

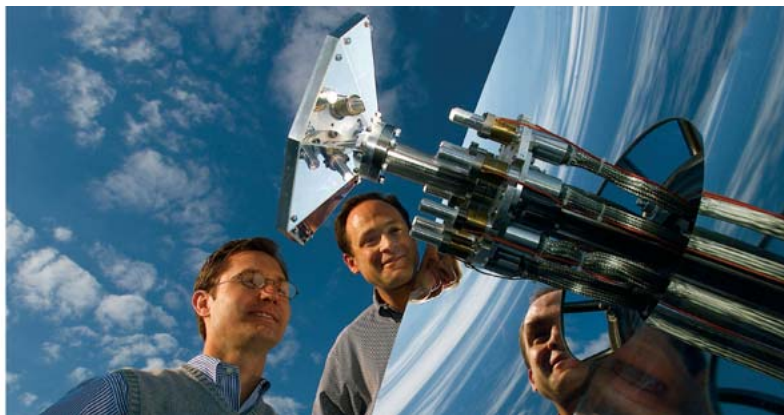
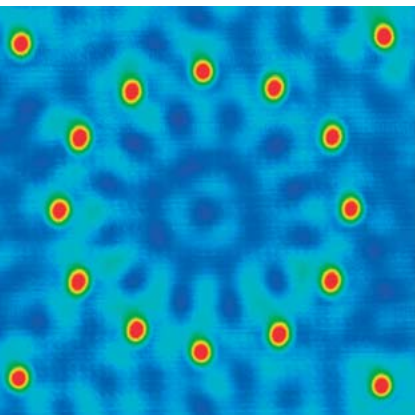
SPIE Optics+Photonics

Conferences + Courses: 26–30 August 2007

Exhibition: 28–30 August 2007

San Diego Convention Center
San Diego California USA

Technical Program



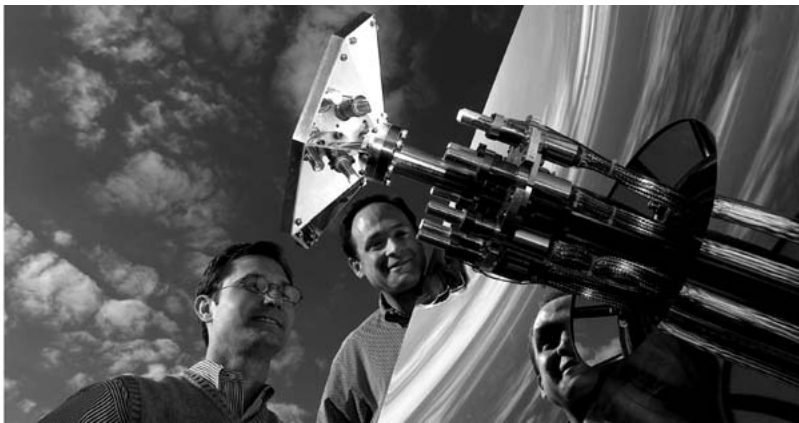
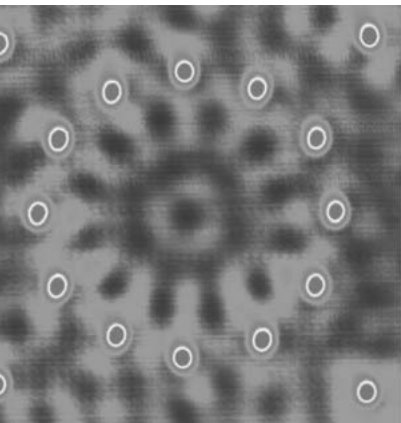
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Connecting minds. Advancing light.

Technical
Program

Welcome to

SPIE 
Optics+Photonics



Conferences + Courses: 26–30 August 2007

Exhibition: 28–30 August 2007

San Diego Convention Center

San Diego California USA

SPIE would like to express its deepest appreciation to the program chairs, conference chairs, cochairs, 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.

Left cover photo: Courtesy of National Institute of Standards and Technology. Quantum Daisy. Twelve cobalt atoms arranged in a circle on a surface of copper produce a daisy-like pattern from the interference of electron waves. This image was made with a one-of-a-kind instrument that, acting autonomously, picks up and places individual atoms anywhere on a surface. NIST scientists are studying the quantum properties of different atom arrangements to help improve the design and fabrication of nanoscale devices.

Center cover photo: Courtesy of Oak Ridge National Laboratory. LIGHTING THE WAY — From left, Alex Fischer, head of ORNL's Technology Transfer program, is shown with Jeff Muhs of ORNL's Engineering Science and Technology Division, who developed the hybrid solar lighting technology, April 10, 2003. It allows the sun's ray to light a room directly by using optical fibers to bring sunlight inside, and, in the future, indirectly by harnessing the remaining portion of sunlight (mainly infrared energy) to generate electricity that can power the room's light bulbs.

