xia Chen, The Chinese Univ. of Hong Kong (Hong Kong, China); Zhen Sheng, Zhejiang Univ. (China); Hon K. Tsang, The Chinese Univ. of Hong Kong [7219-02]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 2

Room: Conv. Ctr. Room C3 Wed. 1:30 to 3:10 pm

Optical Interconnects II

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

Joint Session with Conference 7221: Photonics Packaging, Integration, and Interconnects IX

1:30 pm: **Optical interconnects for board and chip-level applications** (*Invited Paper*), Bert J. Offrein, Folkert Horst, Roger F. Dangel, Daniel Jubin, Tobias Lamprecht, Norbert Meier, Rene Beyeler, Laurent Dellmann, Michel Despont, IBM Zürich Research Lab. (Switzerland) [7219-03]

2:00 pm: **Polymer multimode waveguide optical and electronic PCB manufacturing** (*Invited Paper*), David R. Selviah, Univ. College London (United Kingdom) [7219-04]

2:30 pm: **Self-organization of coupling optical waveguides by the "pulling water" effect of write beam reflections in photo-induced refractive-index increase media**, Tetsuzo Yoshimura, Hiroshi Kaburagi, Tokyo Univ. of Technology (Japan) [7221-36]

2:50 pm: **A comparative analysis of short- and long-wavelength multi-chip optical transmitter modules for optical PCBs applications**, Md. Shorab M. Shirazy, Do-Won Kim, Tae-Woo Lee, Information and Communications Univ. (Korea, Republic of); Byeong-Su Yoo, RayCan (Korea, Republic of); Hyo-Hoon Park, Information and Communications Univ. (Korea, Republic of) [7221-37]

Coffee Break 3:10 to 3:40 pm

SESSION 3

Room: Conv. Ctr. Room C3 Wed. 3:40 to 5:30 pm

OEIC Resonators

Session Chair: **Yung-Jui Chen**, Univ. of Maryland, Baltimore County

3:40 pm: **Advanced coupled-micro-resonator architectures for dispersion and spectral engineering applications** (*Invited Paper*), Vien Van, Univ. of Alberta (Canada) [7219-05]

4:10 pm: **Polysilane optical waveguide devices using photo-bleaching effect** (*Invited Paper*), Soichi Kobayashi, Chitose Institute of Science and Technology (Japan); Toshihiro Suda, Photonic Science Technology, Inc. (Japan); Takumi Ishiguro, Daiki Motoyoshi, Yoshiaki Yamabayashi, Chitose Institute of Science and Technology (Japan) [7219-06]

4:40 pm: **Recent advances in WGM optical microresonators** (*Invited Paper*), Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) [7219-08]

5:10 pm: **Tunable laser oscillation with optical switches and grating on polysilane optical waveguides**, Daiki Motoyoshi, Seigi Oki, Chitose Institute of Science and Technology (Japan); Toshihiro Suda, Photonic Science Technology, Inc. (Japan); Yoshiaki Yamabayashi, Soichi Kobayashi, Chitose Institute of Science and Technology (Japan) [7219-09]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Design of compact silicon optical modulator using photonic crystal MZI structure, Tae-Yong Han, Hyun-Shik Lee, El-Hang Lee, Inha Univ. (Korea, Republic of) [7219-25]

Optimization of UV imprinting singlemode polymer waveguide by characterizing residual layer thickness, Shinmo An, Hyun-Shik Lee, Seung-Gol Lee, Beom-Hoan O, Se-Geun Park, El-Hang Lee, Inha Univ. (Korea, Republic of) [7219-26]

Triple wavelength OEIC with improved optical responsivity, Deukhee Park, SAMSUNG Electro-Mechanics Co., Ltd. (Korea, Republic of) and Sungkyunkwan Univ. (Korea, Republic of); Chae dong Go, Ha Woong Jeong, Kyoung Soo Kwon, SAMSUNG Electro-Mechanics Co., Ltd. (Korea, Republic of); Byeong Sung Kim, Sungkyunkwan Univ. (Korea, Republic of) [7219-27]

Preparation of nonlinear optical polymeric system based on polycarbonate and cellulose acetate, In-Joo Chin, Shi-Li Quan, Inha Univ. (Korea, Republic of) [7219-28]

An ultra low-power ambient light sensor for portable devices, Soon-Ik Cho, Yun-jeong Kim, Korea Univ. (Korea, Republic of); Jong-ho Lee, The Univ. of Texas at Austin (United States); Kwang-Hyun Baek, Chung-Ang Univ. (Korea, Republic of); Suki Kim, Korea Univ. (Korea, Republic of) [7219-29]

Interferometric switching of a surface plasmon-polariton excitation by grating-induced perfect absorption phenomena, Jaewoong Yoon, Gang-Min Koh, Woo-Jae Park, Seok-Ho Song, Hanyang Univ. (Korea, Republic of) [7219-30]

Precision chromatic dispersion measurement technique for short length photonic waveguides, Seung-Hwan Kim, Kyong-Hon Kim, Seong Hun Lee, Min-Hee Lee, El-Hang Lee, Inha Univ. (Korea, Republic of); Jong-Moo Lee, Electronics and Telecommunications Research Institute (Korea, Republic of) [7219-31]

Design and fabrication of mode size adapters using hybrid lithography, Se-Hwan Sim, Han-hyong Kim, Seung-Kook Yang, Sang-Hyun Shin, Hai-Joong Park, Seong-Jong Kim, Jong-Geun Lee, Beom-Hoan O, Seung-Gol Lee, El-Hang Lee, Se-Geun Park, Inha Univ. (Korea, Republic of)[7219-32]

High speed OEIC with offset drift compensation for bluray disc system, JooYul Ko, SAMSUNG Electro-Mechanics Co., Ltd. (Korea, Republic of); Kwang-Hyun Baek, Chung-Ang Univ. (Korea, Republic of); Suki Kim, Korea Univ. (Korea, Republic of)[7219-33]

Thursday 29 January

SESSION 4

Room: Conv. Ctr. Room C3Thurs. 8:30 to 10:00 am

Trends in PICs, OEICs, and PVICs

Session Chair: Ali Serpenguzel, Koç Univ. (Turkey)

8:30 am: **Optonanomechanical self-adaptive photonic devices based on light forces: a path to robust high-index-contrast nanophotonic circuits** (*Invited Paper*), Milos A. Popovic, Peter T. Rakich, Massachusetts Institute of Technology (United States)[7219-10]

9:00 am: **Integrated quantum dot-based optoelectronic devices** (*Invited Paper*), Sudha Mokkapati, Chennupati Jagadish, Hark H. Tan, The Australian National Univ. (Australia)[7219-11]

9:30 am: **CIGS photovoltaic integrated circuits from solution-deposited precursors** (*Invited Paper*), Louay A. Eldada, HelioVolt Corp. (United States)[7219-12]

Coffee Break10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room C3Thurs. 10:30 to 11:50 am

Photonic Crystals and Metamaterials

Session Chair: Louay A. Eldada, HelioVolt Corp.

10:30 am: **The almost magical world of metamaterials** (*Invited Paper*), Ekmel Ozbay, Bilkent Univ. (Turkey)[7219-13]

11:00 am: **Integration of photonic crystal fibres and MEMS for nonlinear optical endoscopy** (*Invited Paper*), Min Gu, Swinburne Univ. of Technology (Australia)[7219-14]

11:30 am: **Ultrasml square-lattice zero-cell photonic crystal laser,** Ho-Seok Ee, Korea Univ. (Korea, Republic of); Kwang-Yong Jeong, Min-Kyo Seo, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of); Hong-Gyu Park, Korea Univ. (Korea, Republic of)[7219-15]

Lunch/Exhibition Break11:50 am to 1:00 pm

SESSION 6

Room: Conv. Ctr. Room C3Thurs. 1:00 to 3:00 pm

All-Optical OEICs

Session Chair: Louay A. Eldada, HelioVolt Corp.

1:00 pm: **All-optical switches and bistable devices using high-Q photonic crystal nanocavities** (*Invited Paper*), Takasumi Tanabe, Akihiko Shinya, Eiichi Kuramochi, Hideaki Taniyama, Masaya Notomi, NTT Basic Research Labs. (Japan)[7219-16]

1:30 pm: **Advanced photonic integrated technologies for optical routing and switching** (*Invited Paper*), Milan L. Masanovic, Emily Burmeister, Matthew Dummer, Brian Koch, Steven C. Nicholes, Biljana Jevremovic, Kim Nguyen, John E. Bowers, Larry A. Coldren, Daniel J. Blumenthal, Univ. of California, Santa Barbara (United States)[7219-17]

2:00 pm: **Novel optical gate by integrating a WG-PD and a TW-EAM on N-InP,** Zaiyi Liao, Institute of Semiconductors (China)[7219-18]

2:20 pm: **Monolithically-integrated 4x4 SOA switch fabricated using quantum well intermixing,** Ronald Millett, Karin Hinzer, Trevor J. Hall, Univ. of Ottawa (Canada); Maxime Poirier, Santur Corp. (Canada); Henry Schriemer, Univ. of Ottawa (Canada)[7219-19]

2:40 pm: **40Gbit/s GaInAsP multiple-quantum-well integrated electro-absorption modulator/distributed feedback laser,** Yuanbing Cheng, Institute of Semiconductors (China)[7219-20]

Coffee Break3:00 to 3:30 pm

SESSION 7

Room: Conv. Ctr. Room C3Thurs. 3:30 to 5:00 pm

Sensing OEICs

Session Chair: El-Hang Lee, Inha Univ. (Korea, Republic of)

3:30 pm: **Optoelectronic integration of silicon photonic wire biosensors** (*Invited Paper*), Adam S. Densmore, Dan-Xia Xu, Siegfried Janz, Philip Waldron, Jean Lapointe, Jens H. Schmid, Trevor Mischki, Greg Lopinski, André Delâge, Ross McKinnon, Pavel Cheben, Boris Lamontagne, National Research Council Canada (Canada)[7219-21]

4:00 pm: **Improved sensitivity of portable bio-sensor systems using lock-in detection method,** Ho-Hyun Son, Chung-Ang Univ. (Korea, Republic of)[7219-22]

4:20 pm: **A particle flow sensor based on monolithic integrated organic light-emitting diodes (OLEDs),** Sven Reckziegel, Daniel Kreye, Tino Pügner, Christiane Grillberger, Uwe Vogel, Fraunhofer-Institut für Photonische Mikrosysteme (Germany)[7219-23]

4:40 pm: **A portable vapor sensing system using auto-switched mode CMOS image sensor,** Jian Guo, Tufts Univ. (United States)[7219-24]

Conference 7220 · Convention Center Room N

Monday-Wednesday 26-28 January 2009 • Proceedings of SPIE Vol. 7220

Silicon Photonics IV

Conference Chairs: **Joel A. Kubby**, Univ. of California/Santa Cruz; **Graham T. Reed**, Univ. of Surrey (United Kingdom)

Program Committee: **Laurence W. Cahill**, La Trobe Univ. (Australia); **Philippe M. Fauchet**, Univ. of Rochester; **Cary Gunn**, Luxtera Inc.; **Siegfried Janz**, National Research Council Canada (Canada); **Andrew Peter Knights**, McMaster Univ. (Canada); **Laura Maria Lechuga**, CIN2 Research Ctr. on Nanoscience and Nanotechnology (Spain); **Sebania Libertino**, Istituto per la Microelettronica e Microsistemi (Italy); **Mario J. Paniccia**, Intel Corp.; **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong China); **Dan-Xia Xu**, National Research Council Canada (Canada)

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room N Mon. 8:00 to 10:10 am

Waveguides

Session Chair: **Graham T. Reed**, Univ. of Surrey (United Kingdom)

8:00 am: **Polarization diversity circuit based on a double-core structure consisting of silicon photonic wire and silicon-oxinitride waveguide** (*Invited Paper*), Koji Yamada, Hiroshi Fukuda, Tai Tsuchizawa, Toshifumi Watanabe, Hiroyuki Shinjima, Hidetaka Nishi, Seiichi Itabashi, Nippon Telegraph and Telephone Corp. (Japan) [7220-01]

8:30 am: **The design of signal processing devices employing SOI-MMI couplers**, Laurence W. Cahill, Thanh Trung Le, La Trobe Univ. (Australia) [7220-02]

8:50 am: **Optical characteristics of V-groove waveguide structures**, Paul Müllner, Rainer Hainberger, ARC Seibersdorf Research GmbH (Austria) [7220-03]

9:10 am: **Sub-wavelength grating gradient index mode transformers in high index contrast waveguides**, Przemek J. Bock, National Research Council Canada (Canada) and Univ. of Ottawa (Canada); Pavel Cheben, Jens H. Schmid, Dan-Xia Xu, Siegfried Janz, National Research Council Canada (Canada); Trevor J. Hall, Univ. of Ottawa (Canada) [7220-04]

9:30 am: **Free carrier lifetime modification in silicon**, Nicholas M. Wright, David J. Thomson, Konstantin L. Litvinenko, William R. Headley, Andrew J. Smith, Univ. of Surrey (United Kingdom); Andrew P. Knights, McMaster Univ. (Canada); Jonathan H. Deane, Frederic Y. Gardes, Goran Z. Mashanovich, Russell M. Gwilliam, Graham T. Reed, Univ. of Surrey (United Kingdom) [7220-05]

9:50 am: **Design, optimization and realization of an advanced silicon optical modulator based on PN junction embedded in micro-ring resonator**, Ilya Goykhman, Boris Desiatov, Uriel Levy, The Hebrew Univ. of Jerusalem (Israel) [7220-06]

Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room N Mon. 10:40 to 11:30 am

Modulators

Session Chair: **Philippe M. Fauchet**, Univ. of Rochester

10:40 am: **Hybrid silicon modulators** (*Invited Paper*), Hui-Wen Chen, Ying-hao Kuo, John E. Bowers, Univ. of California, Santa Barbara (United States) [7220-07]

11:10 am: **High speed silicon optical modulator**, Gilles Rasigade, Delphine Marris-Morini, Laurent Vivien, Paul Crozat, Eric Cassan, Univ. Paris-Sud-XI (France); Philippe Lyan, Pierrette Rivallin, Jean-Marc Fédéli, CEA-LETI, Minatec (France); Suzanne C. Laval, Institut d'Electronique Fondamentale (France) [7220-08]

Lunch Break 11:30 am to 1:00 pm

SESSION 3

Room: Conv. Ctr. Room N Mon. 1:00 to 3:20 pm

Integration

Session Chair: **Siegfried Janz**, National Research Council Canada (Canada)

1:00 pm: **Silicon photonics developments in Europe** (*Invited Paper*), Jean-Marc Fédéli, Commissariat à l'Energie Atomique (France) [7220-09]

1:30 pm: **High speed analog-to-digital conversion with silicon photonics** (*Invited Paper*), Charles W. Holzwarth, Reja Amatya, Mohammad Araghchini, Jonathan R. Birge, Hyunil Byun, Li-Jin Chen, Marcus S. Dahlem, Nicole A. DiLello, Fuwan Gan, Judy L. Hoyt, Erich P. Ippen, Franz X. Kärtner, Anatoly M. Khilo, Jung Won Kim, Meekyung Kim, Ali R. Motamedi, Jason S. Orcutt, Matthew J. Park, Michael H. Perrott, Milos A. Popovic, Rajeev J. Ram, Henry I. Smith, Guirong Zhou, Massachusetts Institute of Technology (United States); Steven J. Spector, Theodore M. Lyszczarz, Michael W. Geis, Donna M. Lennon, Jung U. Yoon, Matthew E. Grein, Robert T. Schuelein, MIT Lincoln Lab. (United States) [7220-10]

2:00 pm: **Universal PIN photodiodes in a 0.35µm BiCMOS mixed-signal ASIC technology**, Artur K. Marchlewski, Technische Univ. Wien (Austria); Gerald Meinhardt, Ingrid Jonak-Auer, Verena Vescoli, Ewald W. Wachmann, austriamicrosystems AG (Austria); Kerstin Schneider-Hornstein, Horst K. Zimmermann, Technische Univ. Wien (Austria) [7220-11]

2:20 pm: **Compact silicon-based wavelength-selective photonic integrated devices and the applications** (*Invited Paper*), Daoxin Dai, Sailing He, Zhejiang Univ. (China) [7220-12]

2:50 pm: **Optical signal processing on silicon** (*Invited Paper*), Lionel C. Kimerling, Massachusetts Institute of Technology (United States) [7220-13]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Conv. Ctr. Room N Mon. 3:50 to 5:10 pm

Detectors

Session Chair: **Paul E. Jessop**, McMaster Univ. (Canada)

3:50 pm: **High speed germanium photodetectors integrated in silicon waveguide**, Laurent Vivien, Johann Osmond, Delphine Marris-Morini, Paul Crozat, Eric Cassan, Juliette Mangeney, Suzanne C. Laval, Univ. Paris-Sud-XI (France); Jean-Marc Fédéli, Jean-François Damlencourt, Yves Lecunff, CEA-LETI, Minatec (France) [7220-14]

4:10 pm: **Characterization of point defects introduced via ion implantation for the fabrication of silicon waveguide photodetectors with enhanced sensitivity at 1550 nm**, Jonathan K. Doylend, Andrew P. Knights, McMaster Univ. (Canada); Russell M. Gwilliam, Univ. of Surrey (United Kingdom); B. J. Luff, Dawei Zheng, R. Shafiqi, Mehdi Asghari, Kotura, Inc. (United States) [7220-15]

4:30 pm: **Solid state photomultipliers and Geiger photodiodes with integrated readout and signal processing**, Christopher J. Stapels, Eric B. Johnson, Sharmistha Mukhopadhyay, Paul S. Linsay, Eric C. Chapman, James F. Christian, Radiation Monitoring Devices, Inc. (United States) [7220-16]

4:50 pm: **SPAD array for biomedical imaging fabricated in a standard low voltage 0.18 µm CMOS technology**, Suhaila Isaak, Roger A. Light, Mark C. Pitter, Ian Harrison, The Univ. of Nottingham (United Kingdom) [7220-17]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

- 8:00 am: **Introduction and Opening Remarks**
 - 8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)
 - 8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)
 - 9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)
- See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: Conv. Ctr. Room N Tues. 10:30 am to 12:30 pm

Lab on a Chip I

Session Chair: Laurence W. Cahill, La Trobe Univ. (Australia)

- 10:30 am: **Micromonitors: waveguide based immunoassays for clinical diagnostics applications**, Shalini Prasad, Portland State Univ. (United States) [7220-18]
 - 10:50 am: **Reconfigurable optofluidic silicon-based photonic crystal components**, Christian Karnutsch, Uwe Bog, Cameron L. Smith, Snjezana Tomljenovic-Hanic, Christian Grillet, Christelle Monat, The Univ. of Sydney (Australia); Liam O'Faolain, Tom P. White, Thomas F. Krauss, Univ. of St. Andrews (United Kingdom); Ross C. McPhedran, Benjamin J. Eggleton, The Univ. of Sydney (Australia) [7220-19]
 - 11:10 am: **Biosensing microsystem platforms based on the integration of Si Mach-Zehnder interferometer, microfluidics and grating couplers** (*Invited Paper*), Laura M. Lechuga, CIN2 Research Ctr. on Nanoscience and Nanotechnology (Spain) [7220-20]
 - 11:40 am: **Biosensors using planar optical band-gaps in silicon** (*Invited Paper*), Martin Kristensen, Nina Skivesen, Århus Univ. (Denmark) [7220-21]
 - 12:10 pm: **A robust silicon photonic platform for multiparameter biological analysis**, Ryan C. Bailey, Adam L. Washburn, Abraham J. Qavi, Univ. of Illinois at Urbana-Champaign (United States); Muzammil Iqbal, Martin Gleeson, Frank Tybor, L. Cary Gunn, Genalyte, Inc. (United States) [7220-22]
- Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 6

Room: Conv. Ctr. Room N Tues. 2:00 to 3:30 pm

Lab on a Chip II

Session Chair: Laura Maria Lechuga, CIN2 Research Ctr. on Nanoscience and Nanotechnology (Spain)

- 2:00 pm: **Biosensors in silicon on insulator** (*Invited Paper*), Peter Bienstman, Katrien Devos, Tom Claes, Peter Debackere, Roel G. Baets, Univ. Gent (Belgium) [7220-23]
 - 2:30 pm: **Micro-nano photonic biosensors scalable at the wafer level** (*Invited Paper*), Miguel Holgado, Rafael Casquel, Univ. Politécnica de Madrid (Spain) [7220-24]
 - 3:00 pm: **Silicon optofluidic devices for biomolecular analysis** (*Invited Paper*), David Erickson, Cornell Univ. (United States) [7220-25]
- Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: Conv. Ctr. Room C2 Tues. 4:00 to 6:00 pm

Silicon Photonics

Session Chair: Mario J. Paniccia, Intel Corp.

Joint Session with Conference 7230: Novel In-Plane Semiconductor Lasers VIII

- 4:00 pm: **Grating based hybrid silicon lasers** (*Invited Paper*), Richard Jones, Brian Koch, Matthew N. Sysak, Intel Corp. (United States); Omri Raday, Intel Corp. (Israel); Alexander W. Fang, Erica Lively, Di Liang, Ying-hao Kuo, John E. Bowers, Univ. of California, Santa Barbara (United States) [7230-29]
- 4:30 pm: **Lasing of lattice-matched Ga(NAsP) quantum well heterostructures monolithically integrated on (001) Si substrate** (*Invited Paper*), Bernardette Kunert, NAsP III/V GmbH (Germany); Steffen Zinnkann, Igor Németh, Gleb Lukin, Rafael Fritz, Kerstin Volz, Wolfgang Stolz, Christoph Lange, Nico S. Koester, Daniel J. Franzbach, Sangam Chatterjee, Wolfgang W. Rühle, Philipps-Univ. Marburg (Germany); Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) [7220-26]
- 5:00 pm: **Self-assembled InGaAs/GaAs quantum dot microtube coherent light sources on GaAs and Si** (*Invited Paper*), Zetian Mi, Vicknesh Sahmuganathan, McGill Univ. (Canada); Pallab K. Bhattacharya, Univ. of Michigan (United States) [7220-27]
- 5:30 pm: **Cascaded Raman lasing in silicon** (*Invited Paper*), Haisheng Rong, Shengbo Xu, Intel Corp. (United States); Oded Cohen, Omri Raday, Intel Corp. (Israel); Mindy R. Lee, Vanessa Sih, Mario J. Paniccia, Intel Corp. (United States) [7220-28]

Wednesday 28 January

SESSION 8

Room: Conv. Ctr. Room N Wed. 8:00 to 10:20 am

Resonators and Interconnects

Session Chair: Graham T. Reed, Univ. of Surrey (United Kingdom)

- 8:00 am: **Physical layer design of nanoscale silicon photonic interconnection networks** (*Invited Paper*), Keren Bergman, Columbia Univ. (United States) [7220-29]
 - 8:30 am: **The native integration of silicon photonics and ULSI electronics for computing systems intraconnect** (*Invited Paper*), Ashok V. Krishnamoorthy, Ron Ho, John E. Cunningham, Jon Lexau, Xuezhe Zheng, Sun Microsystems, Inc. (United States) [7220-30]
 - 9:00 am: **Complete optical isolation created by indirect interband photonic transitions**, Zongfu Yu, Shanhui Fan, Stanford Univ. (United States) . . [7220-31]
 - 9:20 am: **Experimental demonstration of vertical multiple-slot waveguide ring resonators**, Laurent Vivien, Delphine Marris-Morini, Institut d'Electronique Fondamentale (France); Jesus Alvarez, Amadeu Griol, Nanophotonics Technology Ctr. (Spain); Kristin B. Gylfason, Microsystem Technology Lab. (Sweden); Daniel Hill, Nanophotonics Technology Ctr. (Spain); Hans B. Sohlström, Microsystem Technology Lab. (Sweden); Juan Hurtado, Nanophotonics Technology Ctr. (Spain); David Bouville, Eric Cassan, Institut d'Electronique Fondamentale (France) [7220-32]
 - 9:40 am: **Identifying resonance frequency deviations for high order nano-wire ring resonator filters based on a coupling strength variation**, Sahnggi Park, Kap-Joog Kim, Duk-Jun Kim, Gyungok Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [7220-33]
 - 10:00 am: **Fabrication of micro fiber rings on patterned substrates**, Jian-Hong Chen, Shih-Min Chuo, Lon A. Wang, National Taiwan Univ. (Taiwan) [7220-34]
- Coffee Break 10:20 to 10:40 am

OPTO

Conference 7220

SESSION 9

Room: Conv. Ctr. Room N Wed. 10:40 to 11:40 am

Resonators and Waveguide Devices

Session Chair: Joel A. Kubby, Univ. of California, Santa Cruz

10:40 am: **High sensitive two-dimensional photonic crystal nano-slot cavities**, Mindy R. Lee, Jonathan Y. Lee, Philippe M. Fauchet, Univ. of Rochester (United States) [7220-35]

11:00 am: **Fabrication and tailoring of silicon photonic devices via focused ion beam**, Simon Howe, David J. Thomson, David C. Cox, William R. Headley, Goran Z. Mashanovich, Graham T. Reed, Univ. of Surrey (United Kingdom). [7220-36]

11:20 am: **Multi-channel silicon ring resonator fabricated by DUV lithography and temperature-insensitive silicon-slot waveguide**, Jong-Moo Lee, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of). [7220-37]

SESSION 10

Room: Conv. Ctr. Room N Wed. 11:40 am to 12:10 pm

Emitters

Session Chair: Joel A. Kubby, Univ. of California, Santa Cruz

11:40 am: **Photoluminescence and electroluminescence from silicon-rich nitride films and superlattice structures** (Invited Paper), Luca Dal Negro, Boston Univ. (United States) and The Photonics Ctr. at Boston Univ. (United States); Rui Li, Joseph Warga, Boston Univ. (United States) [7220-38]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

On-chip silicon photonic wavelength control of laser source, Xuan Wang, Tao Liu, Roberto R. Panepucci, Florida International Univ. (United States). [7220-40]

RF frequency doubling using a silicon p-i-n diode based Mach-Zehnder modulator, Jeong Woo Park, Jong-Bum You, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [7220-41]

12.5 Gbps high speed optical modulation in a silicon racetrack resonator based on an asymmetric PN-diode, Jong-Bum You, Electronics and Telecommunications Research Institute (Korea, Republic of) and Univ. of Science and Technology (Korea, Republic of); Mi-Ran Park, Jeong Woo Park, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of). [7220-42]

Photonics Packaging, Integration, and Interconnects IX

Conference Chairs: **Alexei L. Glebov**, OptiGrate Corp.; **Ray T. Chen**, The Univ. of Texas at Austin

Program Committee: **Gee-Kung Chang**, Georgia Institute of Technology; **Allen M. Earman**, Arasor, Inc.; **Felix Frischkorn**, ficonTEC GmbH (Germany); **Michael W. Haney**, Defense Advanced Research Projects Agency; **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatforschung (Germany); **Willem Hoving**, XiO Photonics (Netherlands); **Jurgen Jahns**, FernUniv. in Hagen (Germany); **Toshikuni Kaino**, Tohoku Univ. (Japan); **John H. Lau**, Institute of Microelectronics (Singapore); **Bert Jan Offrein**, IBM Zürich Research Lab. (Switzerland); **Hyo-Hoon Park**, Information and Communications Univ. (Korea, Republic of); **Yakov G. Soskind**, David H. Pollock Consultants, Inc.; **Tetsuzo Yoshimura**, Tokyo Univ. of Technology (Japan)

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room C3 Mon. 8:30 to 10:10 am

Photonic Integration

Session Chair: **Bert Jan Offrein**,
IBM Zürich Research Lab. (Switzerland)

- 8:30 am: **Advanced photonic integration and the revolution in optical networks** (*Invited Paper*), David F. Welch, Infinera Corp. (United States) [7221-01]
- 9:00 am: **Photonic 3D gratings for integrated optical systems and network building blocks** (*Invited Paper*), Susanna Orlic, Enrico Dietz, Sven Frohmann, Jonas Gortner, Christian Müller, Alexander Schloesser, Christian Stark, Technische Univ. Berlin (Germany) [7221-02]
- 9:30 am: **Packaging consideration of two dimensional polymer-based photonic crystals for laser beam steering**, Xinyuan Dou, Xiaonan Chen, The Univ. of Texas at Austin (United States); Lanlan Gu, Wei Jiang, Omega Optics, Inc. (United States); Jiaqi Chen, Ray T. Chen, The Univ. of Texas at Austin (United States) [7221-03]
- 9:50 am: **An array waveguide sensor for artificial optical skins**, Jeroen Missinne, Geert Van Steenberge, Bram Van Hoe, Kristof Van Coillie, Tim Van Gijsegheem, Peter Dubruel, Jan M. A. Vanfleteren, Peter Van Daele, Univ. Gent (Belgium) [7221-04]
- Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room C3 Mon. 10:40 am to 12:20 pm

Planar Photonics

- Session Chair: **Yakov G. Soskind**, David H. Pollock Consultants, Inc.
- 10:40 am: **Recent advances in PLC technology** (*Invited Paper*), Joseph Shmulovich, CyOptics Inc. (United States) [7221-05]
- 11:10 am: **Packaging and system demonstration of an X-band phased array antenna utilizing highly dispersive photonic crystal fiber based true-time-delay**, Harish Subbaraman, The Univ. of Texas at Austin (United States); Maggie Y. Chen, Omega Optics, Inc. (United States); Ray T. Chen, The Univ. of Texas at Austin (United States) [7221-06]
- 11:30 am: **Recent advances in planar optical integration** (*Invited Paper*), Markus Riestler, Maris TechCon Technology and R&D Consulting (Austria) [7221-07]
- 12:00 pm: **Nano-scale optical circuits and self-organized lightwave network (SOLNET) fabricated using sol-gel materials with photo-induced refractive index increase**, Shigeru Ono, Tetsuzo Yoshimura, Tokyo Univ. of Technology (Japan); Tetsuo Sato, Juro Oshima, Nissan Chemical Industries, Ltd. (Japan) [7221-08]
- Lunch Break 12:20 to 1:50 pm

SESSION 3

Room: Conv. Ctr. Room C3 Mon. 1:50 to 3:30 pm

Optical Interconnects: Integration

Session Chair: **Hyo-Hoon Park**,
Information and Communications Univ. (Korea, Republic of)

- 1:50 pm: **Three dimensional optical lines fabricated onto substrate for on-board interconnection** (*Invited Paper*), Takahiro Matsubara, KYOCERA Corp. (Japan) [7221-09]
- 2:20 pm: **Photonic integration and optical interconnects for future communications, computing, and signal processing systems** (*Invited Paper*), S. J. Ben Yoo, Univ. of California, Davis (United States) [7221-10]
- 2:50 pm: **MT-compatible interface between peripheral fiber ribbons and printed circuit board-integrated optical waveguides**, Jurgen Van Erps, Vrije Univ. Brussel (Belgium); Nina Hendrickx, Univ. Gent (Belgium); Michael Vervaeke, Christof Debaes, Vrije Univ. Brussel (Belgium); Geert Van Steenberge, Peter Van Daele, Univ. Gent (Belgium); Hugo Thienpont, Vrije Univ. Brussel (Belgium) [7221-11]
- 3:10 pm: **Out-of-plane coupling using thin glass based arrayed waveguide components**, Henning Schröder, Norbert Arndt-Staufenbiel, Tolga Tekin, Lars Brusberg, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) [7221-12]
- Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: Conv. Ctr. Room C3 Mon. 4:00 to 5:40 pm

Optical Interconnects: Technologies

Session Chair: **Ray T. Chen**, The Univ. of Texas at Austin

- 4:00 pm: **Silicon photonic WDM network for high performance macrochip communications** (*Invited Paper*), Xuezhe Zheng, Pranay Koka, Herb Schwetman, Jon Lexau, Ron Ho, Ivan N. Shubin, John E. Cunningham, Ashok V. Krishnamoorthy, Sun Microsystems, Inc. (United States) [7221-13]
- 4:30 pm: **Communication technologies for exascale systems** (*Invited Paper*), Jeffrey A. Kash, Christian Baks, Young H. Kwark, Petar K. Pepeljugoski, Mark B. Ritter, A. Ryljakov, Clint L. Schow, IBM Thomas J. Watson Research Ctr. (United States) [7221-14]
- 5:00 pm: **"Vanishing-core" tapered coupler for interconnect applications**, Daniel Neugroschl, Victor I. Kopp, Jonathan Singer, Guoyin Zhang, Chiral Photonics, Inc. (United States) [7221-15]
- 5:20 pm: **Comparison of long- and short-wavelength optical transmitters for optical PCB applications**, Do-Won Kim, Md. Shorab M. Shirazy, Tae-Woo Lee, Information and Communications Univ. (Korea, Republic of); Byeong-Su Yoo, RayCan (Korea, Republic of); Hyo-Hoon Park, Information and Communications Univ. (Korea, Republic of) [7221-16]

Conference 7221

Tuesday 27 January

OPTO PLENARY SESSION

Room: **Montgomery Theater** Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: **Conv. Ctr. Room C3** Tues. 10:30 am to 12:10 pm

Optical Interconnects: Polymers

Session Chair: **Ruth Houbertz-Krauss**,
Fraunhofer-Institut für Silicatforschung (Germany)

10:30 am: **Flexible optical interconnects based on silicon-containing polymers** (*Invited Paper*), Ed Anzures, Rohm and Haas Electronic Materials (United States); Roger F. Dangel, Rene Beyeler, IBM Zürich Research Lab. (Switzerland); Allie Cannon, Rohm and Haas Electronic Materials (United States); Folkert Horst, IBM Zürich Research Lab. (Switzerland); Cecilia Kiarie, Phil Knudsen, Rohm and Haas Electronic Materials (United States); Norbert Meier, IBM Zürich Research Lab. (Switzerland); Matthew L. Moynihan, Rohm and Haas Electronic Materials (United States); Bert J. Offrein, IBM Zürich Research Lab. (Switzerland) [7221-17]

11:00 am: **Multimode siloxane polymer components for optical interconnects** (*Invited Paper*), Ian H. White, Richard V. Penty, Joseph Beals IV, Nikolaos Bamiedakis, Univ. of Cambridge (United Kingdom); Jon De Groot, Terry V. Clapp, David J. DeShazer, Dow Corning Corp. (United States) [7221-18]

11:30 am: **Impact of technological processing conditions on optical properties of inorganic-organic hybrid polymers**, Anne Bock, Torsten Pieper, Fraunhofer Institut für Silicatforschung (Germany); Ruth Houbertz-Krauss, Fraunhofer-Institut für Silicatforschung (Germany); Gerhard SEXTL, Fraunhofer-Institut für Silicatforschung (Germany) and Univ. Würzburg (Germany) [7221-19]

11:50 am: **Channel waveguide fabrication via microtransfer molding and microfluidic technique**, Sarfaraz Baig, Bing Chen, Angel Flores, Univ. of Miami (United States); Sangyup Song, New Span Opto-Technology Inc. (United States); Michael R. Wang, Univ. of Miami (United States) [7221-20]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 6

Room: **Conv. Ctr. Room C3** Tues. 1:40 to 3:20 pm

Nanophotonic Devices

Session Chair: **Tetsuzo Yoshimura**,
Tokyo Univ. of Technology (Japan)

1:40 pm: **Limits to silicon modulator bandwidth and power consumption** (*Invited Paper*), Michael R. Watts, Ralph W. Young, Douglas C. Trotter, William Zortman, Anthony Lentine, Sandia National Labs. (United States) [7221-21]

2:10 pm: **Silicon micro-cavities and their system applications** (*Invited Paper*), Min Qiu, Kungliga Tekniska Högskolan (Sweden) [7221-22]

2:40 pm: **Low-loss slow light silicon photonic crystal waveguides for optical time delays**, Yun-Sheng Chen, Yang Zhao, Ray T. Chen, The Univ. of Texas at Austin (United States) [7221-23]

3:00 pm: **Active control of propagating surface plasmons**, Troy Ribaudo, Univ. of Massachusetts Lowell (United States); Eric A. Shaner, Sandia National Labs. (United States); Daniel M. Wasserman, Univ. of Massachusetts Lowell (United States) [7221-24]

Coffee Break 3:20 to 3:50 pm

SESSION 7

Room: **Conv. Ctr. Room C3** Tues. 3:50 to 5:30 pm

Integration of Active Components

Session Chair: **Willem Hoving**, XiO Photonics (Netherlands)

3:50 pm: **Semiconductor IC packaging using modular optical components** (*Invited Paper*), David R. C. Rolston, Reflex Photonics, Inc. (Canada) [7221-25]

4:20 pm: **Large-scale integrated optics using TriPLeX waveguide technology: from UV to IR** (*Invited Paper*), René G. Heideman, Arne Leinse, Lionix, BV (Netherlands); Willem Hoving, Ronald Dekker, Douwe H. Geuzebroek, Edwin J. Klein, XiO Photonics (Netherlands) [7221-26]

4:50 pm: **A VCSEL-based miniature laser-self-mixing interferometer with integrated optical and electronic components**, Armand Pruijboom, Philips Electronics Nederland B.V. (Netherlands); Steffan Intemann, ULM Photonics GmbH (Germany); Michel Barge, Heptagon Oy (Switzerland); Hermann Oppermann, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) [7221-27]

5:10 pm: **Wide steering angle optical phased array based on silicon nano-membrane**, Yang Zhao, Yun-Sheng Chen, Amir Hosseini, Ray T. Chen, The Univ. of Texas at Austin (United States) [7221-28]

Wednesday 28 January

SESSION 8

Room: **Conv. Ctr. Room C3** Wed. 8:00 to 10:00 am

Laser Diode Technologies

Session Chair: **Allen M. Earman**, Arasor

8:00 am: **Advances in high power laser diode packaging** (*Invited Paper*), Edmund Wolak, Newport Spectra-Physics (United States) [7221-29]

8:30 am: **High-power narrow-band semiconductor lasers with external Bragg resonators** (*Invited Paper*), Vadim I. Smirnov, OptiGrate (United States) [7221-30]

9:00 am: **4.5 W hybrid integrated master-oscillator power-amplifier at 976 nm on micro-optical bench**, Alexander M. Sahn, Hendrick Thiem, Katrin Paschke, Arne Knauer, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7221-31]

9:20 am: **Improved opto device bonding performance: precise placement and proper thermal and atmosphere control**, Robert Avila, Finetech (United States) [7221-32]

9:40 am: **Diode laser beam shaping and propagation characteristics**, Yakov G. Soskind, David H. Pollock Consultants, Inc. (United States) [7221-33]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: **Conv. Ctr. Room C3** Wed. 10:30 am to 12:30 pm

Optical Interconnects I

Session Chair: **Alexei L. Glebov**, OptiGrate Corp.

Joint Session with Conference 7219:
Optoelectronic Integrated Circuits XI

10:30 am: **Future compute interconnect challenges** (*Invited Paper*), Jerry R. Bautista, Intel Corp. (United States) [7221-34]

11:00 am: **On-chip optical interconnects: from architecture and network on chip to devices** (*Invited Paper*), Philippe M. Fauchet, Univ. of Rochester (United States) [7221-35]

11:30 am: **Optical proximity communication** (*Invited Paper*), John E. Cunningham, Xuezheng Zheng, Ivan N. Shubin, Ashok V. Krishnamoorthy, Sun Microsystems, Inc. (United States) [7219-01]

12:00 pm: **Chirped waveguide gratings for low-cost silicon photonic wire packaging and other applications** (*Invited Paper*), Chao Li, Xia Chen, The Chinese Univ. of Hong Kong (Hong Kong, China); Zhen Sheng, Zhejiang Univ. (China); Hon K. Tsang, The Chinese Univ. of Hong Kong (Hong Kong, China) [7219-02]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 10

Room: Conv. Ctr. Room C3 Wed. 1:30 to 3:10 pm

Optical Interconnects II

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

Joint Session with Conference 7219: Optoelectronic Integrated Circuits XI
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1:30 pm: **Optical interconnects for board and chip-level applications** (*Invited Paper*), Bert J. Offrein, Folkert Horst, Roger F. Dangel, Daniel Jubin, Tobias Lamprecht, Norbert Meier, Rene Beyeler, Laurent Dellmann, Michel Despont, IBM Zürich Research Lab. (Switzerland) [7219-03]

2:00 pm: **Polymer multimode waveguide optical and electronic PCB manufacturing** (*Invited Paper*), David R. Selviah, Univ. College London (United Kingdom). [7219-04]

2:30 pm: **Self-organization of coupling optical waveguides by the "pulling water" effect of write beam reflections in photo-induced refractive-index increase media**, Tetsuzo Yoshimura, Hiroshi Kaburagi, Tokyo Univ. of Technology (Japan). [7221-36]

2:50 pm: **A comparative analysis of short- and long-wavelength multi-chip optical transmitter modules for optical PCBs applications**, Md. Shorab M. Shirazy, Do-Won Kim, Tae-Woo Lee, Information and Communications Univ. (Korea, Republic of); Byeong-Su Yoo, RayCan (Korea, Republic of); Hyo-Hoon Park, Information and Communications Univ. (Korea, Republic of) [7221-37]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

<i>Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.</i>

A novel method for studying superprism phenomena in 2-D photonic crystal, Sasa Zhang, Qingpu Wang, Xingyu Zhang, Zhaojun Liu, Shandong Univ. (China) [7221-38]

Subwavelength plasmonic device, Zhong Shi, Vladimir Kochergin, Luna Innovations Inc. (United States) [7221-39]

Thermoplastic electronic packaging: low cost/high versatility, Dennis Jones, microPEP (United States); Ken Gilleo, ET Trends, LLC (United States). [7221-40]

4x4 space-time codes for free-space optical interconnects, Sai V. Chinta, Timothy P. Kurzweg, Douglas S. Pfeil, Kapil R. Dandekar, Drexel Univ. (United States). [7221-41]

Aspheric nonimaging concentrators for multimode fiber coupling, Robert P. Dahlgren, Jacob A. Wysocki, Kenneth D. Pedrotti, Univ. of California, Santa Cruz (United States) [7221-42]

Analysis of coupling performance of photonic crystal fiber and photonic band gap simulation for variations due to deliberate defects in the fiber, Tirtha P. Bhattacharjee, Ghanshyam K. Singh, Vijay Janyani, R. P. Yadav, Malaviya National Institute of Technology (India) [7221-43]

Quantum Sensing and Nanophotonic Devices VI

Conference Chair: **Manijeh Razeghi**, Northwestern Univ.

Conference Co-Chairs: **Rengarajan Sudharsanan**, Spectrolab, Inc.; **Gail J. Brown**, Air Force Research Lab.

Program Committee: **Jagmohan Bajaj**, Teledyne Imaging Sensors; **Alexei N. Baranov**, Univ. Montpellier II (France); **Matthew Grayson**, Northwestern Univ.; **Sarath D. Gunapala**, Jet Propulsion Lab.; **Jean-Pierre Huignard**, Thales Research & Technology (France); **Mark A. Itzler**, Princeton Lightwave, Inc.; **Christopher Jelen**, Northrop Grumman Corp.; **Christine A. Jhabvala**, NASA Goddard Space Flight Ctr.; **Armin Lambrecht**, Fraunhofer-Institut für Physik Messtechnik (Germany); **Aizhen Li**, Shanghai Institute of Microsystem and Information Technology (China); **Chang Liu**, Northwestern Univ.; **Ryan P. McClintock**, Northwestern Univ.; **Jerry R. Meyer**, Naval Research Lab.; **Konstantin D. Moiseev**, A.F. Ioffe Physico-Technical Institute (Russia); **Vaidya Nathan**, Air Force Research Lab.; **Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate; **Abderrahim Ramdane**, Ctr. National de la Recherche Scientifique (France); **Robert R. Rice**, Northrop Grumman Space Technology; **Antoni Rogalski**, Wojskowa Akademia Techniczna (Poland); **Gaetano Scamarcio**, Univ. degli Studi di Bari (Italy); **Donald J. Silversmith**, Air Force Office of Scientific Research; **Steven Slivken**, Northwestern Univ.; **Marija Strojnik**, Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Ferechteh Hosseini Teherani**, Nanovation SARL (France); **Meimei Z. Tidrow**, Missile Defense Agency; **Michael Wraback**, Army Research Lab.

Sunday 25 January

SESSION 1

Room: **Marriott Hotel**,
San Jose Ballroom Salon I Sun. 8:30 to 10:00 am

Quantum Cascade Lasers and Applications I

Session Chairs: **Manijeh Razeghi**, Northwestern Univ.;
Marija Strojnik, Ctr. de Investigaciones en Óptica, A.C. (Mexico)

- 8:30 am: **Airborne atmospheric research using mid-infrared laser spectroscopy** (*Invited Paper*), Alan Fried, Petter K. A. Weibring, Dirk Richter, James G. Walega, National Ctr. for Atmospheric Research (United States) [7222-01]
- 9:00 am: **The effect of hydrostatic pressure on the operation of quantum cascade lasers** (*Invited Paper*), Alfred R. Adams, Igor P. Marko, Stephen J. Sweeney, Univ. of Surrey (United Kingdom); Roland Teissier, Alexei N. Baranov, Univ. Montpellier II (France); Stanko Tomic, Univ. of Surrey (United Kingdom) [7222-03]
- 9:30 am: **Toward on-chip mid-infrared sensor technology for liquid phase analysis** (*Invited Paper*), Boris Mizaiakoff, Univ. Ulm (Germany) [7222-04]
- Coffee Break 10:00 to 10:30 am

SESSION 2

Room: **Marriott Hotel**,
San Jose Ballroom Salon I Sun. 10:30 am to 12:00 pm

Quantum Cascade Lasers and Applications II

Session Chairs: **Jerry R. Meyer**, Naval Research Lab.;
Robert R. Rice, Northrop Grumman Space Technology

- 10:30 am: **Diagnostics of molecular plasmas and trace gas analysis using mid infrared lasers** (*Invited Paper*), Jürgen Röpcke, INP Greifswald (Germany); P. B. Davies, Univ. of Cambridge (United Kingdom); S. Glitsch, F. Hempel, N. Lang, INP Greifswald (Germany); M. Nagle, OptoPrecision GmbH (Germany); A. Rousseau, Ecole Polytechnique (France); S. Wege, Qimonda Dresden GmbH & Co. (Germany); S. Welzel, INP Greifswald (Germany) [7222-05]
- 11:00 am: **Quantum cascade laser sources and applications in trace gas sensing** (*Invited Paper*), Frank K. Tittel, Yury A. Bakhrkin, Anatoliy A. Kosterev, Rafal Lewicki, Stephen G. So, David Thomazy, Rice Univ. (United States); Gerard Wysocki, Princeton Univ. (United States) [7222-06]
- 11:30 am: **Hot electron effects and nanoscale heat transfer in Terahertz quantum cascade lasers** (*Invited Paper*), Miriam S. Vitiello, Gaetano Scamarcio, CNR-INFN Regional Lab. LIT3 (Italy) and Univ. degli Studi di Bari (Italy); Giacomo Scaliari, Jerome Faist, Christoph Walther, Institute of Quantum Electronics, ETH Zürich (Switzerland); Vincenzo Spagnolo, CNR-INFN Regional Lab. LIT3 (Italy) and Politecnico di Bari (Italy) [7222-07]
- Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: **Marriott Hotel**,
San Jose Ballroom Salon I Sun. 1:30 to 3:00 pm

Quantum Cascade Lasers and Applications III

Session Chairs: **Armin Lambrecht**, Fraunhofer-Institut für Physik Messtechnik (Germany); **Aizhen Li**, Shanghai Institute of Microsystem and Information Technology (China)

- 1:30 pm: **Application of quantum cascade lasers for infrared spectroscopy of jet-cooled molecules and complexes** (*Invited Paper*), Yunjie Xu, Xunchen Liu, Zheng Su, Raviraj M. Kulkarni, Wai Shun Tam, Cheolhwa Kang, Igor Leonov, Lisa D'Agostino, Univ. of Alberta (Canada) [7222-08]
- 2:00 pm: **A chip-scale microwave repetition rate frequency comb** (*Invited Paper*), Pascal Del Haye, Olivier Arcizet, Albert Schliesser, Ronald Holzwarth, Max-Planck-Institut für Quantenoptik (Germany); Tobias J. Kippenberg, Max-Planck-Institut für Quantenoptik (Germany) and Ecole Polytechnique Federale de Lausanne (Switzerland) [7222-09]
- 2:30 pm: **Single-mode 2.4µm InGaAsSb/AlGaAsSb distributed feedback lasers for gas sensing** (*Invited Paper*), James A. Gupta, Pedro J. Barrios, Jean Lapointe, Geof C. Aers, Daniel Poitras, Craig Storey, Philip Waldron, National Research Council Canada (Canada) [7222-59]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: **Marriott Hotel**,
San Jose Ballroom Salon I Sun. 3:30 to 5:30 pm

Quantum Cascade Lasers and Applications IV

Session Chairs: **Jean-Pierre Huignard**, Thales Research & Technology (France); **Chang Liu**, Northwestern Univ.

- 3:30 pm: **Explosive detection using infrared laser spectroscopy** (*Invited Paper*), Juergen Hildenbrand, Johannes Herbst, Juergen Wollenstein, Armin Lambrecht, Fraunhofer Institute for Physical Measurement Techniques (Germany) [7222-11]
- 4:00 pm: **Frequency metrology with quantum cascade lasers** (*Invited Paper*), Saverio Bartalini, Simone Borri, Iacopo Galli, Davide Mazzotti, Pablo Cancio Pastor, Giovanni Giusfredi, Paolo de Natale, Istituto Nazionale di Ottica Applicata (Italy) and Lab. Europeo di Spettroscopie Non-lineari (Italy) [7222-12]
- 4:30 pm: **Pressure broadening of the oxygen A-band measured by laser absorption spectroscopy**, Benjamin Scherer, Johannes Herbst, Fraunhofer Institute for Physical Measurement Techniques (Germany) [7222-10]
- 4:50 pm: **A novel active region concept for highly efficient GaSb-based optically in-well pumped semiconductor disk lasers**, Joachim Wagner, Benno Rösener, Nicola Schulz, Marcel Rattunde, Rüdiger Moser, Christian Manz, Klaus Köhler, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [7222-13]
- 5:10 pm: **Observation of whispering gallery modes in the mid-infrared with a quantum cascade laser: possible applications to nanoliter chemical sensing**, Sheng Wu, Andrei Deev, California Institute of Technology (United States) [7222-60]

Monday 26 January

SESSION 5

Room: Marriott Hotel,
San Jose Ballroom Salon I Mon. 8:30 to 10:30 am

Quantum Cascade Lasers and Applications V

Session Chairs: Gaetano Scamarcio, Univ. degli Studi di Bari (Italy);
Christopher Jelen, Northrop Grumman Electronic Systems

8:30 am: Compact widely tunable ECqCL and its applications for gas spectroscopy (Invited Paper), Timothy Day, Miles Weida, David Arnone, Sam Crivello, David Caffey, Vince Cook, Russ Pritchett, Daylight Solutions, Inc. (United States) [7222-14]

9:00 am: Infrared QC laser applications to field measurements of atmospheric trace gas sources and sinks in environmental research (Invited Paper), Mark S. Zahniser, David D. Nelson, J. Barry McManus, Scott C. Herndon, Ezra C. Wood, Joanne H. Shorter, Aerodyne Research, Inc. (United States); Rodrigo Jiménez, Bruce C. Daube, Sun Yong Park, Eric Kort, Benjamin G. Lee, Gregory Santoni, Steven C. Wofsy, Harvard Univ. (United States) [7222-15]

9:30 am: Compact ultrafast lasers based on quantum-dot structures (Invited Paper), Edik U. Rafailov, M. A. Cataluna, K. G. Wilcox, S. A. Zolotovskaya, Univ. of Dundee (United Kingdom) [7222-16]

10:00 am: GaN/AlGaIn intersubband optoelectronic devices at telecommunication wavelengths (Invited Paper), François H. Julien, Maria Tchernycheva, Institut d'Electronique Fondamentale (France); Eva Monroy, Commissariat à l'Energie Atomique (France) [7222-61]

Coffee Break 10:30 to 11:00 am

SESSION 6

Room: Marriott Hotel,
San Jose Ballroom Salon I Mon. 11:00 am to 1:00 pm

Quantum Cascade Lasers and Applications VI

Session Chairs: Donald J. Silversmith, Air Force Office of Scientific Research; Konstantin D. Moiseev, A.F. Ioffe Physico-Technical Institute (Russian Federation)

11:00 am: Trace gas sensing using quantum cascade lasers and optoacoustic detection (Invited Paper), Vincenzo Spagnolo, Angela Elia, Univ. degli Studi di Bari (Italy) and CNR-INFM Regional Lab. LIT (Italy); Cinzia Di Franco, CNR-INFM Regional Lab. LIT (Italy); Pietro Mario Lugarà, Miriam S. Vitiello, Gaetano Scamarcio, Univ. degli Studi di Bari (Italy) and CNR-INFM Regional Lab. LIT (Italy) [7222-17]

11:30 am: Spectral and spatial modal control of photonic crystal broad area lasers (Invited Paper), Lin Zhu, Clemson Univ. (United States); Amnon Yariv, California Institute of Technology (United States) [7222-18]

12:00 pm: Continuous monitoring of nitric oxide at 5.33 um with an EC-QCL based Faraday rotation spectrometer: laboratory and field system performance, Gerard Wysocki, Princeton Univ. (United States); Rafal Lewicki, Rice Univ. (United States); Xue Huang, Princeton Univ. (United States); Robert F. Curl, Frank K. Tittel, Rice Univ. (United States) [7222-19]

12:20 pm: A MEMS device for measuring laser power and spot-size, Anjan K. Ghosh, Univ. of Oklahoma (United States); Sagnik Pal, Univ. of Florida (United States) [7222-20]

12:40 pm: Mid-infrared quantum cascade lasers with high wall plug efficiency, Yanbo Bai, B. Gokden, Steven Slivken, Shaban R. Darvish, Siamak A. Pour, Manijeh Razeghi, Northwestern Univ. (United States) [7222-21]

Lunch Break 1:00 to 2:00 pm

SESSION 7

Room: Marriott Hotel,
San Jose Ballroom Salon I Mon. 2:00 to 3:30 pm

Superlattice/Quantum Detectors I

Session Chairs: Gail J. Brown, Air Force Research Lab.;
Jagmohan Bajaj, Teledyne Imaging Sensors

2:00 pm: Infrared focal plane arrays based on dots in a well and strained layer superlattices (Invited Paper), Sanjay Krishna, The Univ. of New Mexico (United States) [7222-22]

2:30 pm: Theory and modeling of type-II strained-layer superlattice detectors (Invited Paper), Michael E. Flatté, The Univ. of Iowa (United States); Christoph H. Grein, Univ. of Illinois at Chicago (United States) [7222-23]

3:00 pm: Engineered quantum dot structures: fabrication and applications (Invited Paper), Johann P. Reithmaier, Emil-Mihai Pavelescu, Christian Gilfert, Alexander Gushterov, Univ. Kassel (Germany); Wolfgang Kaiser, Pia Weinmann, Martin Kamp, Alfred W. B. Forchel, Univ. Würzburg (Germany); Alfredo Martin-Minguez, Ignacio Esquivias, Univ. Politécnica de Madrid (Spain) [7222-24]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Room: Marriott Hotel,
San Jose Ballroom Salon I Mon. 4:00 to 5:40 pm

Superlattice/Quantum Detectors II

Session Chairs: Sarath D. Gunapala, Jet Propulsion Lab.;
Ryan P. McClintock, Northwestern Univ.

4:00 pm: A novel opto-electro-mechanical photon sensor (Invited Paper), Hooman Mohseni, J. Kohoutek, Omer G. Memis, Northwestern Univ. (United States) [7222-25]

4:30 pm: Status of mid-infrared superlattice technology in Germany (Invited Paper), Robert H. Rehm, Martin Walther, Johannes Schmitz, Frank Rutz, Joachim Fleissner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Ralf Scheibner, Johann Ziegler, AIM Infrarot-Module GmbH (Germany) [7222-26]

5:00 pm: III-nitride avalanche photodiodes, Ryan P. McClintock, Jose Luis Pau Vizcaino, Can Bayram, Bruno Fain, Paul Giedraitis, Manijeh Razeghi, Melville P. Ulmer, Northwestern Univ. (United States) [7222-27]

5:20 pm: Angle and polarization dependent characteristics of colloidal quantum dot absorption in Fano filters on flexible substrates, Li Chen, Hongjun Yang, Zexuan Qiang, The Univ. of Texas at Arlington (United States); Huiqing Pang, Zhenqiang Ma, Univ. of Wisconsin, Madison (United States); Jian Xu, The Pennsylvania State Univ. (United States); Gail J. Brown, Air Force Research Lab. (United States); Weidong Zhou, The Univ. of Texas at Arlington (United States) [7222-28]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: Introduction and Opening Remarks

8:05 am: Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: Photonics for Novel High-Performance Computing, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

OPTO

SESSION 9

**Room: Marriott Hotel,
San Jose Ballroom Salon I Tues. 10:30 am to 12:10 pm**

Superlattice/Quantum Detectors III

*Session Chairs: Meimei Z. Tidrow, Missile Defense Agency;
Steven Slivken, Northwestern Univ.*

10:30 am: **Background limited performance of long wavelength infrared focal plane arrays fabricated from M-structure InAs/GaSb superlattices** (*Invited Paper*), Pierre-Yves Delaunay, Binh-Minh Nguyen, Darin M. Hoffman, Edward Kwei-wei Huang, Paritosh Manikor, Simeon Bogdanov, Manijeh Razeghi, Northwestern Univ. (United States) [7222-29]

11:00 am: **Designing phonons for active use in terahertz devices** (*Invited Paper*), Hui Chun Liu, Chun-Ying Song, Zbigniew R. Wasilewski, James A. Gupta, Margaret Buchanan, National Research Council Canada (Canada) [7222-30]

11:30 am: **Control of residual background carriers in undoped mid-infrared InAs/GaSb superlattices**, Heather J. Haugan, Air Force Research Lab. (United States); Said Elhamri, Univ. of Dayton (United States); William C. Mitchel, Air Force Research Lab. (United States); Bruno Ullrich, Bowling Green State Univ. (United States); Gail J. Brown, Lawrence Grazulis, Shantee Houston, Air Force Research Lab. (United States). [7222-31]

11:50 am: **Inductively coupled plasma etching and processing techniques for type-II InAs/GaSb superlattices infrared detectors toward high fill factor focal plane arrays**, Edward Kwei-wei Huang, Binh-Minh Nguyen, Darin M. Hoffman, Pierre-Yves Delaunay, Manijeh Razeghi, Northwestern Univ. (United States). [7222-32]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 10

**Room: Marriott Hotel,
San Jose Ballroom Salon I Tues. 1:40 to 3:00 pm**

Superlattice/Quantum Detectors IV

Session Chairs: Antoni Rogalski, Wojskowa Akademia Techniczna (Poland); Michael Wraback, Army Research Lab.

1:40 pm: **A review of UV detectors for astrophysics: past, present, and future** (*Invited Paper*), Melville P. Ulmer, Northwestern Univ. (United States). [7222-34]

2:10 pm: **Self-consistent electronic structure method for broken-gap superlattices** (*Invited Paper*), T. Andlauer, T. Zibold, Peter Vogl, Walter Schottky Institut (Germany) [7222-41]

2:40 pm: **Pulsed metalorganic chemical vapor deposition of high quality AlN/GaN superlattices for intersubband transitions**, Can Bayram, Bruno Fain, Nicolas Péré-Laperne, Ryan P. McClintock, Manijeh Razeghi, Northwestern Univ. (United States) [7222-35]

Coffee Break 3:00 to 3:30 pm

SESSION 11

**Room: Marriott Hotel,
San Jose Ballroom Salon I Tues. 3:30 to 5:00 pm**

Superlattice/Quantum Detectors V

Session Chairs: Vaidya Nathan, Air Force Research Lab.;
Christine A. Jhabvala, NASA Goddard Space Flight Ctr.

3:30 pm: **Radiometric characterization of strained layer superlattice focal plane array under low irradiance conditions** (*Invited Paper*), John E. Hubbs, Ball Aerospace & Technologies Corp. (United States) [7222-37]

4:00 pm: **GaN-based nanostructured photodetectors**, Jose Luis Pau Vizcaino, Can Bayram, Paul Giedraitis, Ryan P. McClintock, Manijeh Razeghi, Northwestern Univ. (United States). [7222-38]

4:20 pm: **The importance of band alignment in VLWIR type—II InAs/GaSb heterodiodes containing the M—structure barrier**, Darin M. Hoffman, Binh-Minh Nguyen, Edward Kwei-wei Huang, Pierre-Yves Delaunay, Simeon Bagdonov, Paritosh Manikor, Manijeh Razeghi, Northwestern Univ. (United States); Vaidya Nathan, Air Force Research Lab. (United States) [7222-39]

4:40 pm: **A monolithically integrated multi-spectral polarimetric quantum dot infrared photodetector**, Jarrod Vaillancourt, Xuejun Lu, Univ. of Massachusetts Lowell (United States) [7222-40]

Wednesday 28 January

SESSION 12

**Room: Marriott Hotel,
San Jose Ballroom Salon I Wed. 8:30 to 10:00 am**

Nanophotonic Devices I

*Session Chairs: Alexei N. Baranov, Univ. Montpellier II (France);
Ferechteh Hosseini Teherani, Nanovation SARL (France)*

8:30 am: **Nanoplasmonic for sensor applications** (*Invited Paper*), Yeshaiahua Fainman, Univ. of California, San Diego (United States). [7222-42]

9:00 am: **Mid/far-infrared semiconductor devices exploiting plasmonic effects** (*Invited Paper*), Raffaele Colombelli, Y. Chassagneux, Adel Bousseksou, V. Moreau, Institut d'Electronique Fondamentale (France); Stefano Barbieri, Carlo Sirtori, Lab. MPQ, Univ. Paris-VII (France); Gilles Patriarche, Gregoire Beaudoin, Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France); Harvey E. Beere, David A. Ritchie, Univ. of Cambridge (United Kingdom). [7222-43]

9:30 am: **Potential of semiconductor nanowires for single photon sources** (*Invited Paper*), Jean-Christophe Harmand, Linsheng Liu, Gilles Patriarche, Maria Tchernycheva, Lab. de Photonique et de Nanostructures, CNRS (France); Nikolai Akopian, Valery Zwiller, Umberto Perinetti, Kavli Institute of Nanoscience, Delft Univ. of Technology (Netherlands). [7222-46]

Coffee Break 10:00 to 10:30 am

SESSION 13

**Room: Marriott Hotel,
San Jose Ballroom Salon I Wed. 10:30 to 11:50 am**

Nanophotonic Devices II

Session Chairs: Abderrahim Ramdane, Ctr. National de la Recherche Scientifique (France); Matthew Grayson, Northwestern Univ.

10:30 am: **Optical Lévy flights and super diffusion of light** (*Invited Paper*), Pierre Barthelemy, Jacopo Bertolotti, Diederik S. Wiersma, European Lab. for Non-linear Spectroscopy (Italy). [7222-47]

11:00 am: **Electron beam projection nanopatterning using crystal lattice images obtained from high resolution transmission electron microscopy** (*Invited Paper*), Hyo-Sung Lee, Byung-Sung Kim, Hyun-Mi Kim, Jung-Sub Wi, Sung-Wook Nam, Kyung-Bae Jin, Ki-Bum Kim, Seoul National Univ. (Korea, Republic of); Yoshihiro Arai, JEOL Ltd. (Japan) [7222-49]

11:30 am: **A nanophotonic sensor for large electric current measurements**, Anjan K. Ghosh, Devendar Arora, Pramode Verma, Robert C. Huck, John Fagan, Univ. of Oklahoma (United States) [7222-45]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 14

**Room: Marriott Hotel,
San Jose Ballroom Salon I Wed. 1:20 to 3:30 pm**

Single Photon Detectors/Sources I

Session Chairs: Mark A. Itzler, Princeton Lightwave, Inc.;
**Joseph G. Pellegrino, U.S. Army Night Vision &
Electronic Sensors Directorate**

1:20 pm: **InGaAs communication photodiodes: from low to high power level designs** (*Invited Paper*), Achouche Mohand, Alcatel-Thales III-V Lab. (France) [7222-50]

1:50 pm: **Development of single photon counting sensors operating at short wavelength infrared wavelengths** (*Invited Paper*), Joseph C. Boisvert, Rengarajan Sudharsanan, Ping Yuan, Takahiro Isshiki, Paul A. McDonald, Spectrolab, Inc. (United States) [7222-51]

2:20 pm: **Packaging superconducting nanowire single photon detectors** (*Invited Paper*), Sae Woo Nam, National Institute of Standards and Technology (United States). [7222-52]

2:50 pm: **InGaAs/InP single-photon avalanche diodes show low dark currents and require moderate cooling**, Alberto Tosi, Alberto Dalla Mora, Franco Zappa, Sergio D. Cova, Politecnico di Milano (Italy); Mark A. Itzler, Xudong Jiang, Princeton Lightwave, Inc. (United States). [7222-53]

3:10 pm: **SPAD detection head with 32 fully-parallel channels for time-tagging single-photons at 3µs**, Simone Tisa, Micro Photon Devices (Italy); Fabrizio Guerrieri, Franco Zappa, Politecnico di Milano (Italy) [7222-58]

Coffee Break 3:30 to 4:00 pm

SESSION 15

**Room: Marriott Hotel,
San Jose Ballroom Salon I Wed. 4:00 to 5:40 pm**

Single Photon Detectors/Sources II

Session Chairs: **Rengarajan Sudharsanan**, Spectrolab, Inc.;
Gail J. Brown, Air Force Research Lab.

4:00 pm: **Single photon sources using InAs/InP quantum dots**
(Invited Paper), Richard Hostein, Noelle Gogneau, Adrien Michon, Luc Le Gratiot, Edmond Cambriel, Gregoire Beaudoin, Gilles Patriarche, Isabelle Robert-Phillip, Lab. of Photonics and Nanostructures, CNRS (France); Jean Y. Marzin, Lab. of Photonics and Nanostructures, CNRS (United States); Alexios Beveratos, Isabelle Sagnes, Lab. of Photonics and Nanostructures, CNRS (France). [7222-54]

4:30 pm: **A semiconductor ridge micro cavity to generate counterpropagating twin photons** *(Invited Paper)*, Xavier Caillet, Vincent Berger, Giuseppe Leo, Lab. Matériaux et Phénomènes Quantiques, CNRS (France); Isabelle Sagnes, Lab. de Photonique et Nanostructures, CNRS (France); Sara Ducci, Lab. Matériaux et Phénomènes Quantiques, CNRS (France) [7222-55]

5:00 pm: **InP-based negative feedback avalanche diodes**, Mark A. Itzler, Xudong Jiang, Bruce Nyman, Krystyna Slomkowski, Princeton Lightwave, Inc. (United States). [7222-56]

5:20 pm: **GHz-rate single photon sensitive linear mode APD receivers**, George M. Williams, Voxel, Inc. (United States). [7222-57]



Photonic and Phononic Crystal Materials and Devices VIII

Conference Chairs: **Ali Adibi**, Georgia Institute of Technology; **Shawn-Yu Lin**, Rensselaer Polytechnic Institute; **Axel Scherer**, California Institute of Technology

Program Committee: **Douglas C. Allan**, Corning Inc.; **Shanhui Fan**, Stanford Univ.; **Maryanne C. J. Large**, The Univ. of Sydney (Australia); **Susumu Noda**, Kyoto Univ. (Japan); **Masaya Notomi**, NTT Atsugi R & D Ctr. (Japan); **Ekmel Ozbay**, Bilkent Univ. (Turkey); **Dennis W. Prather**, Univ. of Delaware; **William J. Wadsworth**, Univ. of Bath (United Kingdom); **Yong Xu**, Virginia Polytechnic Institute and State Univ.; **Eli Yablonovitch**, Univ. of California/Berkeley

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 1

Room: Marriott Hotel,
Willow Glen Rooms II/III Tues. 10:30 to 11:50 am

Three-dimensional Photonic Crystal Structures

10:30 am: **Photonic band gap materials: light trapping crystals** (*Invited Paper*), Sajeev John, Univ. of Toronto (Canada) [7223-01]

11:00 am: **Toward complete polarization band gaps in 3D chiral photonic crystals** (*Invited Paper*), Michael Thiel, Univ. Karlsruhe (Germany); Georg von Freymann, Martin Wegener, Univ. Karlsruhe (Germany) and Forschungszentrum Karlsruhe (Germany) [7223-02]

11:30 am: **Design and demonstration of three-dimensional photonic crystal demultiplexers**, Majid Badirostami, Babak Momeni, Ali Adibi, Georgia Institute of Technology (United States) [7223-03]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 2

Room: Marriott Hotel,
Willow Glen Rooms II/III Tues. 1:30 to 3:00 pm

Dispersive and Nonlinear Properties of Photonic Crystals

1:30 pm: **Modulating, switching and sensing with dispersion-engineered photonic crystal waveguides** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [7223-04]

2:00 pm: **On-chip spectrometers for visible and infrared sensing applications**, Babak Momeni, Ehsan Shah Hosseini, Amir H. Atabaki, Qing Li, Mohammad Soltani, Ali Adibi, Georgia Institute of Technology (United States) [7223-05]

2:20 pm: **Optical properties in photonic crystals based on polymer-dispersed liquid crystal films**, Andy Y. Fuh, Shing-Trong Wu, Ming-Shian Li, National Cheng Kung Univ. (Taiwan) [7223-06]

2:40 pm: **On the power-bandwidth trade-off in bistable photonic crystal switches**, Ali Naqavi, Hooman Abedi, Khashayar Mehrany, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of) [7223-07]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Room: Marriott Hotel,
Willow Glen Rooms II/III Tues. 3:30 to 5:30 pm

Fabrication of Photonic Crystal Structures

3:30 pm: **Fabrication of tailored photonic crystals using multiphoton lithography** (*Invited Paper*), Joseph W. Perry, Georgia Institute of Technology (United States) [7223-08]

4:00 pm: **Fabrication of 3D high index photonic crystals by holographic lithography and their fidelity** (*Invited Paper*), Shu Yang, Univ. of Pennsylvania (United States) [7223-09]

4:30 pm: **Optical characterization of colloidal crystals based on oxide submicrospheres**, Sabine Portal, M. Angels Vallvé, Oriol Arteaga, Jordi Ignés-Mullol, Adolf Canillas, Enric Bertran, Univ. of Barcelona (Spain) [7223-10]

4:50 pm: **Tuning of narrow-bandwidth photonic crystal devices etched in (InGa)(AsP) planar waveguides by liquid crystal infiltration**, Harm H. J. E. Kicken, Ionut Barbu, Sander Kersten, Mehmet Dundar, Rob W. Van der Heijden, Fouad Karouta, Richard Nötzel, Eindhoven Univ. of Technology (Netherlands); Huub W. M. Salemink, Delft Univ. of Technology (Netherlands) [7223-11]

5:10 pm: **Local polymer infiltration of planar photonic crystals**, Pascale El-Kallassi, Sandor Balog, Romuald Houdré, Laurent Balet, Lianhe Li, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Marco Francardi, Annamaria Gerardino, Consiglio Nazionale delle Ricerche (Italy); Andrea Fiore, Eindhoven Univ. of Technology (Netherlands); Rolando Ferrini, Libero Zuppiroli, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7223-12]

Wednesday 28 January

SESSION 4

Room: Marriott Hotel,
Willow Glen Rooms II/III Wed. 8:00 to 9:50 am

Phononic Crystal Structures

8:00 am: **Evanescence Bloch waves in phononic crystals** (*Invited Paper*), Vincent Laude, Boujemaa Aoubiza, Younes Achaoui, Sarah Benchabane, Abdelkrim Khelif, Institut Femto-ST (France) [7223-13]

8:30 am: **Band structure and waveguiding in a phononic crystal constituted by a periodic array of dots deposited on a homogeneous plate** (*Invited Paper*), Bahram Djafari-Rouhani, Y. Pennec, H. Larabi, Institut d'Electronique de Microélectronique et de Nanotechnologie, CNRS (France) [7223-14]

9:00 am: **Band gaps and wave guiding of Lamb waves in stubbed phononic plates** (*Invited Paper*), Tsung-Tsong Wu, National Taiwan Univ. (Taiwan) [7223-15]

9:30 am: **Two dimensional phononic crystal slab defect mode micromechanical resonator**, Saeed Mohammadi, Ali Asghar Eftekhari, William D. Hunt, Ali Adibi, Georgia Institute of Technology (United States) [7223-16]

Coffee Break 9:50 to 10:30 am

SESSION 5

**Room: Marriott Hotel,
Willow Glen Rooms II/III Wed. 10:30 am to 12:00 pm**

Special Session on Plasmonics I

10:30 am: **Light scattering and localization in deterministic aperiodic structures** (*Invited Paper*), Luca Dal Negro, The Photonics Ctr. at Boston Univ. (United States) [7223-19]

11:00 am: **Active plasmonic components and metamaterials** (*Invited Paper*), Harry A. Atwater, Jr., California Institute of Technology (United States) [7223-17]

11:30 am: **Directed assembly and structural design for tunable plasmonic materials** (*Invited Paper*), Jennifer S. Shumaker-Parry, The Univ. of Utah (United States) [7223-18]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 6

**Room: Marriott Hotel,
Willow Glen Rooms II/III Wed. 1:30 to 3:10 pm**

Special Session on Plasmonics II

1:30 pm: **Left-handed metamaterials operating in the visible: negative refraction and negative radiation pressure** (*Invited Paper*), Henri J. Lezec, Ctr. for Nanoscale Science and Technology, NIST (United States); Kenneth J. Chau, Ctr. for Nanoscale Science and Technology, NIST (Canada) [7223-20]

2:00 pm: **Dielectric vs. plasmonic cavities for Si nanostructures** (*Invited Paper*), Mark L. Brongersma, Stanford Univ. (United States) . . . [7223-21]

2:30 pm: **Aperiodic metal nanoparticle arrays for surface enhanced Raman scattering (SERS)**, Ashwinn Gopinath, Svetlana V. Boriskina, Luca Dal Negro, Björn M. Reinhard, Boston Univ. (United States) [7223-22]

2:50 pm: **Investigation of the tunable IR plasmonic properties of nanocrescents**, Rostislav Bukasov, Jennifer S. Shumaker-Parry, The Univ. of Utah (United States) [7223-23]

Coffee Break 3:10 to 3:40 pm

SESSION 7

**Room: Marriott Hotel,
Willow Glen Rooms II/III Wed. 3:40 to 5:40 pm**

Modeling and Simulation of Photonic Crystal Structures

3:40 pm: **Optical characteristics of photonic crystals based on the fractional Talbot effect**, Yi-Chen Chuang, Thomas Suleski, The Univ. of North Carolina at Charlotte (United States) [7223-24]

4:00 pm: **Optimization of complete bandgaps for photonic crystal slabs through use of symmetry breaking hole shapes**, Matthew D. Weed, Hubert P. Seigneur, Winston V. Schoenfeld, College of Optics & Photonics/Univ. of Central Florida (United States) [7223-25]

4:20 pm: **FDTD sources for localized state excitation in photonic crystals and photonic quasi-crystals**, Scott R. Newman, Robert C. Gauthier, Carleton Univ. (Canada) [7223-26]

4:40 pm: **A new fundamental equation for the band spectra of dielectric layer films**, Frank Szmulowicz, Univ. of Dayton Research Institute (United States) [7223-27]

5:00 pm: **Extraordinary light transmission in rectangular coaxial aperture arrays at mid-infrared**, Ahmet A. Yanik, Xihua Wang, Shyamsunder Erramilli, Hatice Altug, Boston Univ. (United States) [7223-28]

5:20 pm: **Revised guided mode expansion on dispersive photonic media**, **Amin Eftekharian**, Majid Sodagar, Milad Khoshnegar, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of) [7223-29]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Two-dimensional photonic crystals with anisotropic unit cells imprinted from PDMS membranes under elastic deformation, Xuelian Zhu, Ying Zhang, Dinesh Chandra, Shih-Chieh Cheng, James M. Kikkawa, Shu Yang, Univ. of Pennsylvania (United States) [7223-48]

Advanced modeling of subwavelength photonic structures, Ivan Richter, Pavel Kwiecien, Jan Fiala, Milan Šňior, Czech Technical Univ. in Prague (Czech Republic) [7223-49]

Slow light in the one-dimensional photonic crystal waveguide with antireflection structure, Kap-Joong Kim, Korea Advanced Institute of Science and Technology (Korea, Republic of); Sang Soon Oh, Sahnggi Park, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of); Hae-Yong Park, Jae-Eun Kim, Korea Advanced Institute of Science and Technology (Korea, Republic of) [7223-50]

Nanophotonic quantum dot embedded in photonic crystals using a coherent control with a high spectrum resolution, Fumiaki Matsuoka, Hokkaido Univ. (Japan); Hiroyuki Nihei, Health Sciences Univ. of Hokkaido (Japan); Atsushi Okamoto, Hokkaido Univ. (Japan) [7223-51]

Thursday 29 January

SESSION 8

**Room: Marriott Hotel,
Willow Glen Rooms II/III Thurs. 8:00 to 9:30 am**

Photonic Crystal Cavities and Light Emitters I

8:00 am: **Evolution of modulated mode-gap cavities** (*Invited Paper*), Masaya Notomi, NTT Basic Research Labs. (Japan) [7223-30]

8:30 am: **Ultra-high quality factor optical nanocavities based on semiconductor nanowires**, Yinan Zhang, Marko Loncar, Harvard Univ. (United States) [7223-31]

8:50 am: **High Q/V photonic crystal nanocavity design in low refractive index materials**, Murray W. McCutcheon, Marko Loncar, Harvard Univ. (United States) [7223-32]

9:10 am: **Controlled coupling of nanoparticles to photonic crystal cavities**, Michael Barth, Johannes Stingl, Humboldt-Univ. zu Berlin (Germany); Nils C. Nuesse, Bernd Löchel, BESSY GmbH (Germany); Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [7223-33]

Coffee Break 9:30 to 10:30 am

SESSION 9

**Room: Marriott Hotel,
Willow Glen Rooms II/III Thurs. 10:30 am to 12:00 pm**

Photonic Crystal Cavities and Light Emitters II

10:30 am: **Dielectric and metallic nanocavities** (*Invited Paper*), Axel Scherer, California Institute of Technology (United States) [7223-34]

11:00 am: **Midinfrared ($\lambda = 3700$ nm) LEDs and arrays on InGaAsSb with photonic crystals**, Boris A. Matveev, Oleg A. Usov, Yurii M. Zadranov, Nonna V. Zotova, Natalya D. Ilynskaya, Sergey A. Karandashev, Maxim A. Remenny, Nikolai M. Stus', Anna A. Usikova, A.F. Ioffe Physico-Technical Institute (Russian Federation) [7223-35]

11:20 am: **Enhanced spontaneous emission in a photonic crystal LED**, Marco Francardi, Consiglio Nazionale delle Ricerche (Italy); Laurent Balet, Eindhoven Univ. of Technology (Netherlands); Annamaria Gerardino, Consiglio Nazionale delle Ricerche (Italy); Nicolas Chauvin, David Bitauld, Eindhoven Univ. of Technology (Netherlands); Lianhe Li, Blandine Alloing, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Andrea Fiore, Technische Univ. Eindhoven (Netherlands) [7223-36]

11:40 am: **Quantum well design and diffraction efficiency of photonic crystal light emitting diode**, Milad Khoshnegar, Majid Sodagar, Amin Eftekharian, Sina Khorasani, Sharif Univ. of Technology (Iran, Islamic Republic of); Ali Adibi, Georgia Institute of Technology (United States) [7223-37]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 10

Room: Marriott Hotel,
Willow Glen Rooms II/III Thurs. 1:30 to 3:00 pm

Novel Effects and Applications in Photonic Crystal Structures I

1:30 pm: **Reconfigurable photonic crystal circuits using microfluidics** (*Invited Paper*), Benjamin J. Eggleton, The Univ. of Sydney (Australia) [7223-38]

2:00 pm: **On-chip photonic crystal-based micro-interferometers with high spectral sensitivity**, Maysamreza Chamanzar, Babak Momeni, Ali Adibi, Georgia Institute of Technology (United States) [7223-39]

2:20 pm: **Cherenkov radiation and photonic quasi-crystals**, Robert C. Gauthier, Carleton Univ. (Canada) [7223-44]

2:40 pm: **Polarization control by transmission through a scalar wave three-dimensional metamaterial**, Jonghwa Shin, Jung-Tsung Shen, Shanhui Fan, Stanford Univ. (United States) [7223-41]

Coffee Break 3:00 to 3:30 pm

SESSION 11

Room: Marriott Hotel,
Willow Glen Rooms II/III Thurs. 3:30 to 5:20 pm

Novel Effects and Applications in Photonic Crystal Structures II

3:30 pm: **Architectural photonic nanostructure and its energy consequences** (*Invited Paper*), Shawn-Yu Lin, Rensselaer Polytechnic Institute (United States) [7223-42]

4:00 pm: **Towards ultra-small radiative thermal conductance by interfacing multi-layer photonic crystals**, Wah Tung Lau, Jung-Tsung Shen, Shanhui Fan, Stanford Univ. (United States) [7223-43]

4:20 pm: **Discretely disordered photonic bandgap structures: a more accurate invariant measure calculation**, Glen J. Kissel, Univ. of Southern Indiana (United States) [7223-45]

4:40 pm: **Dielectric optical slab waveguides periodically loaded with Josephson junctions and superconducting weak-links**, Behnood G. Ghamdari, A. Hamed Majedi, Univ. of Waterloo (Canada) [7223-46]

5:00 pm: **Backward scattering effect of periodically-aligned carbon nanotube array**, Pengfei Wu, New Span Opto-Technology Inc. (United States); Zhifeng Ren, Boston College (United States); Michael R. Wang, New Span Opto-Technology Inc. (United States) [7223-47]

Quantum Dots, Particles, and Nanoclusters VI

Conference Chairs: **Kurt G. Eyink**, Air Force Research Lab.; **Frank Szmulowicz**, Univ. of Dayton Research Institute; **Diana L. Huffaker**, Univ. of California/Los Angeles

Program Committee: **Pallab K. Bhattacharya**, Univ. of Michigan; **C. Jeffrey Brinker**, Sandia National Labs.; **Dennis G. Deppe**, The Univ. of Texas at Austin; **Alfred W. B. Forchel**, Univ. Würzburg (Germany); **L. Jay Guo**, Univ. of Michigan; **Axel G. Hoffmann**, Technische Univ. Berlin (Germany); **Yong-Hee Lee**, Korea Advanced Institute of Science and Technology (Korea, Republic of); **Luke F. Lester**, The Univ. of New Mexico; **James A. Lott**, Technische Univ. Berlin; **Manijeh Razeghi**, Northwestern Univ.; **Kevin L. Silverman**, National Institute of Standards and Technology; **Jian Xu**, The Pennsylvania State Univ.

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room A5 Sun. 1:30 to 3:00 pm

CQD I

Session Chair: **Jian Xu**, The Pennsylvania State Univ.

- 1:30 pm: **Quantum dots in three-dimensional optical data storage photonic crystals** (*Invited Paper*), Min Gu, Swinburne Univ. of Technology (Australia) [7224-01]
- 2:00 pm: **II-VI semiconductor quantum dots in aqueous medium: highly fluorescent and stable optical probes** (*Invited Paper*), Patricia M. A. Farias, Beate S. Santos, Claudilene R. Chaves, Ricardo C. Ferreira, André Galembeck, Univ. Federal de Pernambuco (Brazil); Domingo Scordo, Federal Univ. of Pernambuco (Brazil); Rafael Bezerra Lira, Adriana Fontes, Univ. Federal de Pernambuco (Brazil) [7224-02]
- 2:30 pm: **Two-photon excitation of quantum-dot-based fluorescence resonance energy transfer** (*Invited Paper*), Aaron R. Clapp, Iowa State Univ. (United States); Igor L. Medintz, Hedi Mattoussi, Naval Research Lab. (United States) [7224-03]
- Coffee Break 3:00 to 3:30 pm

SESSION 2

Room: Conv. Ctr. Room A5 Sun. 3:30 to 6:00 pm

Quantum Dot Growth

Session Chair: **Lawrence H. Friedman**, The Pennsylvania State Univ.

- 3:30 pm: **Surface energy effects on the self-assembly of epitaxial quantum dots** (*Invited Paper*), Lawrence H. Friedman, The Pennsylvania State Univ. (United States) [7224-04]
- 4:00 pm: **Multiscale kinetic Monte Carlo simulation of quantum dots self-organized growth** (*Invited Paper*), Ernie Pan, Univ. of Akron (United States); Peter W. Chung, Army Research Lab. (United States) [7224-05]
- 4:30 pm: **Selective MOCVD growth of InGaAs/GaAs and InGaAs/InP quantum dots employing diblock copolymer nanopatterning** (*Invited Paper*), Luke J. Mawst, J. H. Park, M. Rath, Thomas F. Kuech, Univ. of Wisconsin, Madison (United States); V. B. Verma, James J. Coleman, Univ. of Illinois at Urbana-Champaign (United States) [7224-06]
- 5:00 pm: **Morphological change in tip based nano-patterned planar InAs**, Kurt G. Eyink, Air Force Research Lab. (United States); Jodie Shoaf, Wright State Univ. (United States); Lawrence Grazulis, Univ. of Dayton Research Institute (United States) [7224-07]
- 5:15 pm: **Photoluminescence investigation of InAs quantum dots incorporating DWELL structures on patterned and planar GaAs (001) substrate**, Baolai Liang, Ping-Show Wong, Univ. of California, Los Angeles (United States); V. G. Dorogan, Univ. of Arkansas (United States); Alexander R. Albrecht, H. Xiang, Ctr. for High Technology Materials (United States); Jun Tatebayashi, Univ. of California, Los Angeles (United States); Yuri I. Mazur, Gregory J. Salamo, Univ. of Arkansas (United States); Steven R. J. Brueck, The Univ. of New Mexico (United States); Diana L. Huffaker, Univ. of California, Los Angeles (United States) [7224-08]
- 5:30 pm: **Synthesis of ZnO nanoparticles using a low temperature modified vapor phase transport process**, Curtis R. Taylor, Univ. of Florida (United States); Tarek Trad, Kyle Donley, Virginia Commonwealth Univ. (United States); Kurt G. Eyink, David H. Tomich, Air Force Research Lab. (United States); David C. Look, Wright State Univ. (United States) [7224-09]
- 5:45 pm: **InSb quantum dots and quantum rings in a narrow-gap InAsSbP matrix**, Konstantin D. Moiseev, Maya P. Mikhailova, Yana Parkhomenko, Ekaterina Gushchina, Petr Dementyev, Sergey S. Kizhaev, Edward V. Ivanov, Yury P. Yakovlev, A.F. Ioffe Physico-Technical Institute (Russian Federation) [7224-10]

Monday 26 January

SESSION 3

Room: Conv. Ctr. Room A5 Mon. 8:00 to 10:00 am

Nanowires I

Session Chair: **Diana L. Huffaker**, Univ. of California, Los Angeles

- 8:00 am: **Growth kinetics of Si and Ge nanowires** (*Invited Paper*), Suneel Kodambaka, Univ. of California, Los Angeles (United States); Jerry Tersoff, Mark C. Reuter, Frances M. Ross, IBM Thomas J. Watson Research Ctr. (United States) [7224-11]
- 8:30 am: **Effect of growth conditions on the catalyst composition and properties of GaSb nanowires** (*Invited Paper*), Joan M. Redwing, Robert A. Burke, Xiaojun Weng, The Pennsylvania State Univ. (United States); Roger J. Reeves, Steven M. Durbin, Univ. of Canterbury (New Zealand) [7224-12]
- 9:00 am: **Heterostructures in GaP-based free-standing nanowires on Si substrates** (*Invited Paper*), Kouta Tateno, Guoqiang Zhang, Hidetoshi Nakano, NTT Basic Research Labs. (Japan) [7224-13]
- 9:30 am: **Nanowires and nanoneedles: enabling a new era of optoelectronics** (*Invited Paper*), Connie J. Chang-Hasnain, Linus C. Chuang, Michael J. Moewe, Shanna M. Crankshaw, Univ. of California, Berkeley (United States) [7224-44]
- Coffee Break 10:00 to 10:30 am

SESSION 4

Room: Conv. Ctr. Room A5 Mon. 10:30 am to 12:30 pm

Nanowires II

Session Chair: **Diana L. Huffaker**, Univ. of California, Los Angeles

- 10:30 am: **Electrical and optical characterization of individual GaSb nanowires** (*Invited Paper*), Hongbin Yu, Arizona State Univ. (United States) [7224-16]
- 11:00 am: **Position controlled growth and optical properties of III-V semiconductor core-shell nanowires grown by selective area MOVPE** (*Invited Paper*), Junichi Motohisa, Katsuhiko Tomioka, Shinjiro Hara, Takashi Fukui, Hokkaido Univ. (Japan) [7224-17]
- 11:30 am: **Advances in understanding the synthesis of InAs and GaAs nanowires** (*Invited Paper*), Deli Wang, Univ. of California, San Diego (United States) [7224-18]
- 12:00 pm: **Material quality improvement of GaN thin films through epitaxial overgrowth of GaN nanowires**, Kent L. Averett, John Albrecht, Air Force Research Lab. (United States); Chih-Chung Yang, Tsung-Yi Tang, Wen-Yu Shiao, Yung-Shen Cheng, National Taiwan Univ. (Taiwan) [7224-14]
- 12:15 pm: **Catalyst-free growth of nanopillars on patterned substrates by MOCVD**, Ping-Show Wong, Baolai Liang, Univ. of California, Los Angeles (United States); Xiang He, Steven R. J. Brueck, The Univ. of New Mexico (United States); Diana L. Huffaker, Univ. of California, Los Angeles (United States) [7224-15]
- Lunch Break 12:30 to 1:30 pm

Conference 7224

SESSION 5

Room: Conv. Ctr. Room A5 Mon. 1:30 to 3:15 pm

CQD II

Session Chair: **Jian Xu**, The Pennsylvania State Univ.

- 1:30 pm: **Engineered nanostructures exhibiting enhanced optical nonlinearity** (*Invited Paper*), Mary J. Potasek, SimPhoTek, Inc. (United States) [7224-19]
- 2:00 pm: **Two-photon pumped lasing from colloidal nanocrystal quantum dots** (*Invited Paper*), Jian Xu, Chunfeng Zhang, Fan Zhang, The Pennsylvania State Univ. (United States); Yongqiang A. Wang, Ocean Nanotech LLC (United States) [7224-20]
- 2:30 pm: **Enhanced three-photon-excited photoluminescence in transition-metal-doped semiconductor quantum dots** (*Invited Paper*), Wei Ji, National Univ. of Singapore (Singapore) [7224-21]
- 3:00 pm: **Infrared absorbing quantum dots: synthesis and deposition**, Chien M. Wai, Alexander B. Smetana, Univ. of Idaho (United States) [7224-22]
- Coffee Break 3:15 to 3:45 pm

SESSION 6

Room: Conv. Ctr. Room A5 Mon. 3:45 to 6:15 pm

Nanodevices

- 3:45 pm: **Quantum dot insertions in VCSELs from 840 to 1300 nm: growth, characterization, and device performance** (*Invited Paper*), Nikolay N. Ledentsov, VI Systems GmbH (Germany) [7224-23]
- 4:15 pm: **Photonic emitters and circuits based on colloidal quantum dot composites** (*Invited Paper*), Vinod M. Menon, Queens College/CUNY (United States) [7224-24]
- 4:45 pm: **Spatial hole burning and optical power in a quantum dot laser**, L. Jiang, Levon V. Asryan, Virginia Polytechnic Institute and State Univ. (United States) [7224-25]
- 5:00 pm: **The spectral analysis and mode structure of ultrabroad InAs/InAlGaAs quantum dash laser**, Chee-Loon Tan, Yun-Hsiang Ding, Clara E. Dimas, Lehigh Univ. (United States); Hery S. Djie, JDSU (United States); Yang Wang, OptiComp Corp. (United States); Vitchanetra Hongpinyo, C. Chen, Boon-Siew Ooi, Lehigh Univ. (United States) [7224-26]
- 5:15 pm: **QD VCSELs with InAs/GaAs short period superlattice QW injector**, Vadim E. Tokranov, Michael Yakimov, Serge Oktyabrsky, Univ. at Albany (United States) [7224-27]
- 5:30 pm: **A CdSe quantum dot in a ZnSe nanowire as an efficient high-temperature single-photon source**, Thomas Aichele, Humboldt-Univ. zu Berlin (Germany); Adrien Tribu, Gregory Sallen, Catherine Bougerol, Jean-Philippe Poizat, Kuntheak Kheng, Régis André, Serge Tatarenko, Univ. Joseph Fourier (France) [7224-28]
- 5:45 pm: **Quantum dot in a well infrared photodetectors for high operating temperature focal plane arrays**, Stanley Tsao, Siamak Abdollahi Pour, Takayuki Yamanaka, Bijan Movaghar, Manijeh Razeghi, Northwestern Univ. (United States) [7224-29]
- 6:00 pm: **A voltage-tunable 320x256 InAs/GaAs quantum-dot infrared photodetector imaging focal plane array**, Jarrod Vaillancourt, Applied NanoFemto Technologies (United States); Cindy X. Chen, Xuejun Lu, Univ. of Massachusetts Lowell (United States) [7224-30]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

- 8:00 am: Introduction and Opening Remarks
- 8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)
- 8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)
- 9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)
- See p. 26 for details.

Coffee Break 10:00 to 10:30 am

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Generation of identical photons using an electrically driven single-photon source, Raj B. Patel, Toshiba Research Europe Ltd. (United Kingdom) and Univ. of Cambridge (United Kingdom); Anthony J. Bennett, Toshiba Research Europe Ltd. (United Kingdom); Ken Cooper, Paola Atkinson, Christine A. Nicoll, David A. Ritchie, Univ. of Cambridge (United Kingdom); Andrew J. Shields, Toshiba Research Europe Ltd. (United Kingdom) [7224-31]

Spontaneous lifetime inhibition of dye molecules at the presence of silicon nano-pillars, Bukem Bilen, Dogus Univ. (Turkey); Sabriye Acikgoz, Gulen Aktas, Naci Inci, Bogazici Univ. (Turkey) [7224-32]

One-pot overgrowth of gold nanorods: a spectroscopic investigation, Fulvio Ratto, Paolo Matteini, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) [7224-33]

Simulation of one- and two-photon spectra of CdSe quantum dots using coupled cluster and time-dependent density functional theory, Kiet A. Nguyen, Paul N. Day, Ruth Pachter, Air Force Research Lab. (United States) [7224-34]

Near-field distribution of localized SP coupling in isolated and collective metal nanoparticle arrays, Chen-Han Huang, Hsing-Ying Lin, Hsiang-Chen Chui, National Cheng Kung Univ. (Taiwan) [7224-35]

The phase distribution of near-field optical enhancement in a metal nanoparticle, Hsing-Ying Lin, Chen-Han Huang, Chih-Han Chang, Hsiang-Chen Chui, National Cheng Kung Univ. (Taiwan) [7224-36]

A passive mode-locked InAs/InP quantum dot laser with pulse duration of less than 300 fs, Zhenguo Lu, Jiaren Liu, Philip J. Poole, Pedro J. Barrios, Daniel Poitras, Sylvain Raymond, National Research Council Canada (Canada) [7224-37]

Focused ion beam induced deposition of quantum dot waveguides for plasmonics interconnects, Michael D. Gerhold, U.S. Army Research Office (United States); Anuj Dhawan, Tuan Vo-Dinh, Duke Univ. (United States); Donovan Leonard, Phillip E. Russell, Appalachian State Univ. (United States) [7224-38]

Efficient light source fabrication based on colloidal quantum dots, Jianfeng Xu, New Span Opto-Technology Inc. (United States); Sarfaraz Baig, Michael R. Wang, Univ. of Miami (United States) [7224-39]

Magneto-optical effects enhanced by localized surface plasmon resonance in Au nanoparticles and magnetic garnet composite films, Hironaga Uchida, Yusuke Masuda, Yusuke Mizutani, Rintaro Fujikawa, Alexander V. Baryshev, Mitsuteru Inoue, Toyohashi Univ. of Technology (Japan) [7224-40]

Effect of silver nanoislands-embedded grating for surface plasmon based total internal reflection fluorescence imaging, Kyujung Kim, Dong Jun Kim, Donghyun Kim, Yonsei Univ. (Korea, Republic of) [7224-41]

Modeling the optical properties of gold nanoclusters using time-dependent density functional theory, Paul N. Day, Air Force Research Lab. (United States); Kiet A. Nguyen, Air Force Research Lab. (United States) and UES, Inc. (United States); Ruth Pachter, Air Force Research Lab. (United States) [7224-42]

Carrier-density effects in type-II GaSb/GaAs quantum dot lasers, Kamil Gradkowski, Tyndall National Institute (Ireland) and Cork Institute of Technology (Ireland); Tomasz J. Ochalski, Tyndall National Institute (Ireland); Eoin P. O'Reilly, Tyndall National Institute (Ireland) and Univ. College Cork (Ireland); Guillaume Huyet, Tyndall National Institute (Ireland) and Cork Institute of Technology (Ireland); Jun Tatebayashi, Diana L. Huffaker, Univ. of California, Los Angeles (United States) [7224-43]

Conference 7225 · Convention Center Room L

Wednesday-Thursday 28-29 January 2009 • Proceedings of SPIE Vol. 7225

Advanced Optical Concepts in Quantum Computing, Memory, and Communication II

Conference Chairs: **Zameer U. Hasan**, Temple Univ.; **Alan E. Craig**, Montana State Univ./Bozeman; **Philip R. Hemmer**, Texas A&M Univ.

Program Committee: **Aleksander K. Rebane**, Montana State Univ./Bozeman; **Charles M. Santori**, Hewlett-Packard Labs.; **Selim M. Shahriar**, Northwestern Univ.; **Alan Eli Willner**, Univ. of California/Los Angeles

Wednesday 28 January

SESSION 1

Room: Conv. Ctr. Room L Wed. 8:00 to 10:20 am

Single Atom or Spin for Quantum Computing

Session Chair: **Charles M. Santori**, Hewlett-Packard Labs.

8:00 am: **Engineering single spins and coherence for spintronics** (*Invited Paper*), David D. Awschalom, Univ. of California, Santa Barbara (United States).....[7225-01]

8:25 am: **Complete quantum control of a single electron spin in a quantum dot using picosecond optical pulses** (*Invited Paper*), David L. Press, Stanford Univ. (United States); Thaddeus D. Ladd, Stanford Univ. (United States) and National Institute of Informatics (Japan); Bingyang Zhang, Stanford Univ. (United States); Yoshihisa Yamamoto, Stanford Univ. (United States) and National Institute of Informatics (Japan)[7225-02]

8:50 am: **Optoelectronic manipulation of single spins in semiconductors** (*Invited Paper*), Michael E. Flatté, The Univ. of Iowa (United States).....[7225-03]

9:15 am: **Tradeoffs of spectral hole burning memories for bio-imaging applications** (*Invited Paper*), Philip R. Hemmer, Texas A&M Univ. (United States); Lihong Wang, Washington Univ. in St Louis (United States).....[7225-04]

9:40 am: **Atomic tailoring of rare earth based materials for applications from terabits storage to quantum memories and computing** (*Invited Paper*), Zameer U. Hasan, Temple Univ. (United States) [7225-05]

10:05 am: **Europium based optical centers in multilayer thin film structures for spectral storage**, Francisco J. Bezares, Zameer U. Hasan, Temple Univ. (United States).....[7225-06]

Coffee Break 10:20 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room L Wed. 10:40 am to 12:20 pm

Nanoscale Devices and Sensing

Session Chair: **Aleksander K. Rebane**, Montana State Univ., Bozeman

10:40 am: **Nanophotonic devices in single crystal diamond** (*Invited Paper*), Paul E. Barclay, Kai-Mei C. Fu, Charles M. Santori, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States).....[7225-07]

11:05 am: **Nanoscale magnetic sensing with an individual electronic spin in diamond** (*Invited Paper*), Jeronimo Maze, Jonathan S. Hodges, Paul S. Stanwix, Sungkun S. Hong, Jacob M. Taylor, Paola Cappellaro, Liang Jiang, Alexander S. Zibrov, Emre Togan, Gurudev Dutt, Amir Yacoby, Ronald Walsworth, Mikhail D. Lukin, Harvard Univ. (United States).....[7225-08]

11:30 am: **Nanophotonics platform for quantum information processing in diamond** (*Invited Paper*), Marko Loncar, Harvard Univ. (United States).....[7225-09]

11:55 am: **Quantum optics for subwavelength imaging** (*Invited Paper*), Philip R. Hemmer, Texas A&M Univ. (United States) [7225-10]

Lunch/Exhibition Break 12:20 to 1:45 pm

SESSION 3

Room: Conv. Ctr. Room L Wed. 1:45 to 3:40 pm

Photorefractives and Photonic Crystals for Quantum Computing

Session Chair: **Philip R. Hemmer**, Texas A&M Univ.

1:45 pm: **Fabrication of photonic crystal in diamond** (*Invited Paper*), Jonathan C. Lee, Chioufu Wang, Univ. of California, Santa Barbara (United States); Jie Yang, Naval Research Lab. (United States); Ronald Hanson, Univ. of California, Santa Barbara (United States); James E. Bultter, Naval Research Lab. (United States); David D. Awschalom, Evelyn L. Hu, Univ. of California, Santa Barbara (United States).....[7225-11]

2:10 pm: **Photon blockade in a photonic crystal cavity with a strongly coupled quantum dot** (*Invited Paper*), Andrei Faraon, Ilya Fushman, Dirk R. Englund, Jelena Vuckovic, Stanford Univ. (United States) [7225-12]

2:35 pm: **Photonic structures for QIP in diamond** (*Invited Paper*), Kai-Mei C. Fu, Charles M. Santori, Paul E. Barclay, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States).....[7225-13]

3:00 pm: **Single photon nonlinear optics in photonic crystal chips** (*Invited Paper*), Dirk R. Englund, Ilya Fushman, Andrei Faraon, Jelena Vuckovic, Stanford Univ. (United States).....[7225-14]

3:25 pm: **Photorefractive time-domain differential detection method for high-precision distinction of phase-modulated signals in holographic data storage**, Masanori Takabayashi, Atsushi Okamoto, Hokkaido Univ. (Japan).....[7225-15]

Coffee Break 3:40 to 4:00 pm

SESSION 4

Room: Conv. Ctr. Room L Wed. 4:00 to 5:15 pm

New Concepts and Systems

Session Chair: **Zameer U. Hasan**, Temple Univ.

4:00 pm: **Towards strongly optically coupled quantum solids** (*Invited Paper*), Aleksander K. Rebane, Charles W. Thiel, Krishna Rupavatharam, William R. Babbitt, Rufus L. Cone, Montana State Univ., Bozeman (United States).....[7225-16]

4:25 pm: **Quantum interference between single photons emitted by independent semiconductor nanodevices** (*Invited Paper*), Kaoru Sanaka, Stanford Univ. (United States).....[7225-17]

4:50 pm: **Ultrafast optical spin rotation in semiconductors** (*Invited Paper*), Hailin Wang, Univ. of Oregon (United States).....[7225-18]

Thursday 29 January

SESSION 5

Room: Conv. Ctr. Room LThurs. 8:00 to 10:30 am

Experimental Quantum Metrology

Session Chair: **Hwang Lee**, Louisiana State Univ.

8:00 am: **Spin manipulation of paramagnetic atoms embedded in a dense cryogenic buffer gas** (*Invited Paper*), Todor S. Karaulanov, Byung-Kyu Park, Univ. of California, Berkeley (United States); Alexander O. Sushkov, Yale Univ. (United States); Dmitry Budker, Univ. of California, Berkeley (United States)[7225-19]

8:30 am: **Optical manipulation of single NV centers in diamond** (*Invited Paper*), Charles M. Santori, Kai-Mei C. Fu, Paul E. Barclay, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)[7225-20]

9:00 am: **Quantum optomechanical correlations induced by radiation pressure between light and mirrors** (*Invited Paper*), Antoine Heidmann, Pierre-Francois Cohadon, Tristan Briant, Pierre Verlot, Chiara Molinelli, A. Tavernarakis, Univ. Pierre et Marie Curie (France)[7225-21]

9:30 am: **Transfer standard detector/amplifier optimized for calibrating photon counting detectors** (*Invited Paper*), Alan L. Migdall, National Institute of Standards and Technology (United States)[7225-22]

10:00 am: **Fast light in a photorefractive crystal for broadband gravitational wave detection with an augmented advanced-LIGO interferometer** (*Invited Paper*), Mary Salit, Max Kellner, Subramanian Krishnamurthy, Selim M. Shahriar, Northwestern Univ. (United States); Honam Yum, Philip R. Hemmer, Texas A&M Univ. (United States)[7225-23]

Coffee Break10:30 to 10:50 am

SESSION 6

Room: Conv. Ctr. Room LThurs. 10:50 am to 12:20 pm

Entanglement Metrology

Session Chair: **Charles M. Santori**, Hewlett-Packard Labs.

10:50 am: **Quantum metrology using entangled photons** (*Invited Paper*), Shigeki Takeuchi, Hokkaido Univ. (Japan)[7225-24]

11:20 am: **Metrology with a Fabry-Perot interferometer and entangled states of light** (*Invited Paper*), Christoph F. Wildfeuer, Sean D. Huver, Jonathan P. Dowling, Louisiana State Univ. (United States)[7225-26]

11:50 am: **Prolonging qubit coherence: a systematic experimental study of dynamic decoupling schemes** (*Invited Paper*), Hermann Uys, National Institute of Standards and Technology (United States)[7225-34]

Lunch/Exhibition Break12:20 to 1:40 pm

SESSION 7

Room: Conv. Ctr. Room LThurs. 1:40 to 3:40 pm

Alternative Perceptions and Techniques

Session Chair: **Alan E. Craig**, Montana State Univ.

1:40 pm: **The photon sheds light on the quantum: quantum optical and classical Maxwell routes to Schrödinger's wave equation** (*Invited Paper*), Marlan O. Scully, Texas A&M Univ. (United States) and Princeton Univ. (United States)[7225-27]

2:10 pm: **Density matrix formalism for Heisenberg-limited interferometry** (*Invited Paper*), Hwang Lee, Louisiana State Univ. (United States)[7225-28]

2:40 pm: **Entanglement and Heisenberg limit in quantum interferometry** (*Invited Paper*), Augusto Smerzi, Univ. degli Studi di Trento (Italy)[7225-29]

3:10 pm: **Quantum metrology with cold atoms** (*Invited Paper*), Mark Kasevich, Stanford Univ. (United States)[7225-35]

Coffee Break3:40 to 4:00 pm

SESSION 8

Room: Conv. Ctr. Room LThurs. 4:00 to 6:00 pm

Quantum Phase and Quantum Imaging

Session Chair: **Selim M. Shahriar**, Northwestern Univ.

4:00 pm: **Laboratory investigations of quantum imaging and quantum metrology** (*Invited Paper*), Robert W. Boyd, Univ. of Rochester (United States)[7225-30]

4:30 pm: **Quantum optical metrology, imaging, and sensing with entangled states of light** (*Invited Paper*), Jonathan P. Dowling, Louisiana State Univ. (United States)[7225-31]

5:00 pm: **Experimental demonstration of phase measurement precision beating standard quantum limit by projection measurement** (*Invited Paper*), Fangwen Sun, Columbia Univ. (United States) and Univ. of Science and Technology of China (China)[7225-32]

5:30 pm: **Optical quantum measurement and metrology** (*Invited Paper*), Geoff J. Pryde, G. Y. Xiang, Brendon L. Higgins, Howard M. Wiseman, Griffith Univ. (Australia); Dominic W. Berry, Macquarie Univ. (Australia); Stephen D. Bartlett, The Univ. of Sydney (Australia)[7225-33]

Conference 7226 · Marriott Hotel, San Jose Ballroom Salon II

Sunday-Tuesday 25-27 January 2009 • Proceedings of SPIE Vol. 7226

Advances in Slow and Fast Light II

Conference Chairs: **Selim M. Shahriar**, Northwestern Univ.; **Philip R. Hemmer**, Texas A&M Univ.; **John R. Lowell**, Defense Advanced Research Projects Agency

Program Committee: **Raymond G. Beausoleil**, Hewlett-Packard Labs.; **Alan E. Craig**, Montana State Univ./Bozeman; **Shanhui Fan**, Stanford Univ.; **Daniel J. Gauthier**, Duke Univ.; **Kohzo Hakuta**, The Univ. of Electro-Communications (Japan); **John C. Howell**, Univ. of Rochester; **Holger Schmidt**, Univ. of California/Santa Cruz; **M. Suhail Zubairy**, Texas A&M Univ.

Sunday 25 January

SESSION 1

Room: **Marriott Hotel,
San Jose Ballroom Salon II** Sun. 1:30 to 5:20 pm

Slow Light in Polaritons, Gratings, and Related Systems

Session Chair: **Jacob Scheuer**, Tel Aviv Univ. (Israel)

1:30 pm: **Slow light in nonlinear Bragg gratings** (*Invited Paper*), Benjamin J. Eggleton, The Univ. of Sydney (Australia) [7226-01]

2:00 pm: **Theory of slow and fast light via polariton effects in bulk media** (*Invited Paper*), Baijie Gu, Nai-Hang Kwong, Rolf H. Binder, A. Smirl, College of Optical Sciences/The Univ. of Arizona (United States) [7226-02]

2:30 pm: **Dispersion-free slow light pulse and its functionalities** (*Invited Paper*), Toshihiko Baba, H. Sasaki, J. Adachi, Y. Hamachi, Yokohama National Univ. (Japan) [7226-03]

3:00 pm: **SBS-based slow light in optical fibers: optimum design considerations for undistorted slow-light signal propagation in small and large signal regimes** (*Invited Paper*), Liyong Ren, Yasuo Tomita, The Univ. of Electro-Communications (Japan) [7226-04]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Delay line using drifting cavity solitons** (*Invited Paper*), Jorge R. Tredicce, Univ. de Nice Sophia Antipolis (France) [7226-05]

4:30 pm: **Enhanced second harmonic generation in coupled semiconductor whispering gallery mode microresonators**, Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [7226-06]

4:50 pm: **Non-linear interactions in electromagnetically induced transparency and related pump-probe optical phenomena** (*Invited Paper*), Verne L. Jacobs, Naval Research Lab. (United States) [7226-07]

Monday 26 January

SESSION 2

Room: **Marriott Hotel,
San Jose Ballroom Salon II** Mon. 8:00 to 10:00 am

Slow and Fast Light in Optical Fiber I

Session Chair: **Min Xiao**, Univ. of Arkansas

8:00 am: **Few photon switching with slow light in hollow fiber** (*Invited Paper*), Michal Bajcsy, S. Hofferberth, V. Balic, Harvard Univ. (United States); T. Peyronel, Massachusetts Institute of Technology (United States); Alexander S. Zibrov, Harvard Univ. (United States); Vladan Vuletic, Massachusetts Institute of Technology (United States); Mikhail D. Lukin, Harvard Univ. (United States) [7226-09]

8:30 am: **Use of Faraday rotator mirror for delay stabilization of SBS slow light in fibers** (*Invited Paper*), Michael J. Steiner, Naval Research Lab. (United States) [7226-10]

9:00 am: **Achieving tunable delays using wavelength conversion** (*Invited Paper*), Alan E. Willner, Univ. of Southern California (United States) [7226-11]

9:30 am: **Potentialities of slow and fast light in optical fibers** (*Invited Paper*), Luc Thevenaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7226-12]

Coffee Break 10:00 to 10:30 am

SESSION 3

Room: **Marriott Hotel,
San Jose Ballroom Salon II** Mon. 10:30 am to 12:10 pm

Slow and Fast Light in Optical Fiber II

Session Chair: **Min Xiao**, Univ. of Arkansas

10:30 am: **Large tunable optical delays via conversion/dispersion techniques** (*Invited Paper*), Alexander L. Gaeta, Cornell Univ. (United States) [7226-13]

11:00 am: **High-speed ultra-low light level optical switching with a nano-fiber via degenerate v-system EIT**, Ken Salit, Mary Salit, Subramanian Krishnamurthy, Selim M. Shahriar, Northwestern Univ. (United States) [7226-14]

11:20 am: **Slow and fast light in optical fibers using acousto-optic coupling between two co-propagating modes**, Magnus W. Haakestad, Norwegian Defense Research Establishment (Norway); Johannes Skaar, Norwegian Univ. of Science and Technology (Norway) [7226-15]

11:40 am: **Buffering and sensing applications of SBS induced fast light in a fiber resonator** (*Invited Paper*), Honam Yum, Philip R. Hemmer, Texas A&M Univ. (United States); Mary Salit, Selim M. Shahriar, Northwestern Univ. (United States) [7226-16]

Lunch Break 12:10 to 1:10 pm

SESSION 4

Room: **Marriott Hotel,
San Jose Ballroom Salon II** Mon. 1:10 to 3:00 pm

Slow Light in Atomic Vapor

Session Chair: **Alan Eli Willner**, Univ. of Southern California

1:10 pm: **Slow light and EIT for realistic (imperfect) conditions** (*Invited Paper*), Ronald Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (United States) [7226-17]

1:40 pm: **Slow light and related phenomena: recent studies** (*Invited Paper*), Marlan O. Scully, Texas A&M Univ. (United States) [7226-18]

2:10 pm: **Realistic theory of electromagnetically-induced transparency and slow light in a hot atomic vapor** (*Invited Paper*), Rupamanjari Ghosh, Jawaharlal Nehru Univ. (India) [7226-19]

2:40 pm: **Impact of non-adiabatic fields and dissipation on quantum storage and retrieval**, Joyee Ghosh, Rupamanjari Ghosh, Deepak Kumar, Jawaharlal Nehru Univ. (India) [7226-20]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Room: **Marriott Hotel,
San Jose Ballroom Salon II** Mon. 3:30 to 5:30 pm

Slow and Fast Light in Plasmonics and Metamaterials

Session Chair: **Thomas F. Krauss**, Univ. of St. Andrews (United Kingdom)

3:30 pm: **Tailoring and cancelling dispersion of slow or stopped and subwavelength surface-plasmonodielectric-polaritonic light** (*Invited Paper*), Aristeidis Karalis, Massachusetts Institute of Technology (United States) [7226-21]

4:00 pm: **The turbulent mechanism of slow fast and stopped light in plasmonics** (*Invited Paper*), Meir Orenstein, Technion-Israel Institute of Technology (Israel) [7226-22]

4:30 pm: **Controlled slow light in complex photonic materials** (*Invited Paper*), Ortwin Hess, Univ. of Surrey (United Kingdom) [7226-23]

5:00 pm: **Rabi splitting induced by photon tunneling modes in effective zero-index metamaterials** (*Invited Paper*), Haitao Jiang, Liwei Zhang, Yaping Yang, Hong Chen, Tongji Univ. (China); Shiyao Zhu, Hong Kong Baptist Univ. (China) [7226-24]

Tuesday 27 January

OPTO PLENARY SESSION

Room: **Montgomery Theater** Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: **Marriott Hotel, San Jose Ballroom Salon II** Tues. 10:30 am to 12:30 pm

Slow and Fast Light in Microresonators

Session Chair: **Philip R. Hemmer**, Texas A&M Univ.

10:30 am: **Active CROW delay lines** (*Invited Paper*), Jacob Scheuer, Tel Aviv Univ. (Israel) [7226-25]

11:00 am: **Light trapping and other dynamic effects with one or two cavities** (*Invited Paper*), Shanhui Fan, Stanford Univ. (United States) [7226-26]

11:30 am: **Slow and fast light on-chip using ultra fast EO silicon devices** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (United States) [7226-27]

12:00 pm: **Dispersion properties of high-Q passive and active single or coupled resonators** (*Invited Paper*), Yannick Dumeige, Stéphane Trébaol, Laura Ghisa, Thi Kim Ngan Nguyen, Hervé Tavernier, Patrice Féron, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) [7226-28]

Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 7

Room: **Marriott Hotel, San Jose Ballroom Salon II** Tues. 1:30 to 3:00 pm

Slow and Fast Light in PBG Structures, Waveguides and Cavities I

Session Chair: **Robert W. Boyd**, Univ. of Rochester

1:30 pm: **Slow-light vortices and resonances in periodic waveguides** (*Invited Paper*), Andrey A. Sukhorukov, The Australian National Univ. (Australia) [7226-31]

2:00 pm: **Speed of light control via resonant nonlinearity and disorder in a photonic crystal** (*Invited Paper*), Igor V. Melnikov, Optolink Ltd. (Russian Federation) [7226-30]

2:30 pm: **Coupling and propagation losses in slow light (ng->100) photonic crystal waveguides** (*Invited Paper*), Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [7226-29]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Room: **Marriott Hotel, San Jose Ballroom Salon II** Tues. 3:30 to 5:00 pm

Slow and Fast Light in PBG Structures, Waveguides and Cavities II

3:30 pm: **Slow and fast light effects in semiconductor waveguides for applications in microwave photonics** (*Invited Paper*), W. Xue, Y. Chen, Filip Öhman, S. Sales, Jesper Mørk, Danmarks Tekniske Univ. (Denmark) . . [7226-32]

4:00 pm: **Optical spectra of coherent atoms inside an optical cavity** (*Invited Paper*), Min Xiao, Univ. of Arkansas (United States) [7226-33]

4:30 pm: **Slow light structure versus a single cavity: relative merits for nonlinear optics** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (United States) [7226-34]

SESSION 9

Room: **Marriott Hotel, San Jose Ballroom Salon II** Tues. 5:00 to 6:00 pm

Interferometric Application of Slow and Fast Light

Session Chair: **Jacob B. Khurgin**, The Johns Hopkins Univ.

5:00 pm: **Applications of slow light for interferometry** (*Invited Paper*), Robert W. Boyd, George M. Gehring, Andreas Liapis, Aaron Schweinsberg, Zhimin Shi, Joseph E. Vornehm, Univ. of Rochester (United States) . . [7226-35]

5:30 pm: **A superluminal ring laser as a versatile hypersensitive sensor** (*Invited Paper*), Mary Salit, Northwestern Univ. (United States); Honam Yum, Texas A&M Univ. (United States); Selim M. Shahriar, Northwestern Univ. (United States) [7226-36]

Conference 7227 · Convention Center Room B4

Wednesday-Thursday 28-29 January 2009 • Proceedings of SPIE Vol. 7227

Complex Light and Optical Forces III

Conference Chair: **Enrique J. Galvez**, Colgate Univ.

Conference Co-Chairs: **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Jesper Glückstad**, Danmarks Tekniske Univ. (Denmark)

Program Committee: **Nicholas P. Bigelow**, Univ. of Rochester; **Shu-Chun Chu**, National Cheng Kung Univ. (Taiwan); **Kishan Dholakia**, Univ. of St. Andrews (United Kingdom); **Wolfgang A. Ertmer**, Univ. Hannover (Germany); **Jean-Marc R. Fournier**, École Polytechnique Fédérale de Lausanne (Switzerland); **David G. Grier**, New York Univ.; **Gerard Nienhuis**, Univ. Leiden (Netherlands); **Miles J. Padgett**, Univ. of Glasgow (United Kingdom); **Halina H. Rubinsztein-Dunlop**, The Univ. of Queensland (Australia); **Grover A. Swartzlander, Jr.**, College of Optical Sciences/The Univ. of Arizona; **Juan P. Torres**, Institut de Ciències Fotòniques (Spain); **Ewan M. Wright**, College of Optical Sciences/The Univ. of Arizona

Wednesday 28 January

SESSION 1

Room: Conv. Ctr. Room B4 Wed. 1:30 to 3:10 pm

Complex Light Generation

Session Chair: **Enrique J. Galvez**, Colgate Univ.

1:30 pm: **Dynamic shaping of complex light fields with cascaded phase diffractive patterns** (*Invited Paper*), Monika A. Ritsch-Martel, Innsbruck Medical Univ. (Austria) [7227-01]

2:10 pm: **Optical vortex generation with vectograph technology**, Grover A. Swartzlander, Jr., Arvind S. Marathay, Jennifer M. Harwell, College of Optical Sciences/The Univ. of Arizona (United States); Jason Figueiredo, Rowland Institute for Science Inc. (United States); Joshua A. Gordon, College of Optical Sciences/The Univ. of Arizona (United States) [7227-02]

2:30 pm: **Cylindrical vector beam generation from spun fiber**, Henry I. Sztul, Giovanni Millone, Robert R. Alfano, City College/CUNY (United States); Daniel A. Nolan, Xi Chen, Joohyun Koh, Corning Inc. (United States) [7227-03]

2:50 pm: **Photonic Stern-Gerlach filter**, Todor K. Kalkandjiev, Maria A. Bursukova, Conerefringent optics SL (Spain) [7227-04]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Room: Conv. Ctr. Room B4 Wed. 3:40 to 4:20 pm

Biological Applications of Optical Tweezers

Session Chair: **Jesper Glückstad**, Danmarks Tekniske Univ. (Denmark)

3:40 pm: **Effect of 1065-nm laser on the growth rate of Saccharomyces cerevisiae yeast cells** (*Invited Paper*), Thomas Aabo, Copenhagen Univ. (Denmark); Ivan R. Perch-Nielsen, Jeppe S. Dam, Darwin Z. Palima, Danmarks Tekniske Univ. (Denmark); Henrik Siegumfeldt, Copenhagen Univ. (Denmark); Jesper Glückstad, Danmarks Tekniske Univ. (Denmark); Nils Arneborg, Copenhagen Univ. (Denmark) [7227-05]

SESSION 3

Room: Conv. Ctr. Room B4 Wed. 4:20 to 5:40 pm

Beam Manipulation in Optical Tweezers

Session Chair: **Jesper Glückstad**, Danmarks Tekniske Univ. (Denmark)

4:20 pm: **Single and two photon holographic photolysis of caged neurotransmitter** (*Invited Paper*), Valentina Emiliani, René Descartes Univ. (France); Eirini I. Papagiakoumou, René Descartes Univ. (France) and INSERM (France); Christoph Lutz, René Descartes Univ. (France); Thomas S. Otis, David Geffen School of Medicine at UCLA (United States); Serge Charpak, David DiGregorio, René Descartes Univ. (France); Dan Oron, Weizmann Institute of Science (Israel) [7227-06]

5:00 pm: **Angular spectrum tailoring in solid immersion microscopy**, Stephen B. Ippolito, IBM Corp. (United States); Peilin Song, IBM Thomas J. Watson Research Ctr. (United States); Darrell L. Miles, John D. Sylvestri, IBM Corp. (United States) [7227-07]

5:20 pm: **High numerical aperture focusing of singular beams**, Alexander Normatov, Boris Spektor, Joseph Shamir, Technion-Israel Institute of Technology (Israel) [7227-08]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Forced generation of vortex array beams from a thin-slice solid-state laser with wide-aperture laser-diode pumping, Shu-Chun Chu, National Cheng Kung Univ. (Taiwan) [7227-20]

Spatial mode interference at the single-photon level, Enrique J. Galvez, Erik Johnson, Ben J. Reschovsky, Ashish Shah, Colgate Univ. (United States) [7227-21]

Thursday 29 January

SESSION 4

Room: Conv. Ctr. Room B4 Thurs. 8:30 to 9:50 am

Singular Optics and Optical Vortices

Session Chair: **Gerard Nienhuis**, Univ. Leiden (Netherlands)

8:30 am: **Chain topological reactions in developing random light fields** (*Invited Paper*), Marat S. Soskin, Vasilij I. Vasil'ev, Vladislav V. Ponevchinsky, Institute of Physics (Ukraine) [7227-09]

9:10 am: **Composite vortices formed by displaced Laguerre-Gauss beams**, Enrique J. Galvez, Daniel Kalb, Colgate Univ. (United States) [7227-10]

9:30 am: **Laguerre-Gauss shaped optical lattices generated in the reciprocal space using light beams with orbital angular momentum**, Willamys Soares, Dilson Pereira Caetano, Univ. Federal de Alagoas (Brazil); Sabino Chávez-Cerda, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Jandir M. Hickmann, Univ. Federal de Alagoas (Brazil) [7227-11]

Coffee Break 9:50 to 10:20 am

SESSION 5

Room: Conv. Ctr. Room B4 Thurs. 10:20 am to 12:00 pm

Optical Forces and Angular Momentum

Session Chair: **Grover A. Swartzlander, Jr.**, College of Optical Sciences, The Univ. of Arizona

10:20 am: **Vaterite twist-microrheology with AOM controlled optical tweezers**, Maren Funk, Timo A. Nieminen, Norman R. Heckenberg, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia) [7227-12]

10:40 am: **Optical forces arising from phase gradients**, David G. Grier, Yohai Roichman, Bo Sun, New York Univ. (United States); Sang-Hyuk Lee, Univ. of California, Berkeley (United States); Yael Roichman, Jesse Amato-Grill, New York Univ. (United States) [7227-13]

11:00 am: **Measuring the light's orbital angular momentum using diffraction**, Dilson Pereira Caetano, Willamys Soares, Eduardo J. S. Fonseca, Univ. Federal de Alagoas (Brazil); Sabino Chávez-Cerda, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Jandir M. Hickmann, Univ. Federal de Alagoas (Brazil) [7227-14]

11:20 am: **Momentum of optical airy beams**, Henry I. Sztul, Robert R. Alfano, City College/CUNY (United States) [7227-15]

11:40 am: **Stability properties of a rotating optical cavity**, Gerard Nienhuis, Steven J. M. Habraken, Univ. Leiden (Netherlands) [7227-16]

Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 6

Room: Conv. Ctr. Room B4 Thurs. 1:30 to 2:50 pm

Quantum Effects and Complex Light

Session Chair: **Halina H. Rubinsztein-Dunlop**, The Univ. of Queensland (Australia)

1:30 pm: **Angular diffraction** (*Invited Paper*), Sonja Franke-Arnold, Barry Jack, Jonathan Leach, Miles J. Padgett, Univ. of Glasgow (United Kingdom) [7227-17]

2:10 pm: **Spinning a spinor condensate**, Nicholas P. Bigelow, Kevin Wright, L. Suzanne Leslie, Azure Hansen, Univ. of Rochester (United States) [7227-18]

2:30 pm: **BEC experiments in micro-gravity environment**, Tim van Zoest, Leibniz Univ. Hannover (Germany) [7227-19]

OPTO

Conference 7228 · Marriott Hotel, San Jose Ballroom Salon I

Wednesday-Thursday 28-29 January 2009 • Proceedings of SPIE Vol. 7228

Laser Refrigeration of Solids II

Conference Chairs: **Richard I. Epstein**, Los Alamos National Lab.; **Mansoor Sheik-Bahae**, The Univ. of New Mexico

Program Committee: **Rolf H. Binder**, College of Optical Sciences/The Univ. of Arizona; **Zameer U. Hasan**, Temple Univ.; **Jacob B. Khurgin**, Johns Hopkins Univ.; **Yong-Hang Zhang**, Arizona State Univ.

Wednesday 28 January

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Fast differential luminescence thermometry, Denis V. Seletskiy, Michael P. Hasselbeck, Mansoor Sheik-Bahae, The Univ. of New Mexico (United States); Richard I. Epstein, Los Alamos National Lab. (United States) [7228-19]

Thursday 29 January

SESSION 1

Room: Marriott Hotel,
San Jose Ballroom Salon I Thurs. 8:00 to 10:00 am

Semiconductors for Laser Cooling I

Session Chair: **Kent L. Miller**, Air Force Office of Scientific Research

8:00 am: **Ultra-sensitive measurements of external quantum efficiency in semiconductor laser cooling** (*Invited Paper*), Michael P. Hasselbeck, Chengao Wang, Denis V. Seletskiy, Mansoor Sheik-Bahae, The Univ. of New Mexico (United States); Richard I. Epstein, Los Alamos National Lab. (United States) [7228-01]

8:25 am: **MBE growth and characterization of semiconductor laser coolers**, Andreas Stintz, The Univ. of New Mexico (United States); Richard I. Epstein, Los Alamos National Lab. (United States); Mansoor Sheik-Bahae, Kevin J. Malloy, Michael P. Hasselbeck, Chengao Wang, Seth D. Melgaard, The Univ. of New Mexico (United States) [7228-02]

8:45 am: **Band tail and laser cooling** (*Invited Paper*), Jacob B. Khurgin, The Johns Hopkins Univ. (United States) [7228-03]

9:10 am: **The role of spatial charge carrier separation on photo-luminescence and laser cooling in doped GaAs/GaN heterostructures** (*Invited Paper*), Greg Rupper, Nai-Hang Kwong, Rolf H. Binder, The Univ. of Arizona (United States) [7228-04]

9:35 am: **Quantum efficiency measurements using semiconductor lasers** (*Invited Paper*), Stephen J. Sweeney, Univ. of Surrey (United Kingdom) and Arizona State Univ. (United States) and Philipps-Univ. Marburg (Germany) [7228-05]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Marriott Hotel,
San Jose Ballroom Salon I Thurs. 10:30 am to 12:25 pm

Semiconductors for Laser Cooling II

Session Chair: **Rolf H. Binder**,
College of Optical Sciences/The Univ. of Arizona

10:30 am: **Anti-Stokes photoluminescence in GaN single crystals and heterostructures** (*Invited Paper*), Yujie J. Ding, Lehigh Univ. (United States) [7228-06]

10:55 am: **Latest progress in the study of electroluminescence refrigeration** (*Invited Paper*), Yong-Hang Zhang, Arizona State Univ. (United States) [7228-07]

11:20 am: **Nonradiative losses and cooling performance in semiconductor based luminescence refrigerators**, Shane R. Johnson, Rajesh Atluri, Ding Ding, Shui-Qing Yu, Yong-Hang Zhang, Arizona State Univ. (United States) [7228-08]

11:40 am: **Characterization of semiconductor laser cooling samples using near-field, far-field and atomic force microscopy**, Daniel A. Bender, Mansoor Sheik-Bahae, The Univ. of New Mexico (United States) [7228-09]

12:00 pm: **Photoluminescence upconversion in GaAs quantum wells** (*Invited Paper*), Soheyla Eshlaghi, Wieland A. Worthoff, Technische Univ. Dortmund (Germany); Andreas D. Wieck, Ruhr-Univ. Bochum (Germany); Dieter Suter, Technische Univ. Dortmund (Germany) [7228-10]

Lunch/Exhibition Break 12:25 to 1:55 pm

SESSION 3

Room: Marriott Hotel,
San Jose Ballroom Salon I Thurs. 1:55 to 3:20 pm

Optical Refrigeration in Rare-Earth Doped Materials I

Session Chair: **Zameer U. Hasan**, Temple Univ.

1:55 pm: **Synthesis and evaluation of ultra-pure rare-earth doped ZIBLAN glass for laser refrigeration** (*Invited Paper*), Wendy M. Patterson, The Univ. of New Mexico (United States); Markus P. Hehlen, Los Alamos National Lab. (United States); Mansoor Sheik-Bahae, The Univ. of New Mexico (United States); Richard I. Epstein, Los Alamos National Lab. (United States) [7228-11]

2:20 pm: **Fluorescence cooling and nonradiative losses in erbium-doped optical materials in the 1.5 micron spectral region**, Nicholas J. Condon, Steven R. Bowman, Shawn O'Connor, Naval Research Lab. (United States); Carl E. Mungan, U.S. Naval Academy (United States); Richard S. Quimby, Worcester Polytechnic Institute (United States); Michael J. Myers, Kigre, Inc. (United States); John Vetrovec, Aqwest (United States) [7228-12]

2:40 pm: **Novel materials for laser refrigeration**, Markus P. Hehlen, Los Alamos National Lab. (United States) [7228-13]

3:00 pm: **Recent progress in laser cooling via resonant cavity**, Denis V. Seletskiy, Seth D. Melgaard, Michael P. Hasselbeck, Mansoor Sheik-Bahae, The Univ. of New Mexico (United States); Richard I. Epstein, Los Alamos National Lab. (United States); Stefano Bigotta, Mauro Tonelli, Univ. di Pisa (Italy) [7228-14]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Marriott Hotel,
San Jose Ballroom Salon I Thurs. 3:50 to 5:30 pm

Optical Refrigeration in Rare-Earth Doped Materials II

Session Chair: **Markus P. Hehlen**, Los Alamos National Lab.

3:50 pm: **High purity fluoride glass synthesis: a review** (*Invited Paper*), Mohammed Saad, IRphotonics Inc. (Canada) [7228-15]

4:15 pm: **Laser refrigeration in erbium-based solid state materials** (*Invited Paper*), Zameer U. Hasan, Temple Univ. (United States) [7228-16]

4:40 pm: **Rare-earth-doped photonic crystals for the development of solid-state optical cryocoolers** (*Invited Paper*), Angel J. Garcia-Adeva, Rolindes Balda, Joaquín M. Fernández, Univ. del País Vasco (Spain) [7228-17]

5:05 pm: **Optimisation of tapered fiber sample for laser cooling of solids** (*Invited Paper*), Galina Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [7228-18]

Vertical-Cavity Surface-Emitting Lasers XIII

Conference Chairs: **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign; **Chun Lei**, Emcore Corp.

Program Committee: **Kent M. Geib**, Sandia National Labs.; **Martin Grabherr**, ULM Photonics GmbH (Germany); **Luke A. Graham**, JDSU; **James K. Guenter**, Finisar Corp.; **Jeong-Ki Hwang**, Avago Technologies Ltd.; **Kevin L. Lear**, Colorado State Univ.; **Duane A. Louderback**, OptiComp Corp.; **Krassimir Panajotov**, Vrije Univ. Brussel (Belgium); **Jean-Francois Seurin**, Princeton Optronics, Inc.; **Renaud Stevens**, Commissariat à l'Energie Atomique (France); **Noriyuki Yokouchi**, The Furukawa Electric Co., Ltd. (Japan)

Wednesday 28 January

SESSION 1

Room: Conv. Ctr. Room B2 Wed. 8:00 to 10:00 am

Advancing VCSEL Performance

Session Chair: **Chun Lei**, EMCORE Corp.

8:00 am: **Highly reliable high speed 1.1µm-InGaAs/GaAsP VCSELs** (*Invited Paper*), Hiroshi Hatakeyama, Takeshi Akagawa, Kimiyoshi Fukatsu, Naofumi Suzuki, Keiichi Tokutome, Takayoshi Anan, Masayoshi Tsuji, NEC Corp. (Japan) [7229-01]

8:30 am: **Progress in high-power high-efficiency VCSEL arrays** (*Invited Paper*), Jean-Francois Seurin, Guoyang Xu, Viktor Khalfin, Alexander Miglo, James D. Wynn, Prachi Pradhan, Chuni Ghosh, Arthur D'Asaro, Princeton Optronics, Inc. (United States) [7229-02]

9:00 am: **850nm oxide VCSEL capacitance optimization through leakage current reduction** (*Invited Paper*), Chen Ji, Jeong-Ki Hwang, Avago Technologies, Ltd. (United States); Gim Hong Koh, Avago Technologies Singapore (Singapore); Laura Giovane, Avago Technologies, Ltd. (United States) [7229-03]

9:30 am: **More VCSELs at Finisar** (*Invited Paper*), James K. Guenter, Robert A. Hawthorne III, Bobby Hawkins, Ralph H. Johnson, Gary Landry, Kent Wade, Finisar Corp. (United States) [7229-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room B2 Wed. 10:30 am to 12:20 pm

Emerging VCSEL Applications

Session Chair: **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign

10:30 am: **Optical sub-assembly solution for single fiber optical HDMI connector** (*Invited Paper*), S. C. Liu, J. J. Liu, W. P. Chen, C. Z. Wu, Jin-Shan Pan, TrueLight Corp. (Taiwan) [7229-05]

11:00 am: **Narrow linewidth VCSELs for high-resolution spectroscopy** (*Invited Paper*), Darwin K. Serkland, Gordon A. Keeler, Kent M. Geib, Gregory M. Peake, Sandia National Labs. (United States) [7229-06]

11:30 am: **VCSEL-based optical trapping for microparticle manipulation** (*Invited Paper*), Rainer Michalzik, Andrea Kroner, Fernando Rinaldi, Univ. Ulm (Germany) [7229-07]

12:00 pm: **Vertical cavity surface emitting lasers for optical sensing**, Ansas M. Kasten, Antonios Giannopoulos, Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (United States) [7229-08]

Lunch/Exhibition Break 12:20 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room B2 Wed. 1:30 to 3:30 pm

VCSEL Wavelengths

Session Chair: **Krassimir Panajotov**, Vrije Univ. Brussel (Belgium)

1:30 pm: **Modal and thermal characteristics of 670nm VCSELs** (*Invited Paper*), Mary K. Hibbs-Brenner, Klein Johnson, Ray Johnson, Vixar (United States) [7229-09]

2:00 pm: **New developments in 850nm and 1300nm VCSELs at JDSU** (*Invited Paper*), Luke A. Graham, Melinda Schnoes, Kevin D. Maranowski, Thomas R. Fanning, Max V. Crom, Stewart A. Feld, Matthew Gray, Ben Gable, Gayle Schomberger, JDSU (United States) [7229-10]

2:30 pm: **120°C 20 Gbit/s operation of 980nm VCSEL based on sub-monolayer growth** (*Invited Paper*), Friedhelm Hopfer, Alex Mutig, Gerrit Fiol, Phillip Moser, Dejan Arsenijevic, Technische Univ. Berlin (Germany); Vitaly A. Shchukin, Nikolay N. Ledentsov, Technische Univ. Berlin (Germany) and VI Systems GmbH (Germany); Sergey S. Mikhrin, Igor L. Krestnikov, Daniil A. Livshits, Innolume GmbH (Germany); Alexey R. Kovsh, Innolume Inc. (Germany); Matthias Kuntz, Technische Univ. Berlin (Germany) and Univ. of California, Berkeley (United States); Dieter Bimberg, Technische Univ. Berlin (Germany) [7229-11]

3:00 pm: **An efficient electro-thermo-optical model for vectorial and 3D VCSEL simulations** (*Invited Paper*), Pierluigi Debernardi, Politecnico di Torino (Italy) [7229-12]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: Conv. Ctr. Room B2 Wed. 4:00 to 5:50 pm

Novel VCSEL Structures

Session Chair: **Kent M. Geib**, Sandia National Labs.

4:00 pm: **Integrated photodiodes complement the VCSEL platform**, Martin Grabherr, Philipp Gerlach, Roger King, Michael Riedl, Roland Jaeger, ULM Photonics GmbH (Germany) [7229-13]

4:20 pm: **Recent advances in modeling of photonic-crystal vertical cavity surface emitting lasers** (*Invited Paper*), Krassimir Panajotov, Vrije Univ. Brussel (Belgium); Maciej Dems, Tomasz Czynszanowski, Politechnika Łódzka (Poland); Hugo Thienpont, Vrije Univ. Brussel (Belgium) [7229-14]

4:50 pm: **Tapered hollow waveguide multiplexer for multi-wavelength VCSEL array**, Akihiro Imamura, Fumio Koyama, Tokyo Institute of Technology (Japan) [7229-15]

5:10 pm: **Beam forming in nano-apertured VCSELs**, Joshua Sulkin, Chen Chen, Placid Ferreira, Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (United States) [7229-16]

5:30 pm: **Optical coupling for VCSEL slow light waveguides using micro-corner mirror**, Takayoshi Fujisawa, Ayumi Fuchida, Fumio Koyama, Tokyo Institute of Technology (Japan) [7229-17]

OPTO

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Design rules of high reflectivity Bragg GaIN mirrors for 300nm VCSELs, Claire Alhenc-Gelas, Paul Heroin, Supélec (France); Joel Jacquet, Supélec (France) and CNRS (France) and Univ. Paul Verlaine Metz (France); Mohamed Abid, Abdallah Ougazzaden, Georgia Tech Lorraine (France) and CNRS (France) [7229-22]

High spectral purity optoelectronic oscillator using a 1.55 μ m VCSEL for embedded systems applications, Ahmad A. Hayat, Margarita Varon, Institut Supérieur de l'Aéronautique et de l'Espace (France); Alexandre Bacou, Angélique Rissons, Jean-Claude Mollier, Ecole Nationale Supérieure de l'Aéronautique et de l'Espace (France) [7229-23]

Signal structure and sensitive detection of molecular species: optimal experimental techniques in wavelength modulation spectroscopy (*Invited Paper*), Mohammad A. Khan, Karan D. Mohan, Amin N. Dharamsi, Old Dominion Univ. (United States) [7229-24]

Thursday 29 January

SESSION 5

Room: Conv. Ctr. Room B2 Thurs. 8:30 to 10:00 am

Modulation and Short Pulse

Session Chair: James K. Guenter, Finisar Corp.

8:30 am: **Physics of scaling in vertical-cavity surface-emitting lasers** (*Invited Paper*), Dennis G. Deppe, S. Freisem, Abdullah Demir, G. Ozgur, College of Optics & Photonics/Univ. of Central Florida (United States). [7229-18]

9:00 am: **VCSEL with intracavity modulator: fast modulation options,** Michael Yakimov, Vadim E. Tokranov, Artem Sergeev, Serge Oktyabrsky, Univ. at Albany (United States). [7229-19]

9:20 am: **0.76GHz sub-picosecond mode-locked ring VCSEL,** Tomasz J. Ochalski, Aoife de Burca, Guillaume Huyet, Tyndall National Institute (Ireland); Agata Jasik, Jan Muszalski, Maciej Bugajski, Instytut Technologii Elektronowej (Poland) [7229-20]

9:40 am: **Low phase-noise oscillator using a long-wavelength single-mode optically injection-locked VCSEL,** Ahmad A. Hayat, Margarita Varon, Institut Supérieur de l'Aéronautique et de l'Espace (France); Alexandre Bacou, Angélique Rissons, Jean-Claude Mollier, Ecole Nationale Supérieure de l'Aéronautique et de l'Espace (France); Vladimir Iakovlev, Alexei Syrbu, Beam Express S.A. (Switzerland); Eli E. Kapon, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and Beam Express S.A. (Switzerland). [7229-21]

Novel In-Plane Semiconductor Lasers VIII

Conference Chairs: **Alexey A. Belyanin**, Texas A&M Univ.; **Peter M. Smowton**, Cardiff Univ. (United Kingdom)

Program Committee: **Martin Achtenhagen**, Photodigm, Inc.; **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan); **Dan Botez**, Univ. of Wisconsin/Madison; **David Bour**, Palo Alto Research Ctr., Inc.; **Federico Capasso**, Harvard Univ.; **Gary A. Evans**, Southern Methodist Univ.; **Claire F. Gmachl**, Princeton Univ.; **Michael Kneissl**, Technische Univ. Berlin (Germany); **Hui Chun Liu**, National Research Council Canada (Canada); **Luke J. Mawst**, Univ. of Wisconsin/Madison; **Jerry R. Meyer**, Naval Research Lab.; **Jesper Mørk**, Danmarks Tekniske Univ. (Denmark); **Mario J. Paniccia**, Intel Corp.; **Richard V. Penty**, Univ. of Cambridge (United Kingdom); **Johann Peter Reithmaier**, Univ. Kassel (Germany); **Nelson Tansu**, Lehigh Univ.

Monday 26 January

SESSION 1

Room: Conv. Ctr. Room C2 Mon. 8:00 to 10:00 am

Novel Materials I

Session Chair: **Nelson Tansu**, Lehigh Univ.

8:00 am: **High speed semiconductor nano-structure optical amplifiers** (*Invited Paper*), Gadi Eisenstein, Technion-Israel Institute of Technology (Israel) [7230-01]

8:30 am: **Metamorphic telecom lasers on GaAs**, Ivar Tångring, Yu-Xin Song, Chalmers Tekniska Högskola (Sweden); Dong-Hai Wu, Zhi-Chuan Niu, Institute of Semiconductors (China); Shu-Min Wang, Anders Larsson, Chalmers Tekniska Högskola (Sweden) [7230-02]

8:45 am: **TM lasing with InAs quantum rods**, Lianhe Li, Philipp Ridha, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Meletios Mexis, Peter M. Smowton, Cardiff Univ. (United Kingdom); Gilles Patriarche, Ctr. National de la Recherche Scientifique (France); Janusz Andrzejewski, Grzegorz Sek, Jan Misiewicz, Politechnika Wroclawska (Poland); Murat Bozkurt, Paul M. Koenraad, Andrea Fiore, Technische Univ. Eindhoven (Netherlands) [7230-03]

9:00 am: **The persistence of Auger recombination in InAs/GaAs quantum dot lasers**, Stephen J. Sweeney, Alfred R. Adams, Igor P. Marko, Nicolas F. Masse, Aleksey D. Andreev, Univ. of Surrey (United Kingdom); Mark T. Crowley, Eoin P. O'Reilly, Tyndall National Institute (Ireland) [7230-04]

9:15 am: **Dilute nitride-antimonide long wavelength lasers** (*Invited Paper*), James S. Harris, Jr., Stanford Univ. (United States) [7230-05]

9:45 am: **The physics of dilute nitride-phosphide based QW lasers**, Stephen J. Sweeney, James Chamings, Sucheta Ahmed, Alfred R. Adams, Univ. of Surrey (United Kingdom); Bernardette Kunert, Kerstin Volz, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [7230-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Room: Conv. Ctr. Room C2 Mon. 10:30 am to 12:30 pm

Novel Materials II

Session Chair: **Richard V. Penty**, Univ. of Cambridge (United Kingdom)

10:30 am: **Manipulation of photons from quantum dots embedded in 2D and 3D photonic crystal nanocavity** (*Invited Paper*), Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [7230-07]

11:00 am: **Optical injection of single-mode quantum-dot laser**, Stephen P. Hegarty, David Goulding, Bryan Kelleher, Guillaume Huyet, Tyndall National Institute (Ireland); Marc O. Fischer, Florian Gerschuetz, Johannes Koetz, Nanoplus GmbH (Germany); Alexey R. Kovsh, Igor L. Krestnikov, Innolume GmbH (Germany) [7230-08]

11:15 am: **Self pulsing quantum dot lasers for optical coherence tomography**, Haoling Liu, Peter M. Smowton, Huw D. Summers, Gareth T. Edwards, Wolfgang Drexler, Cardiff Univ. (United Kingdom) [7230-09]

11:30 am: **Coherence length characteristics from broadband semiconductor emitters: superluminescent diodes vs Broadband laser diodes**, Clara E. Dimas, Chee-Loon Tan, Yun-Hsiang Ding, Lehigh Univ. (United States); Hery S. Djie, JDSU (United States); Vitchanetra Hongpinyo, Boon-Siew Ooi, Lehigh Univ. (United States) [7230-10]

11:45 am: **Multi-contact quantum dot superluminescent diodes for optical coherence tomography applications**, Richard A. Hogg, Purnima Judson, David Childs, Kristian M. Groom, Mark Hopkinson, Nikola Krstajic, Rod H. Smallwood, The Univ. of Sheffield (United Kingdom) [7230-11]

12:00 pm: **Recent advances in quantum dot based mode locked lasers** (*Invited Paper*), Ramdane Abderrahim, Ctr. National de la Recherche Scientifique (France) [7230-12]

Lunch Break 12:30 to 1:50 pm

SESSION 3

Room: Conv. Ctr. Room C2 Mon. 1:50 to 3:20 pm

Nitrides

Session Chair: **David Bour**, Palo Alto Research Center, Inc.

1:50 pm: **Ultraviolet laser diodes on AlN and sapphire substrates** (*Invited Paper*), Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7230-13]

2:20 pm: **Impact of filamentation on the far-field of high power broad ridge (Al,In)GaAs laser diodes**, Harald Braun, Stephan Rogowsky, Ulrich T. Schwarz, Univ. Regensburg (Germany); Stefanie Brüninghoff, Alfred Lell, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) [7230-14]

2:35 pm: **Design analysis of staggered InGaAs quantum wells for green diode lasers**, Hongping Zhao, Ronald A. Arif, Nelson Tansu, Lehigh Univ. (United States) [7230-15]

2:50 pm: **Progress in the growth, characterization and device performance for nonpolar and semipolar GaN-based materials** (*Invited Paper*), James S. Speck, Univ. of California, Santa Barbara (United States) [7230-16]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Room: Conv. Ctr. Room C2 Mon. 3:50 to 5:05 pm

Ring Lasers and Integration

Session Chair: **Johann Peter Reithmaier**, Univ. Kassel (Germany)

3:50 pm: **Semiconductor micro-ring and micro-disk lasers for all-optical switching** (*Invited Paper*), Marc Sorel, Gabor Mezosi, Michael Strain, Univ. of Glasgow (United Kingdom) [7230-17]

4:20 pm: **Loss characterization of high-index-contrast ridge waveguide oxide-confined InAlGaAs quantum well racetrack ring-resonator lasers**, Jusong Wang, Wangqing Yuan, Christopher S. Seibert, Douglas C. Hall, Univ. of Notre Dame (United States) [7230-18]

4:35 pm: **Tunable ring resonator based silicon Raman laser** (*Invited Paper*), Haisheng Rong, Intel Corp. (United States); Omri Raday, Intel Corp. (Israel); Jonathan K. Doyle, Intel Corp. (United States); Oded Cohen, Intel Corp. (Israel); Mindy R. Lee, Shengbo Xu, Walid Mathlouthi, Vanessa Sih, Mario J. Paniccia, Intel Corp. (United States) [7230-19]

Tuesday 27 January

OPTO PLENARY SESSION

Room: **Montgomery Theater** Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break 10:00 to 10:30 am

SESSION 5

Room: **Conv. Ctr. Room C2** Tues. 10:30 am to 12:10 pm

Integration and Devices for Comms

Session Chair: **Gadi Eisenstein**, Technion-Israel Institute of Technology (Israel)

10:30 am: **InP integrated photonic devices based on semiconductor laser technologies** (*Invited Paper*), Yoshiaki Nakano, The Univ. of Tokyo (Japan) [7230-20]

11:00 am: **A single comb laser source for short reach WDM interconnects**, Gregory L. Wojcik, Dongliang Yin, Alexey R. Kovsh, Innolume Inc. (United States); Alexey E. Gubenko, Igor L. Krestnikov, Sergey S. Mikhlin, Daniil A. Livshits, Innolume GmbH (Germany); David A. Fattal, Marco Fiorentino, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States) [7230-21]

11:20 am: **Discrete mode lasers for communications applications** (*Invited Paper*), Liam P. Barry, Aleksandra M. Kaszubowska, Dublin City Univ. (Ireland); Chris Herbert, James O'Gorman, Dewi Jones, Brian Kelly, Richard Phelan, John O'Carroll, Eblana Photonics Ltd. (Ireland); Prince M. Anandarajah, Philip Perry, Dublin City Univ. (Ireland) [7230-22]

11:50 am: **Multi-purpose InGaAsP buried heterostructure laser diodes for uncooled digital, analog, and wireless applications grown by molecular beam epitaxy and metal-organic chemical-vapor deposition**, Gregory W. Pickrell, Huanlin Zhang, Hong-Wen Ren, Dongxu Zhang, Qizhen Xue, Jae-Yoon Um, Hung-Cheng Lin, Alex Anselm, Toshi Makino, Wen-Yen Hwang, Applied Optoelectronics Inc. (United States) [7230-23]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Room: **Conv. Ctr. Room C2** Tues. 1:30 to 3:30 pm

Mid-IR Lasers

Session Chair: **Alexey A. Belyanin**, Texas A&M Univ.

1:30 pm: **Development of the GaSb-based laser diodes operating within spectral range above 2 μm** (*Invited Paper*), Gregory L. Belenky, Gela Kipshidze, Leon Shterengas, Dmitri Donetski, Takashi Hosoda, Sergey D. Suchalkin, Stony Brook Univ. (United States) [7230-24]

2:00 pm: **Beam shaping of semiconductor lasers using plasmonics** (*Invited Paper*), Federico Capasso, Nanfang Yu, Jonathan Fan, Qi Jie Wang, Christian J. Pflügl, Laurent Diehl, Harvard Univ. (United States); Tadataka Edamura, Masamichi Yamanishi, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan) [7230-39]

2:30 pm: **High-performance interband cascade lasers emitting in the 2.9-4.2 μm wavelength range**, J. Ryan Lindle, Chul Soo Kim, Mijin Kim, William W. Bewley, Chadwick L. Canedy, Igor Vurgaftman, Jerry R. Meyer, Naval Research Lab. (United States) [7230-26]

2:50 pm: **Recent progress in interband cascade lasers**, Rui Q. Yang, Zhaobing Tian, Robert Hinkey, Fanghai Zhao, Univ. of Oklahoma (United States); Kamjou Mansour, Cory J. Hill, Jet Propulsion Lab. (United States) [7230-27]

3:10 pm: **Rapid and minimally invasive quantum cascade wafer testing**, Ekua N. Bentil, Fatima Toor, Anthony J. Hoffman, Matthew D. Escarra, Claire F. Gmachl, Princeton Univ. (United States) [7230-28]

Coffee Break 3:30 to 4:00 pm

SESSION 7

Room: **Conv. Ctr. Room C2** Tues. 4:00 to 6:00 pm

Silicon Photonics

Joint session with conference 7220: Silicon Photonics

4:00 pm: **Grating based hybrid silicon lasers** (*Invited Paper*), Richard Jones, Brian Koch, Matthew N. Sysak, Intel Corp. (United States); Omri Raday, Intel Corp. (Israel); Alexander W. Fang, Erica Lively, Di Liang, Ying-hao Kuo, John E. Bowers, Univ. of California, Santa Barbara (United States) [7230-29]

4:30 pm: **Lasing of lattice-matched Ga(NAsP) quantum well heterostructures monolithically integrated on (001) Si substrate** (*Invited Paper*), Bernardette Kunert, NAsP III/V GmbH (Germany); Steffen Zinnkann, Igor Németh, Gleb Lukin, Rafael Fritz, Kerstin Volz, Wolfgang Stolz, Christoph Lange, Nico S. Koester, Daniel J. Franzbach, Sangam Chatterjee, Wolfgang W. Rühle, Philipps-Univ. Marburg (Germany); Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) [7220-26]

5:00 pm: **Self-assembled InGaAs/GaAs quantum dot microtube coherent light sources on GaAs and Si** (*Invited Paper*), Zetian Mi, Vicknesh Sahnuganathan, McGill Univ. (Canada); Pallab K. Bhattacharya, Univ. of Michigan (United States) [7220-27]

5:30 pm: **Cascaded Raman lasing in silicon** (*Invited Paper*), Haisheng Rong, Shengbo Xu, Intel Corp. (United States); Oded Cohen, Omri Raday, Intel Corp. (Israel); Mindy R. Lee, Vanessa Sih, Mario J. Paniccia, Intel Corp. (United States) [7220-28]

Wednesday 28 January

SESSION 8

Room: **Conv. Ctr. Room C2** Wed. 8:00 to 10:00 am

COMD

Session Chair: **Gary A. Evans**, Photodigm, Inc.

8:00 am: **New approaches towards the understanding of the catastrophic optical damage process in in-plane diode lasers** (*Invited Paper*), Jens W. Tomm, Mathias Ziegler, Vadim Talalaev, Clemens Matthiesen, Thomas Elsaesser, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Marwan Bou Sanayeh, Peter Brick, Martin Reufer, OSRAM Opto Semiconductors GmbH (Germany); Peter Ressel, Bernd Sumpf, Götz Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7230-30]

8:30 am: **Bulk temperature mapping of broad area quantum dot lasers: modeling and micro-thermographic analysis**, Jayanta Mukherjee, Tyndall National Institute (Ireland); Mathias Ziegler, Julien LeClech, Jens W. Tomm, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Brian Corbett, John G. McInerney, Tyndall National Institute (Ireland); Johann P. Reithmaier, Univ. Kassel (Germany); Stefan Deubert, Alfred W. B. Forchel, Univ. Würzburg (Germany) [7230-31]

8:50 am: **Higher power density limit at COMD in GaInP/AlGaInP in quantum dots than in wells**, Stella N. Elliott, Peter M. Smowton, Gareth T. Edwards, Cardiff Univ. (United Kingdom); Andrey Krysa, The Univ. of Sheffield (United Kingdom); Graham M. Berry, IQE plc (United Kingdom) [7230-32]

9:10 am: **Degradation processes in high-power multi-mode InGaAs strained quantum well lasers**, Yongkun Sin, Nathan Presser, Brendan Foran, Steven C. Moss, The Aerospace Corp. (United States) [7230-33]

9:30 am: **Real-time microscopic study of catastrophic optical degradation in laser devices** (*Invited Paper*), Kar-Seng Teng, Richard J. Cobley, Martyn R. Brown, Steve P. Wilks, Swansea Univ. (United Kingdom) [7230-34]

Coffee Break 10:00 to 10:30 am

SESSION 9

Room: Conv. Ctr. Room C2 Wed. 10:30 am to 12:10 pm

Quantum Cascade Lasers I

Session Chair: W. Ted Masselink, Humboldt-Univ. zu Berlin (Germany)

- 10:30 am: **High power continuous-wave room temperature quantum cascade lasers** (*Invited Paper*), Christian J. Pflügl, Laurent Diehl, Qi Jie Wang, Federico Capasso, Harvard Univ. (United States); Arkadiy Lyakh, Richard Maulini, Alexei G. Tsekoun, Rowell Go, Pranalytica, Inc. (United States); Xiaojun Wang, Jenyu Fan, AdTech Optics, Inc. (United States); Tawee Tanbun-Ek, Multiplex, Inc. (United States); C. Kumar N. Patel, Pranalytica, Inc. (United States) [7230-35]
- 11:00 am: **High-power high-wall plug efficiency mid-infrared quantum cascade lasers based on InP/GaNAs/InAlAs material system** (*Invited Paper*), Manijeh Razeghi, Northwestern Univ. (United States) [7230-36]
- 11:30 am: **Voltage tunability of quantum cascade lasers**, Yu Yao, Zhijun Liu, Anthony J. Hoffman, Kale J. Franz, Claire F. Gmachl, Princeton Univ. (United States) [7230-46]
- 11:50 am: **Characteristics of deep-well 4.8 μ m—emitting quantum-cascade lasers grown by MOCVD**, Jae-Cheol Shin, Mithun D'Souza, Zhijun Liu, Univ. of Wisconsin, Madison (United States); Dapeng Xu, nLight Corp. (United States); Jeremy Kirch, Luke J. Mawst, Dan Botez, Univ. of Wisconsin, Madison (United States); Igor Vurgaftman, Jerry R. Meyer, Naval Research Lab. (United States) [7230-38]
- Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 10

Room: Conv. Ctr. Room C2 Wed. 1:40 to 3:20 pm

Quantum Cascade Lasers II

Session Chair: Rui Q. Yang, Univ. of Oklahoma

- 1:40 pm: **InP-based quantum-cascade lasers with emission wavelength 3—5 μ m** (*Invited Paper*), W. Ted Masselink, Mykhaylo P. Semtsiv, Martin Wienold, Mikaela Chashnikova, Humboldt-Univ. zu Berlin (Germany) . . [7230-25]
- 2:10 pm: **Coherence and beam shaping in quantum cascade lasers** (*Invited Paper*), Gottfried Strasser, Univ. at Buffalo (United States); Aaron M. Andrews, Daniela Andrijašević, Maximilian Austerer, Hermann Detz, Leonard K. Hoffmann, Pavel Klang, Elvis Mujagic, Michele Nobile, Stephan Schartner, Werner Schrenk, Technische Univ. Wien (Austria) [7230-40]
- 2:40 pm: **Quantum cascade lasers based on single phonon-continuum depopulation structures**, Kazuue Fujita, Tadataka Edamura, Naota Akikusa, Atsushi Sugiyama, Takahide Ochiai, Shinichi Furuta, Akio Ito, Masamichi Yamanishi, Hirofumi Kan, Hamamatsu Photonics K.K. (Japan) [7230-41]
- 3:00 pm: **Intracavity second harmonic generation in quantum cascade lasers in the telecommunication range**, Yong-Hee Cho, Alexey A. Belyanin, Texas A&M Univ. (United States) [7230-42]
- Coffee Break 3:20 to 3:50 pm

SESSION 11

Room: Conv. Ctr. Room C2 Wed. 3:50 to 5:20 pm

Quantum Cascade Laser Physics

Session Chair: Gregory L. Belenky, Stony Brook Univ.

- 3:50 pm: **Terahertz quantum-cascade lasers: phase resolved dynamics and micro cavity effects** (*Invited Paper*), Juraj Darmo, Gernot Fasching, Alexander Benz, Wolfgang Parz, Michael Martl, Daniel Dietze, Aaron M. Andrews, Gottfried Strasser, Karl Unterrainer, Technische Univ. Wien (Austria); Sefano Barbieri, Carlo Sirtori, Univ. Paris 7-Denis Diderot (France) [7230-43]
- 4:20 pm: **Predictive theory of current and optical gain in THz quantum cascade lasers** (*Invited Paper*), Tillmann Kubis, Peter Vogl, Technische Univ. München (Germany) [7230-44]
- 4:50 pm: **Simulation of gain in quantum cascade lasers** (*Invited Paper*), Andreas Wacker, Rikard Nelander, Carsten Weber, Lund Univ. (Sweden) [7230-45]

Thursday 29 January

SESSION 12

Room: Conv. Ctr. Room C2 Thurs. 8:00 to 10:00 am

High Power I

Session Chair: Luke J. Mawst, Univ. of Wisconsin, Madison

- 8:00 am: **External-to-cavity lateral modes harnessing devices for high-brightness broad-area laser diodes: concept, practical realizations and perspectives** (*Invited Paper*), Nikolai Stelmakh, The Univ. of Texas at Arlington (United States) [7230-47]
- 8:30 am: **High brightness surface-emitting distributed feedback (SE-DFB) laser** (*Invited Paper*), Manoj Kanskar, Delai Zhou, Jason Cai, Eric Stiers, Don Olson, Thomas Klos, Michael G. Martin, Steven H. Macomber, Alfalight, Inc. (United States) [7230-48]
- 9:00 am: **High-brightness tapered lasers with an Al-free active region at 1060 nm**, Nicolas Michel, Michel Calligaro, Michel Lecomte, Olivier Parillaud, Michel Krakowski, Thales Research & Technology (France); Helena Odriozola, Jose-Manuel Garcia-Tijero, Ignacio Esquivias, Univ. Politécnica de Madrid (Spain) [7230-49]
- 9:20 am: **12 W DBR tapered lasers emitting at 1060 nm with a narrow spectral line width and a nearly diffraction limited beam quality**, Bernd Sumpf, Karl-Heinz Hasler, Pawel Adamiec, Frank Bugge, Jörg Fricke, Peter Ressel, Hans Wenzel, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7230-50]
- 9:40 am: **High-power DBR laser diodes grown in a single epitaxial step**, Linglin Jiang, Martin Achtenhagen, Nuditha V. Amarasinghe, Gary A. Evans, Photodigm, Inc. (United States) [7230-51]
- Coffee Break 10:00 to 10:30 am

SESSION 13

Room: Conv. Ctr. Room C2 Thurs. 10:30 am to 12:40 pm

High Power II

Session Chair: Martin Achtenhagen, Photodigm, Inc.

- 10:30 am: **Coherent combination of slab-coupled optical waveguide lasers** (*Invited Paper*), Robin K. Huang, Bien Chann, Leo J. Missaggia, Michael K. Connors, George W. Turner, Antonio Sanchez-Rubio, Joseph P. Donnelly, MIT Lincoln Lab. (United States); John L. Hostetler, Carl Miester, Friedhelm Dorsch, TRUMPF Photonics (United States) [7230-52]
- 11:00 am: **High-power high-reliability and narrow linewidth Al-free DFB laser diode for Cs pumping (852nm)**, Charles Cayron, Vincent Ligeret, Patrick Resneau, Julien Nagle, Shailendra Bansropun, Michel Lecomte, Michel Calligaro, Olivier Parillaud, Michel Krakowski, Thales Research & Technology (France) [7230-53]
- 11:20 am: **High power DFB lasers for D1 and D2 rubidium absorption spectroscopy and atomic clocks**, Andreas Klehr, Hans Wenzel, Olaf Brox, Frank Bugge, Götz Erbert, Phuong Thanh Nguyen, Günther Tränkle, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany) [7230-54]
- 11:40 am: **Ultra-fine pitch individually addressable visible laser arrays for high speed digital printing applications**, Olek P. Kowalski, Stewart D. McDougall, Bocang Qiu, Graeme H. Masterton, Meg L. Armstrong, Stephen Robertson, Steven Caldecott, John H. Marsh, Intense Ltd. (United Kingdom) [7230-55]
- 12:00 pm: **Diode laser arrays for 1.8 to 2.3 μ m wavelength range**, Marc T. Kelemen, Jürgen Gilly, m2k-laser GmbH (Germany); Heiko Kissel, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany); Marcel Rattunde, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [7230-56]
- 12:20 pm: **Control of slow axis mode behaviour with Waveguide Phase Structures in Semiconductor Broad-Area Lasers**, Hans-Christoph Eckstein, Uwe D. Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Wolfgang Schmid, OSRAM Opto Semiconductors GmbH (Germany) [7230-61]
- Lunch/Exhibition Break 12:40 to 1:50 pm

OPTO

Conference 7230

SESSION 14

Room: Conv. Ctr. Room C2 Thurs. 1:50 to 3:30 pm

Mid-IR Applications

Session Chair: **Christian J. Pflügl**, Harvard Univ.

1:50 pm: **High performance results and applications of miniaturized external-cavity quantum cascade lasers** (*Invited Paper*), Timothy Day, Miles Weida, David Arnone, Michael Pushkarsky, Russ Pritchett, David Caffey, Daylight Solutions, Inc. (United States) [7230-57]

2:20 pm: **Resonant two-photon transitions, quadratic detection, and photocurrent autocorrelation using multiple quantum wells** (*Invited Paper*), Harald Schneider, Forschungszentrum Dresden-Rossendorf e. V. (Germany); Hui Chun Liu, National Research Council Canada (Canada); Stephan Winnerl, Oleksiy Drachenko, Manfred Helm, Forschungszentrum Dresden-Rossendorf e. V. (Germany); Martin Walther, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Jerome Faist, ETH Zürich (Switzerland) [7230-58]

2:50 pm: **Native-oxide-confined mid-IR quantum cascade lasers via non-selective oxygen-enhanced wet oxidation**, Christopher S. Seibert, Univ. of Notre Dame (United States); Mithun D'Souza, Jae-Cheol Shin, Luke J. Mawst, Dan Botez, Univ. of Wisconsin, Madison (United States); Douglas C. Hall, Univ. of Notre Dame (United States) [7230-59]

3:10 pm: **Effect of waveguide side-wall roughness on the threshold current density and slope efficiency of quantum cascade lasers**, Fatima Toor, Princeton Univ. (United States); Deborah L. Sivco, Alcatel-Lucent (United States); Claire F. Gmachl, Princeton Univ. (United States) [7230-60]

Conference 7231 · Tues-Wed.: Convention Center Room A5 Thurs.: Convention Center Room A1

Tuesday-Thursday 27-29 January 2009 • Proceedings of SPIE Vol. 7231

LEDs: Materials, Devices, and Applications for Solid State Lighting XIII

Conference Chairs: Klaus P. Streubel, OSRAM Opto Semiconductors GmbH (Germany); Heonsu Jeon, Seoul National Univ. (Korea, Republic of)

Conference Co-Chair: Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan)

Program Committee: Gerd Bacher, Univ. Duisburg-Essen (Germany); Michael Heuken, AIXTRON AG (Germany); Zhaoran Rena Huang, Rensselaer Polytechnic Institute; Satoshi Kamiyama, Meijo Univ. (Japan); Markus Klein, OSRAM Opto Semiconductors GmbH (Germany); Michael R. Krames, Philips Lumileds Lighting Co.; Kei May Lau, Hong Kong Univ. of Science and Technology (Hong Kong China); Kurt J. Linden, Spire Corp.; Hans Nikol, Philips Lighting B.V. (Netherlands); E. Fred Schubert, Rensselaer Polytechnic Institute; Jerry A. Simmons, Sandia National Labs.; Ross P. Stanley, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)

SPIE and the organizers gratefully acknowledge the following conference cosponsors:



Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

- 8:00 am: **Introduction and Opening Remarks**
 - 8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)
 - 8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)
 - 9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)
- See p. 26 for details.

Coffee Break 10:30 to 10:30 am

SESSION 1

Room: Conv. Ctr. Room A5 Tues. 10:30 am to 12:30 pm

LED Applications and SSL

Session Chair: Klaus P. Streubel, OSRAM Opto Semiconductors GmbH (Germany)

- 10:30 am: **Enabling solid state lighting** (*Invited Paper*), Mark McClear, Cree, Inc. (United States) [7231-01]
 - 11:00 am: **LEDs in general lighting: SSL at crossroads** (*Invited Paper*), Hans Nikol, Philips Lighting B.V. (Netherlands) [7231-02]
 - 11:30 am: **Overall LED developments with focus on InGaN-GaN epitaxy and LED performance** (*Invited Paper*), Ted Mihopoulos, Philips Lumileds Lighting Co. LLC (United States) [7231-03]
 - 12:00 pm: **New ways to make phosphor-converted LEDs** (*Invited Paper*), Gerd O. Mueller, Lumileds Lighting US LLC (United States) [7231-04]
- Lunch/Exhibition Break 12:30 to 1:40 am

SESSION 2

Room: Conv. Ctr. Room A5 Tues. 1:40 to 3:40 pm

LED Droop

Session Chair: E. Fred Schubert, Rensselaer Polytechnic Institute

- 1:40 pm: **InGaN IQE: the quest for the holy grail in solid state lighting** (*Invited Paper*), Matthias Sabathil, Ansgar Laubsch, Stefanie Brüninghoff, Martin Strassburg, Hans Lugauer, Norbert Linder, Klaus P. Streubel, OSRAM Opto Semiconductors GmbH (Germany); Joerg Hader, Jerome V. Moloney, College of Optical Sciences/The Univ. of Arizona (United States); Bernhard Pasenow, Stephan W. Koch, Philipps-Univ. Marburg (Germany) [7231-05]
 - 2:10 pm: **Efficiency droop behaviors of InGaN/GaN LEDs with various active-region structures** (*Invited Paper*), Yun-Li Li, National Taiwan Univ. (Taiwan) and Genesis Photonics Inc. (Taiwan); Yu-Hung Lai, Yi-Ru Huang, National Taiwan Univ. (Taiwan) [7231-06]
 - 2:40 pm: **Origin of efficiency droop in GaInN/GaN MQW LEDs and its possible solution** (*Invited Paper*), Min-Ho Kim, Rensselaer Polytechnic Institute (United States) and SAMSUNG Electro-Mechanics Co., Ltd. (Korea, Republic of); Won-Seok Lee, Zhu Di, Martin F. Schubert, Jong-Kyu Kim, E. Fred Schubert, Rensselaer Polytechnic Institute (United States); Cheolsoo Sone, Yongjo Park, SAMSUNG Electro-Mechanics Co., Ltd. (Korea, Republic of); Joachim Piprek, NUSOD Institute LLC (United States) [7231-07]
 - 3:10 pm: **Mechanisms limiting quantum efficiency in III-nitride LEDs** (*Invited Paper*), Nathan F. Gardner, Gerd O. Mueller, Aurelien David, Michael R. Krames, Lumileds Lighting US LLC (United States) [7231-08]
- Coffee Break 3:40 to 4:00 pm

SESSION 3

Room: Conv. Ctr. Room A5 Tues. 4:00 to 5:50 pm

LED Design and Fabrication I

Session Chair: Kei May Lau, Hong Kong Univ. of Science and Technology (Hong Kong, China)

- 4:00 pm: **Color-consistent LED modules for general lighting** (*Invited Paper*), Christoph Hoelen, Peter van der Burgt, Eric Kahlman, Matthijs H. Keuper, Egbert Lenderink, Philips Lighting B.V. (Netherlands); Kwong Man, Philips Lighting Co. (Canada); Claudia Mutter, Jan Willem ter Weeme, Philips Lighting B.V. (Netherlands) [7231-09]
- 4:30 pm: **L3D FELIX: an active static volumetric 3D-display using LEDs**, Thomas Stielow, Malte Beckmann, Lisa von Holten, Lena Reitmann, Daniel Kensik, Vincent Lubeck High School (Germany) [7231-10]
- 4:50 pm: **Beam-shaping properties of InGaN thin-film micro-cavity light-emitting diodes with photonic crystals**, Krister Bergeneck, OSRAM Opto Semiconductors GmbH (Germany) and Univ. of St. Andrews (United Kingdom); Christopher Wiesmann, Heribert Zull, Christian Rumbolz, Ralph Wirth, Norbert Linder, Klaus P. Streubel, OSRAM Opto Semiconductors GmbH (Germany); Thomas F. Krauss, Univ. of St. Andrews (United Kingdom) [7231-11]

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5:10 pm: **Enhanced efficiency and reduced spectral shift of green light-emitting-diode with prestrained growth**, Chih-Feng Lu, Chi-Feng Huang, Tzu-Chi Liu, Yen-Cheng Lu, Wen-Yu Shiao, Yung-Shen Chen, Jyun-Kai Wang, Chih-Chung Yang, National Taiwan Univ. (Taiwan).[7231-12]

5:30 pm: **Growths of staggered InGaN quantum wells light-emitting diodes at 470-480 nm employing graded temperature profile**, Hongping Zhao, Ronald A. Arif, Gen-Sheng Huang, Yik-Khoon Ee, Nelson Tansu, Lehigh Univ. (United States).[7231-13]

Wednesday 28 January

SESSION 4

Room: Conv. Ctr. Room A5 Wed. 8:00 to 10:20 am

UV LEDs

Session Chair: Gerd Bacher, Univ. Duisburg-Essen (Germany)

8:00 am: **III-nitride deep ultraviolet light sources (Invited Paper)**, Michael S. Shur, Rensselaer Polytechnic Institute (United States); Remis Gaska, Sensor Electronic Technology, Inc. (United States)[7231-14]

8:30 am: **MOVPE growth of UV-LEDs (Invited Paper)**, Markus Weyers, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany)[7231-15]

9:00 am: **Metal-doping effect on indium tin oxide thin films**, Yung Hsun Lin, National Central Univ. (Taiwan); Chengyi Liu, National Central Univ. (United States).[7231-16]

9:20 am: **Gd-doped AZO transparent conducting layer**, Chia Ying Wei, Chengyi Liu, Yung Hsun Lin, National Central Univ. (Taiwan).[7231-17]

9:40 am: **Effect of UV irradiation on the apoptosis and necrosis of Jurkat cells using UV LED**, Shunko A. Inada, Hiroshi Amano, Isamu Akasaki, Meijo Univ. (Japan); Akimichi Morita, Keiko Kobayashi, Nagoya City Univ. (Japan).[7231-18]

10:00 am: **Reduced non-thermal roll-over in violet-emitting GaInN wide-well LEDs grown on low-dislocation-density substrates**, Markus Maier, Thorsten Passow, Michael Kunzer, Shangjing Liu, Joachim Wiegert, Ralf Schmidt, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)[7231-56]

Coffee Break 10:20 to 10:40 am

SESSION 5

Room: Conv. Ctr. Room A5 Wed. 10:40 am to 12:10 pm

LED Manufacturing I

Session Chair: Michael Heuken, AIXTRON AG (Germany)

10:40 am: **Multi-wafer MOCVD production technology: challenges and recent progress (Invited Paper)**, Michael Heuken, AIXTRON AG (Germany); B. Dlugosh, Christof Sommerhalter, AIXTRON Inc. (United States); Ruediger Schreiner, Bernd Schineller, AIXTRON AG (Germany)[7231-19]

11:10 am: **Towards process control of nitride LED structures by X-ray scattering methods (Invited Paper)**, Joachim F. Woitok, PANalytical B.V. (Netherlands)[7231-20]

11:40 am: **Optical in-situ sensors for MOCVD production monitoring: recent progress (Invited Paper)**, Kolja Haberland, Marta Borasio, LayTec GmbH (Germany)[7231-21]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 6

Room: Conv. Ctr. Room A5 Wed. 1:40 to 3:40 pm

LED Manufacturing II

Session Chair: Ross P. Stanley, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)

1:40 pm: **Decay of lumen and chromaticity of high-power phosphor-converted white-light-emitting diodes in thermal aging (Invited Paper)**, Jimmy Wang, Wood-Hi Cheng, National Sun Yat-Sen Univ. (Taiwan); Yi-Cheng Hsu, National Pingtung Univ. of Science and Technology (Taiwan); Chun-Chin Tsai, National Sun Yat-Sen Univ. (Taiwan)[7231-23]

2:10 pm: **Photoluminescence mapping as a tool to improve LED production (Invited Paper)**, Zhiqiang Li, Tom Ryan, Nanometrics (United States).[7231-24]

2:40 pm: **High-performance heat sink for solid-state lighting**, John Vetrovec, Aqwest (United States)[7231-25]

3:00 pm: **Size effect of hexagonal pyramids on light extraction efficiency of thin-GaN flip-chip LED**, You Hsien Chang, Chengyi Liu, National Central Univ. (Taiwan); Philip C. Chan, The Hong Kong Univ. of Science and Technology (Hong Kong, China); David G. W. Xiao, Hing Lai, Advanced Packaging Technology Ltd. (Hong Kong, China)[7231-26]

3:20 pm: **the low temperature wafer bonding of Sn-Ag**, Ming Chung Kuo, Chengyi Liu, National Central Univ. (Taiwan)[7231-27]

Coffee Break 3:40 to 4:00 pm

SESSION 7

Room: Conv. Ctr. Room A5 Wed. 4:00 to 5:30 pm

LED Design and Fabrication II

Session Chair: Heonsu Jeon, Seoul National Univ. (Korea, Republic of)

4:00 pm: **Phosphor-free white LED with MQWs in parallel connection (Invited Paper)**, Seong-Ju Park, Il-Kyu Park, Chu-Young Cho, Gwangju Institute of Science and Technology (Korea, Republic of)[7231-28]

4:30 pm: **Enhancement of light extraction efficiency of InGaN quantum wells light-emitting diodes with polydimethylsiloxane concave microstructures**, Yik-Khoon Ee, Pisisit Kumnorkaew, Ronald A. Arif, Hua Tong, James F. Gilchrist, Nelson Tansu, Lehigh Univ. (United States)[7231-30]

4:50 pm: **A 4.26µm RCLED and a fast low-power CO₂ sensor**, Audrey Nelson, General Electric Co. (United States)[7231-31]

5:10 pm: **Electrical and optical characteristics of green light-emitting diodes grown on bulk GaN substrates**, Yi Yang, Xian An Cao, West Virginia Univ. (United States)[7231-32]

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Stray light rejection techniques for LED measurements using CCD based spectrometers, Joe W. Jablonski, SphereOptics, LLC (United States).[7231-51]

Simulator for assessing the long-term performance of polychromatic LED light sources, Miran Bürmen, Franjo Pernu, Bo_tjan Likar, Univ. v Ljubljani (Slovenia).[7231-52]

Synthesis and photoluminescence of Y₂BaZnO₅: Eu₃₊, A⁺ (A = K, Na, Li) with alkali carbonate, Yun-Fang Wu, Kuan-Lin Liou, Yung-Tang Nien, In-Gann Chen, National Cheng Kung Univ. (Taiwan)[7231-53]

Weak-microcavity organic light-emitting diodes with improved light-extraction and wide viewing-angle, Sang-Hwan Cho, Yong-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of); Young-Woo Song, Yoon-Chang Kim, Joon-Gu Lee, Jong Hyuk Lee, Kyu Hwan Hwang, Dong-Sik Zang, SAMSUNG SDI Co., Ltd. (Korea, Republic of)[7231-54]

MgAl-based highly reflective ohmic contact to p-type GaN, Jun Ho Son, Sanghan Lee, Gwan Ho Jung, Pohang Univ. of Science and Technology (Korea, Republic of); Y. G. Kim, C. Y. Kim, Y. J. Yoon, Seoul Opto-device Co. (Korea, Republic of); Jong-Lam Lee, Pohang Univ. of Science and Technology (Korea, Republic of)[7231-55]

Thursday 29 January

SESSION 8

Room: Conv. Ctr. Room A1Thurs. 8:10 to 10:10 am

Phosphors

Session Chair: Hans Nikol, Philips Lighting B.V. (Netherlands)

8:10 am: **Up and down: color conversion for solid-state lighting** (*Invited Paper*), Paul Hartmann, Ledon Lighting Jennersdorf GmbH (Austria)[7231-33]

8:40 am: **Precise phosphor model for GaN-based white LEDs** (*Invited Paper*), Ching-Cherng Sun, Tsung-Hsun Yang, Ching-Yi Chen, Hsin-Yin He, Cheng-Chien Chen, Wei-Ping Lin, National Central Univ. (Taiwan)[7231-34]

9:10 am: **Scanning micro-electroluminescence spectroscopy of commercial high-intensity blue InGaN LEDs with converting phosphors**, Lars Reissmann, Jürgen Christen, Thomas Hempel, Otto-von-Guericke-Univ. Magdeburg (Germany); Tanja Mesli, Joechen Kunze, Andreas Kaluza, odelo LED GmbH (Germany); Rafael C. Jordan, Hermann Oppermann, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)[7231-35]

9:30 am: **Crystal structure and luminescence characterization of $Y_3Al_5O_{12}:Ce$ nanoparticles fired with SiO_2 powder**, Yung-Tang Nien, In-Gann Chen, National Cheng Kung Univ. (Taiwan)[7231-36]

9:50 am: **White light LEDs: design and simulation of phosphors using TracePro[®] optical design software to simulate phosphorescence, bulk scatter and color mixing**, Chao-hsi Tsao, Lambda Research Corp. (United States); Linda A. Smith, Peloton Diagnostics Corp. (United States)[7231-37]

Coffee Break10:10 to 10:30 am

SESSION 9

Room: Conv. Ctr. Room A1Thurs. 10:30 am to 12:30 pm

Nanostructures

Session Chair: Satoshi Kamiyama, Meijo Univ. (Japan)

10:30 am: **Growth and luminescence properties of one-dimensional InN and InGaN nanostructures** (*Invited Paper*), Li-Chyong Chen, Abhijit Ganguly, National Taiwan Univ. (Taiwan); Chih-Wei Hsu, Ming-Shien Hu, Academia Sinica (Taiwan); Ching-Lien Hsiao, Yang-Fang Chen, National Taiwan Univ. (Taiwan); Kuei-Hsien Chen, Academia Sinica (Taiwan)[7231-38]

11:00 am: **InGaN-based nanocolumn arrays grown by rf-assisted molecular beam epitaxy** (*Invited Paper*), Katsumi Kishino, Hiroto Sekiguchi, Akihiko Kikuchi, Sophia Univ. (Japan)[7231-39]

11:30 am: **3D nanostructures for LEDs** (*Invited Paper*), Andreas Waag, Technische Univ. Braunschweig (Germany)[7231-40]

12:00 pm: **Self-assembled and ordered MBE growth of III-Nitride nanocolumns: mechanisms, characterization, and nanodevices** (*Invited Paper*), Enrique Calleja, Univ. Politécnica de Madrid (Spain)[7231-41]

Lunch/Exhibition Break12:30 to 1:40 pm

SESSION 10

Room: Conv. Ctr. Room A1Thurs. 1:40 to 3:30 pm

Novel Substrates

Session Chair: Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan)

1:40 pm: **High quality free-standing GaN thick-films prepared by hydride vapor phase epitaxy using stress reducing techniques** (*Invited Paper*), Wei-I Lee, Hsin-Hsiung Huang, Kuei-Ming Chen, Ting-Li Chu, Pei-Lun Wu, Hung-Wei Yu, National Chiao Tung Univ. (Taiwan); Po-Chun Liu, Chu-Li Chao, Tung-Wei Chi, Jenq-Dar Tsay, Industrial Technology Research Institute (Taiwan); Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan)[7231-42]

2:10 pm: **Investigations of non-polar GaN and InN grown on lithium aluminate**, Po-Han Tseng, Yuan-Ting Lin, Zun-Lin Lee, Kai-Li Wu, Cheng-Ying Ho, Yu-Lin Chang, Zhi-Hao Gong, Mitch M. C. Chou, Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan)[7231-43]

2:30 pm: **GaN on 150 mm (6-inch) silicon: latest results** (*Invited Paper*), Colin J. Humphreys, Dandan Zhu, Univ. of Cambridge (United Kingdom)[7231-44]

3:00 pm: **Development of new substrate technologies for GaN LEDs: atomic layer deposition transition layers on silicon and ZnO** (*Invited Paper*), Nola Li, Shen-Jie Wang, Hongbo Yu, Andrew Melton, Georgia Institute of Technology (United States); Adriana Valencia, Jeff Nause, Cermet, Inc. (United States); Christopher J. Summers, Ian T. Ferguson, Georgia Institute of Technology (United States)[7231-45]

Coffee Break3:30 to 3:50 pm

SESSION 11

Room: Conv. Ctr. Room A1Thurs. 3:50 to 5:20 pm

Organic LEDs

Session Chair: Markus Klein, OSRAM Opto Semiconductors GmbH (Germany)

3:50 pm: **To Be Determined** (*Invited Paper*), Donal D. Bradley, Imperial College London (United Kingdom)[7231-46]

4:20 pm: **An efficient cathode for OLEDs: the Li_3PO_4/Al bilayer electrode**, Andrea Gassmann, Christian Melzer, Heinz von Seggern, Technische Univ. Darmstadt (Germany)[7231-48]

4:40 pm: **Self-consistent modeling of charge transfer doped metal/insulator/metal systems**, Oliver Ottinger, Christian Melzer, Heinz von Seggern, Technische Univ. Darmstadt (Germany)[7231-49]

5:00 pm: **Novel poly(p-phenylenevinylene) derivatives for OLED display**, Sangyup Song, New Span Opto-Technology Inc. (United States); Sarfaraz Baig, Bing Chen, Michael R. Wang, Univ. of Miami (United States)[7231-50]

OPTO

Emerging Liquid Crystal Technologies IV

Conference Chair: **Liang-Chy Chien**, Kent State Univ.

Conference Co-Chair: **Ming Hsien Wu**, Hamamatsu Corp.

Program Committee: **Dick J. Broer**, Technische Univ. Eindhoven (Netherlands); **Vladimir G. Chigrinov**, Hong Kong Univ. of Science and Technology (Hong Kong China); **Harry James Coles**, Univ. of Cambridge (United Kingdom); **Gregory P. Crawford**, Univ. of Notre Dame; **Andy Y. Fuh**, National Cheng Kung Univ. (Taiwan); **Otto Wolfgang Haase**, Technische Univ. Darmstadt (Germany); **Jun-ichi Hanna**, Tokyo Institute of Technology (Japan); **Heinz-Siegfried Kitzerow**, Univ. Paderborn (Germany); **Shunsuke Kobayashi**, Tokyo Univ. of Science (Japan); **Seung Hee Lee**, Chonbuk National Univ. (Korea, Republic of); **Akihiro Mochizuki**, Nano Loa, Inc.; **Ci-Ling Pan**, National Chiao Tung Univ. (Taiwan); **Richard L. Sutherland**, Science Applications International Corp.; **Shin-Tson Wu**, College of Optics & Photonics/Univ. of Central Florida

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room C4 Sun. 9:00 to 10:30 am

Flexible and e-Paper Displays

Session Chair: **Liang-Chy Chien**, Kent State Univ.

9:00 am: **Current progress and technical challenges of flexible liquid crystal displays** (*Invited Paper*), Hideo Fujikake, Hiroto Sato, Japan Broadcasting Corp. (Japan) [7232-01]

9:30 am: **Novel flexible Reflex(TM) displays** (*Invited Paper*), Erica N. Montbach, Donald Davis, Asad A. Khan, Tod L. Schneider, Duane W. Marhefka, Oleg P. Pishnyak, Todd Ernst, Nick Miller, Joseph W. Doane, Kent Displays, Inc. (United States) [7232-02]

10:00 am: **Fast-switching electro-optical films based on polymer encapsulated liquid crystal, carbon nanotube, and dye** (*Invited Paper*), Lu Lu, Shin-Ying Lu, Liang-Chy Chien, Kent State Univ. (United States) [7232-03]

Coffee Break 10:30 to 11:00 am

SESSION 2

Room: Conv. Ctr. Room C4 Sun. 11:00 am to 12:00 pm

Novel Materials and Effects

Session Chair: **Ivan I. Smalyukh**, Univ. of Colorado at Boulder

11:00 am: **Blue phases come of age: a review** (*Invited Paper*), Heinz-Siegfried Kitzerow, Univ. Paderborn (Germany) [7232-04]

11:30 am: **Effects of dielectric relaxation in electrooptics of nematic cells** (*Invited Paper*), Oleg D. Lavrentovich, Hugh A. Wonderly, Mingxia Gu, Sergij V. Shiyonovskii, Kent State Univ. (United States) [7232-05]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Room: Conv. Ctr. Room C4 Sun. 1:30 to 3:10 pm

Holography

Session Chair: **Harry James Coles**, Univ. of Cambridge (United Kingdom)

1:30 pm: **Two-dimensional holographic polarization grating formed on azo-dye-doped PVA films** (*Invited Paper*), Andy Y. Fuh, Wei Yen Wu, Ming-Shian Li, Hui-Chi Lin, National Cheng Kung Univ. (Taiwan) [7232-07]

2:00 pm: **Non-contact optical control of multiple defects and structures in liquid crystals using holographic and time-shared optical trapping** (*Invited Paper*), Ivan I. Smalyukh, Univ. of Colorado at Boulder (United States) [7232-08]

2:30 pm: **Photoresponsive behavior of azotolane liquid crystals**, Kunihiko Okano, Tokyo Univ. of Science (Japan); Tomiki Ikeda, Tokyo Institute of Technology (Japan) [7232-09]

2:50 pm: **Evaluations of liquid crystal panels as a random phase modulator for optical encryption system**, Naoki Mitsuoka, Shingo Fukuyama, Yasuhiro Harada, Kitami Institute of Technology (Japan) [7232-10]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room C4 Sun. 3:30 to 5:00 pm

Polymer and Liquid Crystal Composites

Session Chair: **Oleg D. Lavrentovich**, Kent State Univ.

3:30 pm: **Photorefractive effect of polymer-stabilized ferroelectric liquid crystals** (*Invited Paper*), Takeo Sasaki, Tokyo Univ. of Science (Japan) [7232-11]

4:00 pm: **Synthesis and characterization of pitch tunable cholesteric liquid crystalline polymers** (*Invited Paper*), Jui-Hsiang Liu, Feng-Ming Hsieh, National Cheng Kung Univ. (Taiwan) [7232-12]

4:30 pm: **Holography lithography technique for fabricating 2D and 3D periodic and quasi periodic polymeric structures** (*Invited Paper*), Chia Chen Hsu, Ngoc Diep Lai, Jian Hung Lin, National Chung Cheng Univ. (Taiwan) [7232-40]

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room C4 Mon. 8:30 to 10:10 am

Display Materials and Back Light Units

Session Chair: **Dick J. Broer**, Technische Univ. Eindhoven (Netherlands)

8:30 am: **Molecular dynamics simulation of a liquid crystalline semiconductor: 8-TTP-8** (*Invited Paper*), Makoto Yoneya, National Institute of Advanced Industrial Science and Technology (Japan); Masahiro Funahashi, The Univ. of Tokyo (Japan); Hiroshi Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) [7232-13]

9:00 am: **Novel bonding technologies for flexible LCDs with tight adhesion between two plastic substrates** (*Invited Paper*), Min Young Jin, Jae-Hoon Kim, Hanyang Univ. (Korea, Republic of) [7232-14]

9:30 am: **The innovative color LCD by using three color bank scrolling backlights**, Jia-Chang Wang, Jui-Lung Lin, National Taipei Univ. of Technology (Taiwan) [7232-15]

9:50 am: **Dual backlight unit based on a single light source integrated with a beam splitting reflector**, ChanKyu Park, Hak-Soon Lee, Sang-Shin Lee, Kwangwoon Univ. (Korea, Republic of) [7232-16]

Coffee Break 10:10 to 10:30 am

SESSION 6

Room: Conv. Ctr. Room C4 Mon. 10:30 am to 12:30 pm

Lasers

Session Chair: **Andy Y. Fuh**, National Cheng Kung Univ. (Taiwan)

10:30 am: **Red-green-blue tunable liquid crystal lasers and ultra-fast displays** (*Invited Paper*), Harry J. Coles, Univ. of Cambridge (United Kingdom) [7232-17]

11:00 am: **Cholesteric liquid crystal lasers with in-plane helix alignment** (*Invited Paper*), Masanori Ozaki, Hiroyuki Yoshida, Yo Inoue, Yuko Matsuhisa, Takuya Isomura, Akihiko Fujii, Osaka Univ. (Japan); Ryotaro Ozaki, Hiroshi Moritake, National Defense Academy (Japan) [7232-18]

Tuesday 27 January

11:30 am: **Lasing from reverse mode 2-D holographic polymer dispersed liquid crystals (H-PDLCs)** (*Invited Paper*), Rachel Jakubiak, Air Force Research Lab. (United States); Lalgudi V. Natarajan, Vincent P. Tondiglia, SAIC (United States); Pamela F. Lloyd, UES, Inc. (United States); Richard L. Sutherland, SAIC (United States); Timothy J. Bunning, Air Force Research Lab. (United States).....[7232-19]

12:00 pm: **Multi-wavelength cholesteric liquid crystals laser** (*Invited Paper*), Tsung-Hsien Lin, Chun-Ta Wang, National Sun Yat-Sen Univ. (Taiwan).....[7232-20]

Lunch Break12:30 to 2:00 pm

SESSION 7

Room: Conv. Ctr. Room C4 Mon. 2:00 to 3:10 pm

Optical Films and Lens

Session Chair: Vladimir G. Chigrinov,

Hong Kong Univ. of Science and Technology (Hong Kong, China)

2:00 pm: **Low-cost PRINT(R) manufacturing of patterned films with nano-precision** (*Invited Paper*), Ginger D. Rothrock, Zhilian Zhou, Doug Mar, Xiansheng Meng, Robert Henn, Liquidia Technologies, Inc. (United States).....[7232-21]

2:30 pm: **Liquid crystal quantized GRIN lens and its application to AF systems**, Nobuyuki Hashimoto, Makoto Kurihara, Citizen Holdings Co., Ltd. (Japan).....[7232-22]

2:50 pm: **The design and fabrication of birefringence lens array for integral imaging system with enhanced depth of field**, ChanKyu Park, Yong-Seok Hwang, Sang-Shin Lee, Kwangwoon Univ. (Korea, Republic of)[7232-23]

Coffee Break:3:10 to 3:30 pm

SESSION 8

Room: Conv. Ctr. Room C4 Mon. 3:30 to 5:20 pm

Switches and Filters

Session Chair: Masanori Ozaki, Osaka Univ. (Japan)

3:30 pm: **Liquid crystal applications in photonics** (*Invited Paper*), Vladimir G. Chigrinov, Hong Kong Univ. of Science and Technology (Hong Kong, China).....[7232-24]

4:00 pm: **Security applications of liquid crystal film with plural latent images** (*Invited Paper*), Rumiko Yamaguchi, Akita Univ. (Japan)[7232-25]

4:30 pm: **Polarization-controlled contrasted images using dye-doped nematic liquid crystals** (*Invited Paper*), Ruben Ramos-Garcia, Rosario Porras-Aguilar, Julio C. Ramirez-San-Juan, Oscar Baldovino-Pantaleón, Marcelo D. Iturbe-Castillo, Julián D. Sánchez-de-la-Llave, Maximino L. Arroyo-Carrasco, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico).....[7232-26]

5:00 pm: **Ray-tracing simulations and applications of liquid crystal beam control devices**, Maarten Sluijter, Dick K. de Boer, Philips Research (Netherlands); Hendrik P. Urbach, Technische Univ. Delft (Netherlands).....[7232-27]

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

Coffee Break10:00 to 10:30 am

SESSION 9

Room: Conv. Ctr. Room C4 Tues. 10:30 to 11:30 am

Novel Technology for Projection Displays

Session Chair: Ming Hsien Wu, Hamamatsu Corp.

10:30 am: **Opportunities for new era projectors**, William L. Coggs, Pacific Media Associates (United States).....[7232-28]

10:50 am: **Parabolic transition region curve for a wedge projection display**, Kuan Wen Chen, Univ. of Cambridge (United Kingdom); Adrian Travis, Microsoft Corp. (United States); Timothy D. Wilkinson, Shunyi Tan, Univ. of Cambridge (United Kingdom).....[7232-29]

11:10 am: **Holographic display based on a wedge-shaped waveguide with distortion correction**, Shunyi Tan, Timothy D. Wilkinson, Univ. of Cambridge (United Kingdom); Adrian Travis, Microsoft Corp. (United States); Kuan Wen Chen, Univ. of Cambridge (United Kingdom)[7232-30]

Lunch/Exhibition Break11:30 am to 1:20 pm

SESSION 10

Room: Conv. Ctr. Room C4 Tues. 1:20 to 2:20 pm

Advanced Light Source, Laser Projection, and Related Technologies

Session Chair: Ming Hsien Wu, Hamamatsu Corp.

1:20 pm: **Laser speckle contrast reduction measurement using diffractive diffusers**, Weston Thomas, Christopher T. Middlebrook, Michigan Technological Univ. (United States); John Smith, MEMS Optical, Inc. (United States).....[7232-32]

1:40 pm: **Diffractive beam shaper with double side lenslet array for projector illumination**, Po-Chou Chen, Chien-Chuan Chen, Po-Hon Yao, Chung-Huan Chen, National Tsing Hua Univ. (Taiwan)[7232-33]

2:00 pm: **Future prospects for high end laser projection**, Peter Janssens, Koen Malfait, Barco N.V. (Belgium).....[7232-34]

TECHNICAL EVENT

Fairmont Hotel, Atherton Room Tues. 7:30 to 9:00 pm

Holography

Chair: **Hans I. Bjelkhagen,**
Centre for Modern Optics, OpTIC (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNNT), computer-generated holography (CGH), electro- and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

Wednesday 28 January

Posters-Wednesday

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

Effect of pendant chiral groups on the induction of cholesteric liquid crystalline phases, Jui-Hsiang Liu, Feng-Ming Hsieh, National Cheng Kung Univ. (Taiwan) [7232-35]

Electric field induced manipulation of static and dynamic optical and spatial properties of aggregates of coupled/self-organized quantum dots, Yashwant K. Verma, Christopher Ferri, Somnath Ghosh, Maribel Gallardo, David F. Kelley, Sayantani Ghosh, Univ. of California, Merced (United States) [7232-36]

Development of luminaires using high power color LEDs and application to lighting system for color hologram, Moriaki Wakaki, Takehisa Shibuya, Tokai Univ. (Japan); Junko Baba, Hisashi Asakawa, Marumo Electric Co., Ltd. (Japan) [7232-37]

Phase optimization for phase contrast projection display, Meilan Piao, Jae-Hyeung Park, Nam Kim, Hyun-Soo Kang, Chungbuk National Univ. (Korea, Republic of) [7232-38]

Design of planar integrated optics for near-eye display by considering human-eye factors, Kaul Choi, Joon-Sub Lee, Hanyang Univ. (Korea, Republic of); Sang Gee Kim, Dongnam Health College (Korea, Republic of); Seok-Ho Song, Hanyang Univ. (Korea, Republic of) [7232-39]

Practical Holography XXIII: Materials and Applications

Conference Chairs: **Hans I. Bjelkhagen**, Glyndŵr Univ. (United Kingdom) and Technium OpTIC (United Kingdom); **Raymond K. Kostuk**, The Univ. of Arizona

Program Committee: **Jean-Marc R. Fournier**, École Polytechnique Fédérale de Lausanne (Switzerland); **Gerald L. Heidt**, Wasatch Photonics, Inc.; **Toshio Honda**, Chiba Univ. (Japan); **Fujio Iwata**, Toppan Printing Co., Ltd. (Japan); **Tung H. Jeong**, Lake Forest College; **Gaylord E. Moss**, MossOptics; **Albert O. Okorogu**, The Aerospace Corp.; **Nadya O. Reingand**, Celight, Inc.; **Martin John Richardson**, De Montfort Univ. (United Kingdom); **Christopher W. Slinger**, QinetiQ Ltd. (United Kingdom); **Fred D. Unterseher**, Columbia Career Ctr.; **Ichirou Yamaguchi**, The Institute of Physical and Chemical Research (Japan); **Toyohiko Yatagai**, Utsunomiya Univ. (Japan)

Sunday 25 January

SESSION 1

Room: Conv. Ctr. Room L Sun. 8:50 to 10:10 am

Holographic Displays I

- 8:50 am: **Real-time shader rendering of holographic stereograms**, Quinn Y. J. Smithwick, James Barabas, Daniel E. Smalley, V. Michael Bove, Jr., MIT Media Lab. (United States) [7233-01]
- 9:10 am: **Portable three-dimensional display system for CGHs**, Yuji Sakamoto, Hokkaido Univ. (Japan) [7233-02]
- 9:30 am: **Hologram generation of 3D objects using multiple orthographic view images**, Min-Su Kim, Jae-Hyeung Park, Ganbat Baasantseren, Nam Kim, Min-Young Shin, Kwan-Hee Yoo, Chungbuk National Univ. (Korea, Republic of) [7233-03]
- 9:50 am: **Real-time IP—hologram conversion hardware based on floating point DSPs**, Ryutaro Oi, Kenji Yamamoto, Tomoyuki Mishina, Makoto Okui, National Institute of Information and Communications Technology (Japan) [7233-04]
- Coffee Break 10:10 to 10:40 am

SESSION 2

Room: Conv. Ctr. Room L Sun. 10:40 am to 12:00 pm

Holographic Displays II

- 10:40 am: **Holographic lens array for future display screen**, Frank C. Fan, Shenzhen AFC Technology Co., Ltd. (China) [7233-05]
- 11:00 am: **Modeling light**, Paula H. Dawson, John S. Gage, Univ. of New South Wales (Australia); Masahiro Takatsuka, Shea Goyette, The Univ. of Sydney (Australia) [7233-06]
- 11:20 am: **Acquiring multi-viewpoint image of 3D object using phase-shifting digital holography with lens array**, Min-Ok Jeong, Jae-Hyeung Park, Nam Kim, Chungbuk National Univ. (Korea, Republic of); Seok-Hee Jeon, Univ. of Incheon (Korea, Republic of); Sang Keun Gil, Univ. of Suwon (Korea, Republic of) [7233-07]
- 11:40 am: **Horizontally scanning holography to enlarge both image size and viewing zone angle**, Naoya Okada, Yasuhiro Takaki, Tokyo Univ. of Agriculture and Technology (Japan) [7233-08]
- Lunch Break 12:00 to 1:40 pm

SESSION 3

Room: Conv. Ctr. Room L Sun. 1:40 to 3:00 pm

Holographic Applications

- 1:40 pm: **Dynamic holography and speckle: an application to biomedical imaging**, Haibo Lin, Ping Yu, Univ. of Missouri, Columbia (United States) [7233-10]
- 2:00 pm: **Digital holography image reconstruction and filtering**, Meric Ozcan, Sabanci Univ. (Turkey) [7233-11]
- 2:20 pm: **Quantitative phase-contrast digital holographic microscopy for cell dynamic evaluation**, Lingfeng Yu, Zhongping Chen, Univ. of California, Irvine (United States) [7233-12]
- 2:40 pm: **System characterization studies for turbidity suppression through optical phase conjugation**, Emily J. McDowell, Vahan A. Senekerimyan, Changhui Yang, California Institute of Technology (United States) [7233-09]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Conv. Ctr. Room L Sun. 3:30 to 4:30 pm

Digital Holography I

- 3:30 pm: **Region segmentation and parallel processing for creating large-scale CGHs in polygon source method**, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan) [7233-16]
- 3:50 pm: **Development of one-shot color digital holography**, Kohei Maejima, Univ. of Hyogo (Japan) [7233-17]
- 4:10 pm: **THz holography with reference beam**, Andrei A. Gorodetsky, Victor G. Bespalov, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [7233-18]

Monday 26 January

SESSION 5

Room: Conv. Ctr. Room L Mon. 9:10 to 10:10 am

Holographic Displays III

- 9:10 am: **Computer simulation of reconstructed image for computer-generated holograms**, Tomoki Yasuda, Mitsuru Kitamura, Masachika Watanabe, Dai Nippon Printing Co., Ltd. (Japan); Masato Tsumuta, Takeshi Yamaguchi, Hiroshi Yoshikawa, Nihon Univ. (Japan) [7233-19]
- 9:30 am: **Fast generation of computer-generated hologram by graphics processing unit**, Sho Matsuda, Tomohiko Fujii, Takeshi Yamaguchi, Hiroshi Yoshikawa, Nihon Univ. (Japan) [7233-20]
- 9:50 am: **Light-modulation characteristics of LCD panel and**, Kunihiro Sato, Univ. of Hyogo (Japan) [7233-21]
- Coffee Break 10:10 to 10:40 am

SESSION 6

Room: Conv. Ctr. Room L Mon. 10:40 to 11:40 am

Materials

- 10:40 am: **New recording materials for the holographic industry**, David Jurbergs, Bayer MaterialScience LLC (United States); Friedrich-Karl Bruder, Francois Deuber, Thomas Faecke, Rainer Hagen, Dennis Hoenele, Thomas Roelle, Marc-Stephan Weiser, Bayer MaterialScience AG (Germany) [7233-22]
- 11:00 am: **New thermoplastic-based photosensitive materials for holographic applications**, Mark Cheverton, Sumeet Jain, Moitreyee Sinha, Gary C. Davis, Brian L. Lawrence, GE Global Research (United States); Sophie Casenave, SABIC Innovative Plastics Holding BV (United States); Luc Govaerts, SABIC Innovative Plastics Holding BV (Netherlands); Gregory Harley, Matt Niemeier, Gordon Van Dyke, SABIC Innovative Plastics Holding BV (United States) [7233-23]
- 11:20 am: **One-Step volume holographic grating recording in polymers**, Simon Kibben, Michael Koerd, Thomas Seefeld, Frank Vollertsen, Bremer Institut für Angewandte Strahltechnik (Germany); Javier Garcia-Monreal, Stanislav Kolpakov, Univ. de València (Spain); Steve Daren, Faina Solomon-Tsvetkov, Daren Labs. & Scientific Consultants Ltd. (Israel) [7233-25]
- Lunch Break 11:40 am to 1:30 pm

Conference 7233

SESSION 7

Room: Conv. Ctr. Room L Mon. 1:30 to 2:50 pm

Materials II

1:30 pm: **Removal of the interference noise in a large-area holographic lithography**, Joon-Sub Lee, Ji-Whan Lee, Woo-Jae Park, Kaul Choi, Seok-Ho Song, Hanyang Univ. (Korea, Republic of) [7233-26]

1:50 pm: **Holographic studies of azobenzene-containing low-molecular-weight organic glasses**, Hubert Audorff, Lothar Kador, Roland Walker, Hans-Werner Schmidt, Univ. Bayreuth (Germany) [7233-27]

2:10 pm: **Telescope for lidar system implementing holographic optical elements**, Olga V. Asmolova, Ampac Inc. (United States); Elizabeth J. Billmers, RL Associates Inc. (United States); Pavlo Molchanov, Ampac Inc. (United States) [7233-29]

2:30 pm: **An analysis of the diffraction efficiencies by electromagnetic wave scattering from holographic Fourier gratings**, Makoto Ohki, Koki Sato, Shonan Institute of Technology (Japan); Shogo Kozaki, Gunma Univ. (Japan) [7233-30]

Coffee Break 2:50 to 3:20 pm

SESSION 8

Room: Conv. Ctr. Room L Mon. 3:20 to 5:00 pm

Digital Holography II

3:20 pm: **Calculation method considering the reflectance distribution for metallic objects in CGH**, Kazuhiro Yamaguchi, Yuji Sakamoto, Hokkaido Univ. (Japan) [7233-28]

3:40 pm: **Lens-less holographic microscope with large visual depth**, Osamu Murata, Hiroyuki Toge, Kunihiro Sato, Univ. of Hyogo (Japan) [7233-31]

4:00 pm: **Single-shot phase-shifting digital holography based on the spatial carrier interferometry**, Yasuhiro Harada, Hikaru Goto, Tatsuya Iwaki, Sachiko Wakaguri, Kitami Institute of Technology (Japan) [7233-32]

4:20 pm: **Development of one-shot color digital holography**, Kohei Maejima, Kunihiro Sato, Univ. of Hyogo (Japan) [7233-33]

4:40 pm: **Synthesis of digital Fourier hologram with single side band spectrum**, Sergey A. Kostyukevich, Institute of Semiconductor Physics (Ukraine); Eugene V. Braginets, National Taras Shevchenko Univ. of Kyiv (Ukraine); Vladimir I. Girnyk, Optronics PC (Ukraine); Kateryna V. Kostyukevych, National Academy of Sciences of Ukraine (Ukraine); Vitaliy N. Kurashov, National Taras Shevchenko Univ. of Kyiv (Ukraine) [7233-34]

Tuesday 27 January

OPTO PLENARY SESSION

Room: Montgomery Theater Tues. 8:00 to 10:00 am

8:00 am: **Introduction and Opening Remarks**

8:05 am: **Challenges and Prospects of Conventional and Dilute III-Nitrides for Light Emitting Devices, Solid State Lighting, and Silicon Photonics**, Klaus H. Ploog, Paul Drude Institute for Solid State Electronics (Germany)

8:40 am: **Photonics for Novel High-Performance Computing**, Raymond G. Beausoleil, Hewlett-Packard Labs. (United States)

9:20 am: **Photonics' Pivotal Role in the Nano/Bio/Info Revolution: New Interfaces to Meet the Challenges of the 21st Century**, Paras N. Prasad, Univ. at Buffalo (United States)

See p. 26 for details.

TECHNICAL EVENT

Fairmont Hotel, Atherton Room Tues. 7:30 to 9:00 pm

Holography

Chair: **Hans I. Bjelkhagen**,
Centre for Modern Optics, OpTIC (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNDDT), computer-generated holography (CGH), electro- and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

Wednesday 28 January

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

The Research & Manufacture of Holographic Emergency Visuals: Holographic Exit Arrow System, Ya-Ling Huang, Hao-Jan Chan, Kun Shan Univ. (Taiwan) [7233-13]

All-optical switching in holographic polymer dispersed azobenzene liquid-crystal gratings, Ting-Hsuan Wang, Yen-Jung Li, Che-Lu Cheng, Wei-Ting Chang, Vincent K. S. Hsiao, National Chi Nan Univ. (Taiwan) [7233-24]

Efficient generation of CGH of 3-D objects by use of run-length encoding and look-up table methods, Seung-Cheol Kim, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) [7233-35]

Computer-generated holograms at an arbitrary viewpoint synthesized from multi-view images, Masao Kinoshita, Yuji Sakamoto, Hokkaido Univ. (Japan) [7233-36]

Real-time color holographic movie system in HD resolution with capturing objects, generating hologram, and displaying, Kenji Yamamoto, Tomoyuki Mishina, Ryutarou Oi, Takanori Senoh, Makoto Okui, National Institute of Information and Communications Technology (Japan) [7233-37]

Experience to sustainable national development, Miguel A. Rolfo, Diego A. Garcia, Univ. de Buenos Aires (Argentina) [7233-38]

Optical implementation of edge-enhanced triple correlation via four-wave-mixing correlator, Chung-Chih Chang, Ming-Seng Hsu, Shiang-Shi Cheng, Chinese Military Academy (Taiwan); Wei-Chia Su, National Changhua Univ. of Education (Taiwan); Yueh Ouyang, Chinese Military Academy (Taiwan) [7233-39]

Robust recognition of partially occluded 3D target from digital hologram by using a spatial filtering method, Seok-Chan Park, Seung-Cheol Kim, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) [7233-40]

Improvement of computer-generated disk hologram, Takeshi Yamaguchi, Masato Tsumuta, Tomohiko Fujii, Hiroshi Yoshikawa, Nihon Univ. (Japan) [7233-41]

Optical cryptography of gray-level image information using QPSK modulation and digital holography, Sang Keun Gil, Dong Heon Kang, Young Ho Kim, Univ. of Suwon (Korea, Republic of); Seok-Hee Jeon, Univ. of Incheon (Korea, Republic of); Jong Rae Jung, Suwon Science College (Korea, Republic of) [7233-42]

Large viewing angle and image size projection type electro-holography using 3-D screen, Koki Sato, Shonan Institute of Technology (Japan); Kunihiro Takano, Tokyo Metropolitan College of Aeronautical Engineering (Japan); Makoto Ohki, Shonan Institute of Technology (Japan) [7233-43]

A study of glasses-type color CGH using a color filter considering reduction of burring, Saki Iwami, Yuji Sakamoto, Hokkaido Univ. (Japan) [7233-44]

Thermal stability enhancement of photochromic holograms, Yuri B. Boiko, YBBR, Inc. (Canada) [7233-45]

Volume photochromic holograms in diarylethene doped polymer, Yuri B. Boiko, YBBR, Inc. (Canada) [7233-46]

Optical characteristics of a holographic security system using a reflection photopolymer and a random phase mask, Changwon Shin, Nam Kim, Chungbuk National Univ. (Korea, Republic of); Eunyoung Kim, Yonsei Univ. (Korea, Republic of); Kwon-Yeon Lee, Suncheon National Univ. (Korea, Republic of) [7233-47]

Conference 7234 · Convention Center Room E

Wednesday-Thursday 28-29 January 2009 • Proceedings of SPIE Vol. 7234

Broadband Access Communication Technologies III

Conference Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc.; **Raj Jain**, Washington Univ. in St. Louis; **Katsutoshi Tsukamoto**, Osaka Univ. (Japan)

Program Committee: **Arjan Duresi**, Indiana Univ.-Purdue Univ. Indianapolis; **David W. Faulkner**, British Telecom Research Labs. (United Kingdom); **Mahbub Hassan**, Univ. of New South Wales (Australia); **Mohsen Kavehrad**, The Pennsylvania State Univ.; **Rangaraj Madabhushi**, Madabhushi Consultants, LLC; **Nicholas Madamopoulos**, City College/CUNY; **Dalma Novak**, Pharad, LLC; **Jean-Charles Point**, JCP-Consult (France); **Ken-ichi Sato**, Nagoya Univ. (Japan); **Peter Van Daele**, Univ. Gent (Belgium); **Jeroen S. Wellen**, Lucent Technologies (Netherlands)

Wednesday 28 January

POSTERS-WEDNESDAY

Room: Civic Auditorium Wed. 6:00 to 7:30 pm

Conference attendees are invited to attend the poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster Authors must set up their poster between 10 am and 5 pm on Wednesday. View Poster Setup Instructions on p. 311.

The need for a single cleaning standard for OEM and OSP fiber optic connections, Edward J. Forrest, Paul Blair, ITW Chemtronics (United States) [7234-16]

1.25-Gb/s millimeter-wave band wired/wireless radio-over-fiber system based on RSOA using an injection-locked FP-laser, Yong-Yuk Won, Hyun-Seung Kim, Sang-Kook Han, Yonsei Univ. (Korea, Republic of) [7234-17]

Design and development of merger of two optical devices, Muhammad A. Irfan, Sir Syed Univ. of Engineering & Technology (Pakistan) [7234-18]

RoFSO channel modeling considering time-correlation of scintillation and its application to performance evaluation of WLAN signal transmission, Kyung Hwan Kim, Hideaki Onodera, Higashino Takeshi, Takuya Nakamura, Yuji Aburakawa, Tsukamoto Katsutoshi, Komaki Shozo, Osaka Univ. (Japan); Kazuhiko Wakamori, Toshiji Suzuki, Kamugisha Kazaura, Alam M. Shah, Koichi Takahashi, Kazunori Ohmae, Takuro Satou, Mitsuji Matsumoto, Waseda Univ. (Japan) [7234-19]

Efficient resource allocation scheme for visible-light communication system, Woo-Chan Kim, Dong-Ho Cho, Korea Advanced Institute of Science and Technology (Korea, Republic of); Chi-Sung Bae, Korea Advanced Institute of Science and Technology (Korea, Democratic Peoples Republic of); Hong-Seok Shin, Daekwang Jung, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Yunje Oh, Samsung Electronics Co., Ltd. (United States) [7234-20]

Thursday 29 January

KEYNOTE SESSION

Room: Conv. Ctr. Room E Thurs. 9:00 to 9:30 am

Session Chair: **Benjamin Dingel**, Nasfine Photonics, Inc.

9:00 am: **Convergence of broadband optical and wireless access networks (Keynote Presentation)**, Gee-Kung Chang, Georgia Institute of Technology (United States); Zhensheng Jia, Telcordia Technologies, Inc. (United States); Hung-Chang Chien, Arshad Chowdhury, Yu-Ting Hsueh, Georgia Institute of Technology (United States); Jianjun Yu, NEC Labs. America, Inc. (United States) [7234-01]

SESSION 2

Room: Conv. Ctr. Room E Thurs. 9:30 am to 12:00 pm

Emerging Free-Space Optics- and Wireless-based Broadband Access Technologies

Session Chairs: **Raj Jain**, Washington Univ. in St. Louis; **Tsukamoto Katsutoshi**, Osaka Univ. (Japan)

9:30 am: **Requirements and applications for mesh free-space optics (Invited Paper)**, Mostafa Tofigh, AT&T Labs. Research (United States) [7234-02]

10:00 am: **Research and development of a next-generation free-space optical communication system (Invited Paper)**, Kazuhiko Wakamori, Kamugisha Kazaura, Mitsuji Matsumoto, Waseda Univ. (Japan) [7234-03]

Coffee Break 10:30 to 11:00 am

11:00 am: **Wireless access networks: recent developments, issues and trends (Invited Paper)**, Raj Jain, Washington Univ. in St. Louis (United States) [7234-04]

11:30 am: **Proposal of dynamic subcarrier selection technique using CSMA/CA for cognitive wireless mesh networks (Invited Paper)**, Shinichi Miyamoto, Yuichi Goda, Seiichi Sampei, Osaka Univ. (Japan) [7234-05]

Lunch/Exhibition Break 12:00 to 1:00 pm

SESSION 3

Room: Conv. Ctr. Room E Thurs. 1:00 to 3:30 pm

Advanced FTTH Technologies: PON Architectures and Passive Components

Session Chairs: **Tsukamoto Katsutoshi**, Osaka Univ. (Japan); **Benjamin Dingel**, Nasfine Photonics, Inc.

1:00 pm: **Emerging radio-over-fiber technologies and networks: challenges and issues (Invited Paper)**, John E. Mitchell, Univ. College London (United Kingdom) [7234-21]

1:30 pm: **Broadband access technology for passive optical network (Invited Paper)**, Sien Chi, Yuan Ze Univ. (Taiwan) and National Chiao Tung Univ. (Taiwan); Chien-Hung Yeh, Industrial Technology Research Institute (Taiwan); Chi-Wai Chow, National Chiao Tung Univ. (Taiwan) [7234-06]

2:00 pm: **PON ring architectures for truly shared LAN capability and dynamic bandwidth allocation for fiber-wireless (FiWi) applications**, Nicholas Madamopoulos, Neophytos Antoniadou, Bhadrash Pathak, Muhammad A. Ummay, City College/CUNY (United States) [7234-07]

2:20 pm: **Bidirectional WDM-RoF system for simultaneous 1.25 Gb/s wired/wireless transmission using multi optical carrier suppression in FP LD**, Hyun-Seung Kim, Thang T. Pham, Yong-Yuk Won, Sang-Kook Han, Yonsei Univ. (Korea, Republic of) [7234-08]

2:40 pm: **Bend-insensitive optical fibers for FTTH applications (Invited Paper)**, Ming-Jun Li, Corning Inc. (United States) [7234-09]

3:10 pm: **Advanced integrated WDM system for POF communication**, Matthias Haupt, Ulrich H. Fischer-Hirchert, Hochschule Harz (Germany) [7234-10]

Coffee Break 3:30 to 4:00 pm

SESSION 4

Room: Conv. Ctr. Room E Thurs. 4:00 to 5:50 pm

Advanced FTTH Technologies: 100GE Techniques and Active Components

Session Chairs: **Benjamin Dingel**, Nasfine Photonics, Inc.; **Raj Jain**, Washington Univ. in St. Louis

4:00 pm: **Advances and challenges in vector modulation technologies (Invited Paper)**, Tetsuya Kawanishi, Takahide Sakamoto, Akito Chiba, National Institute of Information and Communications Technology (Japan) [7234-11]

4:30 pm: **Super-linear modulator with extended bandwidth capability for broadband access applications**, Andru J. Prescod, Corning Inc. (United States); Benjamin Dingel, Nasfine Photonics Inc. (United States); Nicholas Madamopoulos, City College/CUNY (United States) [7234-12]

4:50 pm: **Linearity enhancement of uncooled DFB laser diode using opto-electronic predistortion method for radio-over-fiber systems**, Tae-Kyeong Lee, Yon-Tae Moon, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [7234-13]

5:10 pm: **1- μ m-band transmission by use of a wavelength tunable quantum-dot laser over a hole-assisted fiber**, Redouane Katouf, Naokatsu Yamamoto, Kouichi Akahane, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan) and National Institute of Information and Communications Technology (Japan) [7234-14]

5:30 pm: **Optical clock recovery**, Zhe Chen, Hongzhi Z. Sun, Shaozhen Ma, Niloy K. Dutta, Univ. of Connecticut (United States) [7234-15]

Optical Metro Networks and Short-Haul Systems

Conference Chairs: **Werner Weiershausen**, Deutsche Telekom AG (Germany); **Benjamin B. Dingel**, Nasfine Photonics, Inc.; **Achyut Kumar Dutta**, Banpil Photonics, Inc.; **Atul K. Srivastava**, OneTerabit

Program Committee: **Ronald Freund**, Fraunhofer-Institut für Nachrichtentechnik-Heinrich-Hertz (Germany); **Franco Küppers**, College of Optical Sciences/The Univ. of Arizona; **Ralph Leppla**, Deutsche Telekom AG (Germany); **Ernst-Dieter Schmidt**, Siemens AG (Germany); **Sascha Vorbeck**, Deutsche Telekom AG (Germany); **Winston I. Way**, OpVista, Inc.

Thursday 29 January

SESSION 1

Room: Conv. Ctr. Room KThurs. 8:00 to 10:30 am

Optical Networks for Access and Metro Domains

Session Chairs: **Werner Weiershausen**, Deutsche Telekom AG (Germany); **Achyut Kumar Dutta**, Banpil Photonics, Inc.

- 8:00 am: **Advancements in multi-service metro optical networks** (*Invited Paper*), Loukas Paraschis, Cisco Systems, Inc. (United States). [7235-01]
- 8:30 am: **A system's view of metro and regional optical networks** (*Invited Paper*), Cedric F. Lam, Winston I. Way, OpVista, Inc. (United States). [7235-02]
- 9:00 am: **Impact of PON deployment on metro networks** (*Invited Paper*), Julien Poirrier, Fabrice Herviou, Hélène Barboule, Maryse Moignard, Orange Labs. (France) [7235-03]
- 9:30 am: **Optical LAN technologies for the ultra-high definition video era** (*Invited Paper*), Shu Namiki, National Institute of Advanced Industrial Science and Technology (Japan); Hiroshi Onaka, Tadashi Ikeuchi, Fujitsu Ltd. (Japan); Kimiyuki Oyamada, Japan Broadcasting Corp. (Japan); Ken Morito, Fujitsu Ltd. (Japan); Atsushi Sugitatsu, Mitsubishi Electric Corp. (Japan); Hiroshi Ishikawa, National Institute of Advanced Industrial Science and Technology (Japan); Tohru Asami, The Univ. of Tokyo (Japan) [7235-04]
- 10:00 am: **Optical code division multiplexing for confidentiality at the photonic layer in metro networks and beyond** (*Invited Paper*), Paul Toliver, Anjali Agarwal, Ronald C. Menendez, Janet L. Jackel, Shahab Etemad, Telcordia Technologies, Inc. (United States). [7235-05]
- Coffee Break 10:30 to 11:00 am

SESSION 2

Room: Conv. Ctr. Room KThurs. 11:00 am to 12:20 pm

Optical Switches and Multiplexers

Session Chairs: **Atul K. Srivastava**, OneTerabit; **Benjamin Dingel**, Nasfine Photonics, Inc.

- 11:00 am: **ROADMs unlock the edge of the metro network** (*Invited Paper*), Ashish Vengsarkar, Nistica, Inc. (United States). [7235-06]
- 11:30 am: **ROADMs for reconfigurable metro networks** (*Invited Paper*), Jonathan Homa, Krishna Bala, Xtellus Inc. (United States) [7235-07]
- 12:00 pm: **Performance analysis for all optical switch based on MZI switching element with SOAs**, Ghanshyam Singh, R. P. Yadav, Vijay Janyani, Ritu Sharma, Malaviya National Institute of Technology (India) [7235-09]
- Lunch/Exhibition Break 12:20 to 2:00 pm

SESSION 3

Room: Conv. Ctr. Room KThurs. 2:00 to 5:00 pm

Optical Metro Transport

Session Chairs: **Achyut Kumar Dutta**, Banpil Photonics, Inc.; **Atul K. Srivastava**, OneTerabit

- 2:00 pm: **Meeting explosive growth requirements in the metro optical network** (*Invited Paper*), Alan J. Gibbemeyer, Nokia Siemens Networks (United States) [7235-10]
- 2:30 pm: **100GEthernet for aggregation and transport networks** (*Invited Paper*), Malte Schneiders, Sascha Vorbeck, Deutsche Telekom AG (Germany); Cornell P. Gonschior, Fachhochschule Giessen-Friedberg (Germany); Werner Weiershausen, Deutsche Telekom AG (Germany); Franko Küppers, The Univ. of Arizona (United States) [7235-11]
- 3:00 pm: **All-band photonic transport system and its device technologies** (*Invited Paper*), Naokatsu Yamamoto, National Institute of Information and Communications Technology (Japan); Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan) [7235-12]
- Coffee Break 3:30 to 4:00 pm
- 4:00 pm: **Performance monitoring in high speed optical networks** (*Invited Paper*), Michael Haas, Christian G. Schäffer, Technische Univ. Dresden (Germany) [7235-13]
- 4:30 pm: **Electronic predistortion for compensation of polarization-mode dispersion** (*Invited Paper*), Stephan Hellerbrand, Technische Univ. München (Germany); Werner Weiershausen, Deutsche Telekom AG (Germany); Norbert Hanik, Technische Univ. München (Germany) [7235-15]

Quantum Communications Realized II

Conference Chairs: **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan); **Masahide Sasaki**, National Institute of Information and Communications Technology (Japan); **Hideyuki Sotobayashi**, Aoyama Gakuin Univ. (Japan)

Program Committee: **Kyo Inoue**, Osaka Univ. (Japan); **Prem Kumar**, Northwestern Univ.; **Christian Kurtsiefer**, National Univ. of Singapore (Singapore); **Paul G. Kwiat**, Univ. of Illinois at Urbana-Champaign; **Norbert Lütkenhaus**, Univ. of Waterloo; **Paolo Mataloni**, Univ. degli Studi di Roma/La Sapienza (Italy); **Gregoire Ribordy**, id Quantique SA (Switzerland); **Alexander V. Sergienko**, Boston Univ.; **Andrew J. Shields**, Toshiba Research Europe Ltd. (United Kingdom); **Masahiro Takeoka**, National Institute of Information and Communications Technology (Japan); **Akihisa Tomita**, NEC Corp. (Japan); **Harald Weinfurter**, Ludwig-Maximilians-Univ. München (Germany); **Andrew G. White**, The Univ. of Queensland (Australia); **Carl J. Williams**, National Institute of Standards and Technology

Wednesday 28 January

SESSION 1

Room: Conv. Ctr. Room C4 Wed. 1:00 to 3:00 pm

Quantum Information Processing

Session Chairs: **Andrew J. Shields**, Toshiba Research Europe Ltd. (United Kingdom); **Akihisa Tomita**, NEC Corp. (Japan)

1:00 pm: **2-photon multiqubit cluster states** (*Invited Paper*), Paolo Mataloni, Giuseppe Vallone, Raino Ceccarelli, Univ. degli Studi di Roma, La Sapienza (Italy) [7236-01]

1:30 pm: **Physical and architectural considerations in quantum repeaters** (*Invited Paper*), Mohsen Razavi, Marco Piani, Hamidreza Farmanbar, Kyle Thompson, Norbert Lütkenhaus, Univ. of Waterloo (Canada) [7236-02]

2:00 pm: **Ancilla-assisted control of quantum superposition states of continuous variables** (*Invited Paper*), Masahide Sasaki, Hiroki Takahashi, National Institute of Information and Communications Technology (Japan) [7236-03]

2:30 pm: **Quantum mechanics of adding and subtracting a photon** (*Invited Paper*), Myungshik S. Kim, Queen's Univ. Belfast (United Kingdom) ... [7236-04]

Coffee Break 3:00 to 3:30 pm

SESSION 2

Room: Conv. Ctr. Room C4 Wed. 3:30 to 5:10 pm

Atom-Light Interactions

Session Chair: **Kazuhiro Hayasaka**, National Institute of Information and Communications Technology (Japan)

3:30 pm: **Interfacing light and single atoms with a lens** (*Keynote Presentation*), Meng Khoon Tey, Syed Aljunid, National Univ. of Singapore (Singapore); Florian Huber, Technische Univ. München (Germany); Brenda Chng, National Univ. of Singapore (Singapore); Zilong Chen, A*STAR Institute of Materials Research and Engineering (Singapore); Gleb Maslennikov, Christian Kurtsiefer, National Univ. of Singapore (Singapore) [7236-05]

4:10 pm: **Trapped ion entanglement through photonic wires** (*Invited Paper, Presentation Only*), Wolfgang Lange, Peter Blythe, Elisabeth Brama, Matthias Keller, Anders Mortensen, Nicolas Seymour-Smith, Alexander Wilson, Univ. of Sussex (United Kingdom) [7236-06]

4:40 pm: **Microfabricated chips for ion quantum technology** (*Invited Paper, Presentation Only*), Winfried K. Hensinger, Univ. of Sussex (United Kingdom) [7236-07]

Thursday 29 January

SESSION 3

Room: Conv. Ctr. Room C4 Thurs. 8:00 to 9:00 am

Quantum Communication

Session Chair: **Myungshik S. Kim**, Queen's Univ. Belfast (United Kingdom)

8:00 am: **Space-QUEST: quantum physics and quantum communication in space** (*Invited Paper*), Rupert Ursin, Univ. of Vienna (Austria); Thomas Jennewein, Institute for Quantum Optics and Quantum Information (Austria); Anton Zeilinger, Univ. of Vienna (Austria) and Institute for Quantum Optics and Quantum Information (Austria) [7236-08]

8:30 am: **Discrimination of optical coherent states via near-optimal quantum receivers** (*Invited Paper*), Masahiro Takeoka, Kenji Tsujino, Masahide Sasaki, National Institute of Information and Communications Technology (Japan) [7236-09]

SESSION 4

Room: Conv. Ctr. Room C4 Thurs. 9:00 to 10:00 am

Superconducting Photon Detectors I

Session Chair: **Gregory N. Goltsman**, Moscow State Pedagogical Univ. (Russian Federation)

9:00 am: **Photon-number-resolving superconducting-nanowire single-photon detectors** (*Invited Paper*), Eric Dauler, Massachusetts Institute of Technology (United States); Andrew J. Kerman, Bryan S. Robinson, Rich Molnar, Scott A. Hamilton, Joel Yang, MIT Lincoln Lab. (United States); Xiaolong Hu, Charles Herder, Karl K. Berggren, Massachusetts Institute of Technology (United States) [7236-10]

9:30 am: **Titanium TES based photon number resolving detectors with 1 MHz counting rate and 65% quantum efficiency** (*Invited Paper*), Daiji Fukuda, National Institute of Advanced Industrial Science and Technology (Japan); Go Fujii, National Institute of Advanced Industrial Science and Technology (Japan) and Nihon Univ. (Japan); Takayuki Numata, Akio Yoshizawa, Hidemi Tsuchida, National Institute of Advanced Industrial Science and Technology (Japan); Shuichiro Inoue, Nihon Univ. (Japan); Tatsuya Zama, National Institute of Advanced Industrial Science and Technology (Japan) [7236-11]

Coffee Break 10:00 to 10:20 am

SESSION 5

Room: Conv. Ctr. Room C4Thurs. 10:20 am to 12:30 pm

Superconducting Photon Detectors II

Session Chair: **Masahide Sasaki**, National Institute of Information and Communications Technology (Japan)

10:20 am: **Ultrafast nanowire superconducting single-photon detector with photon number resolving capability** (*Keynote Presentation*), Gregory N. Goltsman, Moscow State Pedagogical Univ. (Russian Federation)[7236-12]

11:00 am: **NbN nanowire superconducting single photon detectors for quantum information applications** (*Invited Paper, Presentation Only*), Sae Woo Nam, National Institute of Standards and Technology (United States)[7236-13]

11:30 am: **Development of superconducting single photon detectors for quantum communications** (*Invited Paper*), Zhen Wang, Shigehito Miki, Mikio Fujiwara, Masahide Sasaki, NICT (Japan)[7236-14]

12:00 pm: **Nano-optical studies of superconducting nanowire single-photon detectors** (*Invited Paper*), Robert H. Hadfield, Paul A. Dalgarno, John A. O'Connor, Euan Ramsay, Richard J. Warburton, Heriot-Watt Univ. (United Kingdom); Eric J. Gansen, Univ. of Wisconsin, La Crosse (United States); Burn Baek, Martin J. Stevens, Richard P. Mirin, Sae Woo Nam, National Institute of Standards and Technology (United States)[7236-21]

Lunch/Exhibition Break12:30 to 2:00 pm

SESSION 6

Room: Conv. Ctr. Room C4Thurs. 2:00 to 3:20 pm

Quantum Cryptography I

Session Chair: **Christian Kurtsiefer**, National Univ. of Singapore (Singapore)

2:00 pm: **Practical high-bit-rate quantum key distribution** (*Invited Paper*), Andrew J. Shields, Zhiliang Yuan, Alex Dixon, James F. Dynes, Andrew W. Sharpe, Toshiba Research Europe Ltd. (United Kingdom)[7236-15]

2:30 pm: **DPS quantum key distribution and related technologies** (*Invited Paper*), Kyo Inoue, Osaka Univ. (Japan); Hiroki Takesue, Toshimori Honjo, NTT Basic Research Labs. (Japan)[7236-16]

3:00 pm: **One-chip quantum random number generator**, Simone Tisa, Franco Zappa, Politecnico di Milano (Italy)[7236-17]

Coffee Break3:20 to 3:50 pm

SESSION 7

Room: Conv. Ctr. Room C4Thurs. 3:50 to 5:10 pm

Quantum Cryptography II

Session Chair: **Rupert Ursin**, Univ. Wien (Austria)

3:50 pm: **Test and measurement on quantum key distribution systems** (*Invited Paper*), Akihisa Tomita, NEC Corp. (Japan)[7236-18]

4:20 pm: **Quantum key distribution at GHz transmission rates** (*Invited Paper*), Alessandro Restelli, Joshua C. Bienfang, Charles W. Clark, Alan Mink, National Institute of Standards and Technology (United States)[7236-19]

4:50 pm: **Sagnac quantum key distribution and secret sharing**, Jan J. Bogdanski, Johan Ahrens, Mohamed Bourennane, Stockholm Univ. (Sweden)[7236-20]

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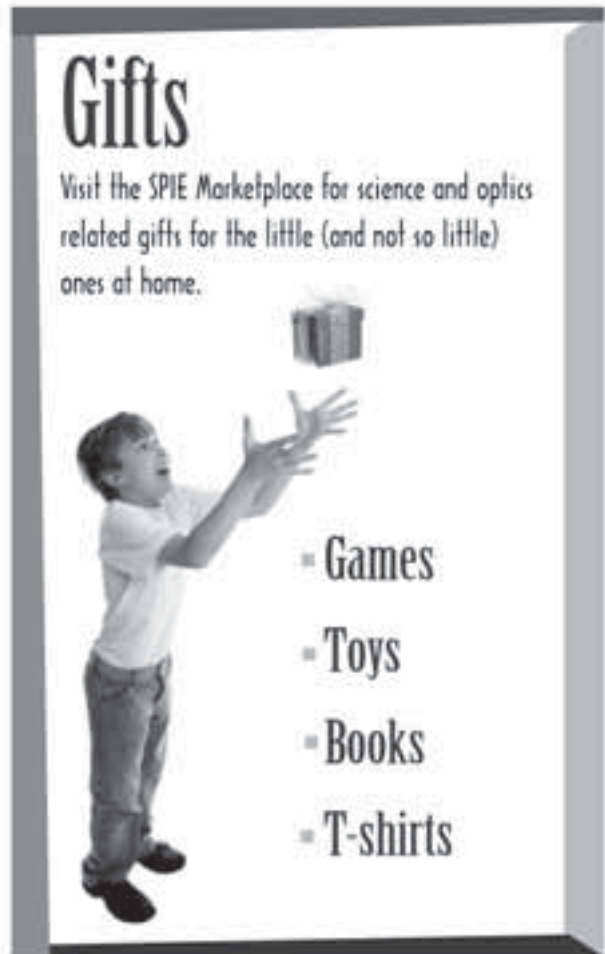
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General Information

Registration

Onsite Registration and Information Hours

San Jose Convention Center, Street Level

Saturday 24 January	7:15 am to 5:00 pm
Sunday 25 January	7:15 am to 5:00 pm
Monday 26 January	7:00 am to 5:00 pm
Tuesday 27 January	7:30 am to 5:00 pm
Wednesday 28 January	7:30 am to 5:00 pm
Thursday 29 January	7:30 am to 4:00 pm

Multiple facilities in downtown San Jose are used for conferences and courses, so please allow yourself enough time to register, pick up your materials and possibly walk to a nearby facility before your meeting or course begins.

Course and Workshop Materials Desk

Located near the SPIE Registration Area

Open during Registration hours

If you have registered to attend a course, please stop by the Course Materials Desk to pick up your course notes and to find out where the class will be located. Pickup the latest Education Services catalog to see the many courses SPIE has available at the symposia, on video, DVD, and CD-ROM; and to discover the opportunities of customized In-Company courses.

Exhibition Hours

BiOS—Biomedical Optics Exhibition

San Jose Convention Center, Hall 1

Saturday 24 January	1:00 to 5:00 pm
Sunday 25 January	10:00 am to 4:00 pm

Photonics West Exhibition

San Jose Convention Center, Exhibition Halls 1-3, Exhibition Foyers, and South Halls 1-2

Tuesday 27 January	10:00 am to 5:00 pm
Wednesday 28 January	10:00 am to 5:00 pm
Thursday 29 January	10:00 am to 4:00 pm

SPIE Receipts, Badge Corrections, Cashier

Receipts - Preregistered attendees who did not receive a receipt prior to the meeting may obtain a new copy of their registration receipt onsite at the Badge Corrections and Receipts counter in the registration area.

Badge Corrections - Attendees who need a correction to their badge information onsite may do so at the Badge Corrections and Receipts counter in the registration area.

Cashier Station - If you are paying by cash or check as part of your onsite registration, wish to add a short course, workshop, or special event requiring payment, or have questions regarding your registration please see the onsite cashier at the Cashier station in the registration area.

Author/Presenter Information

Speaker Check-In Desk/ Preview Station

San Jose Convention Center, Concourse 1

Saturday through Thursday 7:30 am to 5:00 pm

All conference rooms will have a computer workstation, LCD projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to the speaker check-in desk to confirm display settings of their presentations from their memory devices or laptops with the audiovisual equipment being used at this symposium.

Poster Setup Instructions

Civic Auditorium

Monday 26 January
BiOS conferences

Tuesday 27 January
LASE and MOEMS/MEMS conferences

Wednesday 28 January
OPTO conferences

Poster presenters must set up their posters between 10:00 am and 5:00 pm on the day of their assigned presentation (for posters scheduled within conferences 7162, 7164, 7183, and 7185, please refer to Special Poster Setup Instructions sent to you via email).

- Monday 26 January: All BiOS conferences (except 7162, 7164, 7183, and 7185, see individual conference for date/time)
- Tuesday 27 January: All LASE and MOEMS/MEMS conferences
- Wednesday 28 January: All OPTO conferences
- Paper numbers will be posted on the poster boards in numerical order; please find your paper number and post your poster in the designated space.
- A poster author or coauthor is required to stand by the poster during the scheduled poster session to answer questions from attendees.
- Presenters who have not placed their papers on their assigned board by 5:00 pm on the day of their presentation will be considered a "no show" and their manuscript will not be published.
- Presenters must remove their posters immediately after the poster session.
- Posters not removed will be considered unwanted and will be discarded.
- SPIE assumes no responsibility for posters left up after the end of each poster session.

BIOS

LASE

MOEMS-MEMS

OPTO

Courses

General Information

SPIE Onsite Services

SPIE Marketplace & Membership Services

Convention Center lower arcade

Open during Registration hours

The SPIE Marketplace is your source for the latest SPIE Press books, Proceedings, and Educational and Professional Development materials. Become a Member of SPIE, explore the Digital Library, and take home a souvenir.

Press & Media Center

The Press & Media Center provides press conference facilities, refreshments, and press releases from exhibitors. Credentialed media are invited to communicate news via the provided telephone and high-speed internet connections. Registration and exhibition fees are waived for working journalists and editors. Preregister by e-mailing name, organization, title, address, e-mail, and phone number to media@spie.org.

Internet Access

Convention Center – Arcade Area, Street Level

Saturday – Wednesday 7:30 am to 6:00 pm

Thursday 7:30 am to 4:00 pm

In South Hall 1

Tuesday 10:00 am to 5:00 pm

Wednesday 10:00 am to 5:00 pm

Thursday 10:00 am to 4:00 pm

At each of these locations will be multiple workstations allowing attendees to access their internet e-mail during the conference, and several Ethernet connections to use with your personal laptop. There will be a 10-minute time limit per each person's internet session.

SPIEWorks Career Fair

In addition to the onsite recruitment activities, SPIEWorks offers you online services to help you with your search for employment before, during and after the conference. Visit the online Career Fair being held in conjunction with Photonics West; post your resume, view jobs, or sign-up for "Job Alerts" and receive opportunities by email long after this event is over. For more information see pp. 29, 31.

WiFi

Complimentary WiFi access for attendees with 802.11b wireless enabled laptops and PDAs will be available Saturday through Thursday in the Ballroom concourse (east end) and in the Arcade (lower level) of the Convention Center near the SPIE Marketplace.

Business Services

SPIE Copy Center

Saturday through Thursday during registration hours San Diego Copy will provide a copy service during the week for symposium attendees. The rates are 5 cents per copy and \$1 per transparency (\$2.50 for color). The Copy Center will be located near registration.

SPIE Message Center

San Jose Convention Center, located near registration

Messages will be taken during registration hours Saturday through Thursday by calling: 408-271-6000.

Luggage/Package Storage and Coat Check

Convention Center – Street Level Arcade

Saturday through Thursday

Complimentary luggage/package and coat storage will be available to attendees.

Please note hours of operation posted onsite. If you intend to stay later than closing time, you will need to claim your checked items before it closes.

Child Care Services

A few child sitting services available in San Jose are as follows.

1. **Bay Area 2nd MOM Inc.**, Hotel Nanny Service, Toll Free Phone: 1-888-926-3666, or (650) 858-2469, ext. 109. Fax: (650) 493-6598, Email: oncall@2ndmom.com or parentcounselor@2ndmom.com, Website: www.2ndmom.com
2. **Sitters Unlimited**: Toll Free Phone: (408) 452-0225, E-mail: info@bayareasittersunlimited.com or www.bayareasittersunlimited.com
Note: SPIE does not imply an endorsement or recommendation of these services. They are provided on an "information-only" basis for your further analysis and decision. Other services may be available.

Visitor Information Center

A Visitor's Information kiosk is located in the main lobby of the Convention Center and will be open during show hours for sightseeing, shopping, and restaurant information.

Food and Beverage Services _____

Coffee Breaks

Complimentary coffee will be served twice each day at approximately 10:00 am and 3:00 pm on the exhibition floor.

Desserts

Saturday and Sunday

Served in the BiOS exhibition

Tuesday through Thursday

Served in the Photonics West Exhibition Halls and South Halls 1 & 2

Dessert snacks will be served from 3:00 to 3:30 pm. Complimentary tickets for the dessert will be included in course and conference attendee registration packets.

Meals and Refreshments

Refreshment Purchases

For attendee purchase of light refreshments, including continental breakfast, specialty carts will be set up in the foyer of the Convention Center Saturday through Thursday.

Cash Lunches and Exhibition Concessions at Exhibition Halls 1-3, South Hall 1.

A cash sandwich bar will be available in the foyer of the Convention Center Saturday through Thursday.

Visit the Exhibition Concessions located in the back of the exhibition halls on Tuesday-Thursday featuring domestic and international cuisine. They will serve hot and cold snacks, beverages, deli-type sandwiches, salads, hot entrees, and pastries and will be open during exhibition hours.

Free Popcorn

Popcorn carts will be located in Exhibition Hall 3 and South Hall 1 and will be open from 11:00 am to 3:00 pm Tuesday through Thursday.

Policies _____

Audio/Video/Digital Recording Policy

In the Meeting Rooms and Poster Sessions: For copyright reasons, recordings of any kind are strictly prohibited without prior written consent of the presenter in any conference session, course or of posters presented. Each presenter being taped must file a signed written consent form. Individuals not complying with this policy will be asked to leave a given session and asked to surrender their film or recording media. Consent forms are available at the Speakers Check-In Desk.

In the Exhibition Hall: For security and courtesy reasons, photographing or videotaping individual booths and displays in the exhibit hall is allowed ONLY with explicit permission from onsite company representatives. Individuals not complying with this policy will be asked to surrender their film and to leave the exhibition hall.

Laser Pointer Safety Information

SPIE supplies tested and safety approved laser pointers for all conference meeting rooms, and for short course rooms if instructors request one. For safety reasons, SPIE requests that presenters use our provided laser pointers available in each meeting room.

If using your own laser pointer, have it tested at your facility to make sure it has <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct - but don't automatically trust the labeling. Commercially available laser pointers, red or green (or any color), could be incorrectly labeled as to their wavelength and power output.

Presenters intending to use their own laser pointer for presentations are required to come to the Speakers Check-In Desk onsite and test their pointer on our power meter. If the pointer fails the safe power level you may not use the pointer at the conference. You will be required to sign a waiver releasing SPIE of any liability for use of potentially non-safe laser pointers.

Use of a personal laser pointer at an SPIE event represents user's acceptance of liability for use of a non-SPIE supplied laser pointer device. Misuse of any laser pointer could lead to eye damage. In California, it is a criminal misdemeanor to shine a laser pointer at individuals "who perceive they are at risk."

Underage Persons on Show Floor

For safety and insurance reasons, no persons under the age of 16 will be allowed in the exhibition area during move-in and move-out. During open exhibition hours, only children over the age of 12 accompanied by an adult will be allowed in the exhibition area.

Unauthorized Solicitation

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items

Personal belongings such as briefcases, backpacks, coats, book bags, etc., should not be left unattended in meeting rooms or public areas. These items will be subject to removal by security upon discovery.

General Information

Headquarters Hotel

Fairmont Hotel
170 South Market St.
(408) 792 4168

Other Accommodations

San Jose Marriott
301 South Market St.

Hilton San Jose and Towers
300 Almaden Blvd.

Crowne Plaza San Jose Hotel
282 Almaden Blvd.

The Sainte Claire, a Larkspur Hotel
302 South Market St.

Ramada Ltd.
455 South 2nd St.

Hotel Montgomery
211 South First St.

The Wyndham and Holiday Inn are on the light rail line, 15 min. ride to the convention center.

Wyndham Hotel San Jose
1350 North First St.

Holiday Inn San Jose
1740 North First St.

Moorpark Hotel, San Jose
4241 Moorpark Ave.

Radisson Hotel, San Jose
1471 North 4th Street

Homestead Studio Suites, San Jose Airport
1560 N. First St.

Extended Stay Deluxe, San Jose Airport
55 E. Brokaw Rd.

Courtyard by Marriott, San Jose Airport
1727 Technology Dr.

Hampton Inn & Suites, San Jose (Santana Row)
55 Old Tully Rd.

Hotel Valencia, Santana Row
355 Santana Row

Accommodations in the Santa Clara, California Area

Embassy Suites, Santa Clara
2885 Lakeside Dr., Santa Clara, CA 95054

Biltmore Hotel, Santa Clara
2151 Laurelwood Rd., Santa Clara, CA 95054

Accommodations in the Milpitas, California Area

Sheraton Hotel, Milpitas
1801 Barber Lane, Milpitas, CA 95035

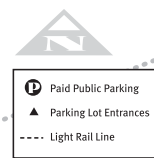
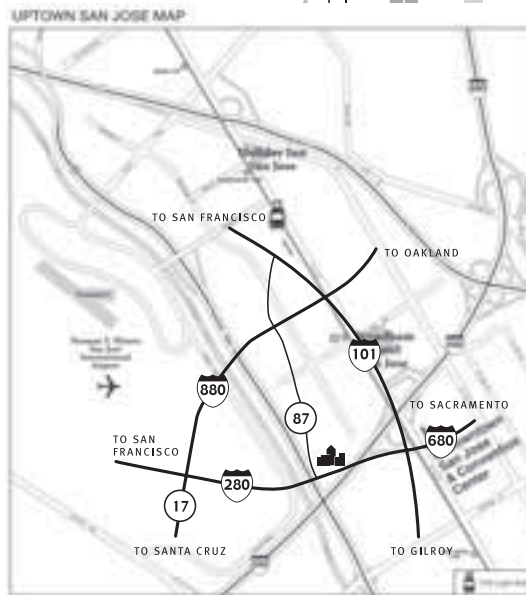
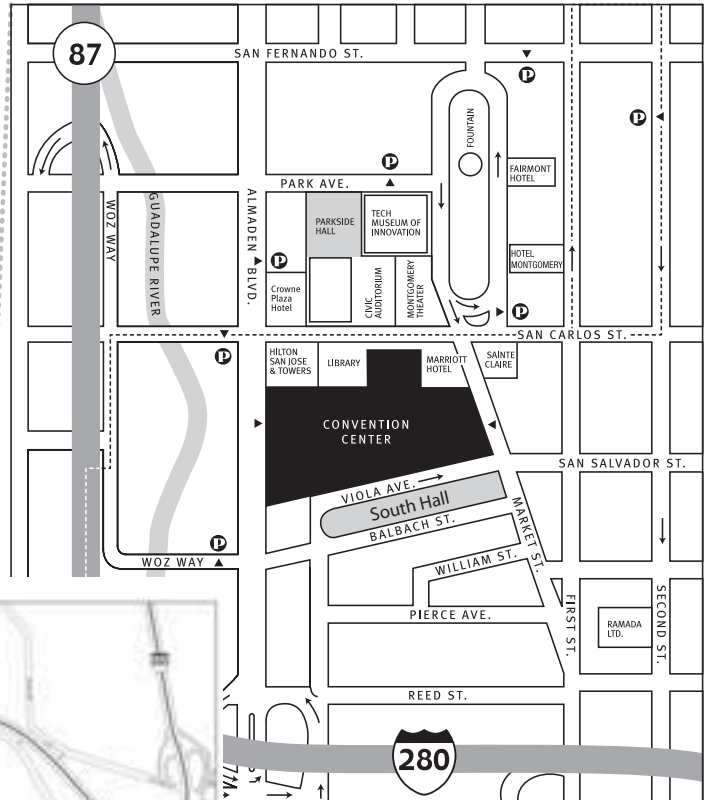
Embassy Suites, Milpitas
901 East Calaveras Blvd., Milpitas, CA 95035

Residence Inn by Marriott, Milpitas
1501 California Circle, Milpitas, CA 95035



Hertz Car Rental is the official car rental agency for this Symposium. To reserve a car, identify yourself as a Photonics West Conference attendee using the Hertz Meeting Code CV# 029B0012

- In the United States call 1-800-654-2240.



Parking During Photonics West

LOCATION **RATES (SUBJECT TO CHANGE)**
 AT THE CONVENTION CENTER
 150 W. San Carlos St. Max \$18 per day. (\$1 for each 20 min to max \$16.)
 There are approximately 650 spaces for the public to use.

ALTERNATE PARKING DOWNTOWN SAN JOSE
 River Park Tower Garage, located on the corner of San Carlos and Woz Way, 333 W. San Carlos St.
 \$1.25 per each 20 minutes, \$18 daily maximum.
 Rates and hours subject to change without notice.
 Approx. 1,000 spaces available each day of the event.
 Hrs of operation:
 Mon-Fri - 6:30 am to 12:00 midnight, Sat - 8:00 am to 12 midnight
 Sun - 8:00 am - may close at 10pm if event over

Parking at the Downtown Hotels

RATES on space available basis
 (rates subject to change without notice)

Fairmont San Jose

Valet Only:
 Overnight guests - \$26 with in/out privileges.
 Visitors - \$5 for 1st 30 min, \$1.50 for each additional 20 min, max per day is \$26. Parking garage is beneath the hotel

San Jose Marriott

Guests - \$25 per day with in/out privileges
 Non-guests - \$6.00 per hour with a maximum of \$25/day.

Hilton San Jose & Towers

Guests: Self - \$18 max. with in/out privileges. Valet \$23 max. with in/out privileges and complimentary with validation at the City Bar & Grille, up to 5 hrs.
 Non Guests: Self - \$18 max. Valet \$20 max. With the City Bar & Grille, validation is \$8 up to 5 hrs.

Crowne Plaza

Guests self parking \$18 with in/out privileges (no valet). Covered parking garage parallel to hotel.
 Non-guest parking is \$20 daily max. (\$6. for 1st hour, then \$1 every 1/2 hour to \$20 max)

Sainte Claire

For Guests only Valet Parking Only, \$21 for overnight.
 In/out privileges for those guests who charge the parking to their rooms.
 Parking garage is not owned by hotel. Fees are subject to change.

Hotel Montgomery

For guests - Self parking \$20 per day, Valet parking \$23 per day (24-hour period), both with in/out privileges.

Ramada Ltd.

Guest parking Complimentary

Wyndham Hotel

Guest parking complimentary

Holiday Inn San Jose

Guest parking complimentary

Park & Ride

Parking Lots

Since parking at the Convention Center can be quite congested at times, try the Park and Ride alternative transportation method, utilizing VTA's complimentary Park & Ride parking lots to commute to the Convention Center. To see a full listing of Park and Ride lots, visit www.vta.org and click on "Schedules, Maps & Fares" and then "Park and Ride." Free regular Park & Ride parking is limited to 72 hours.





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