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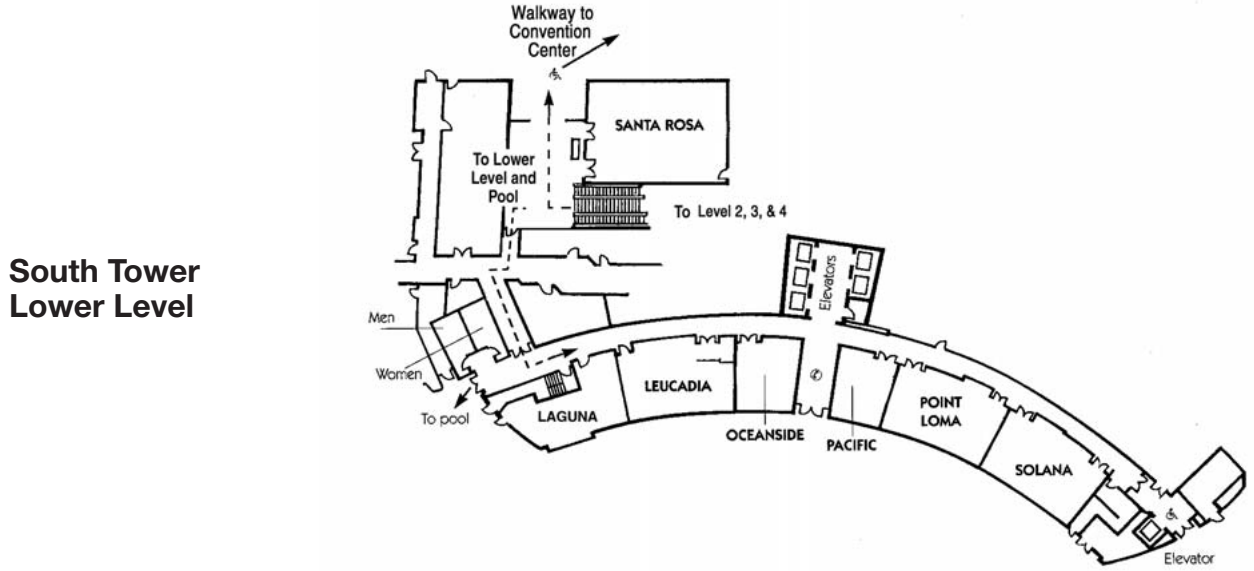
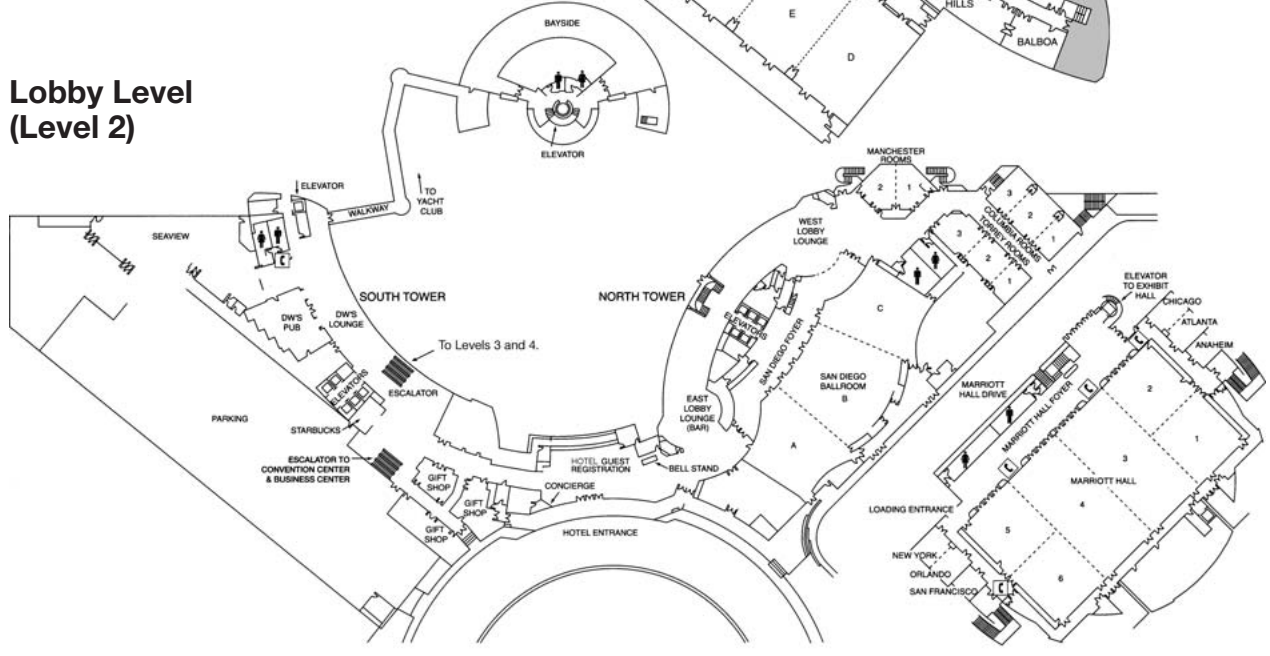
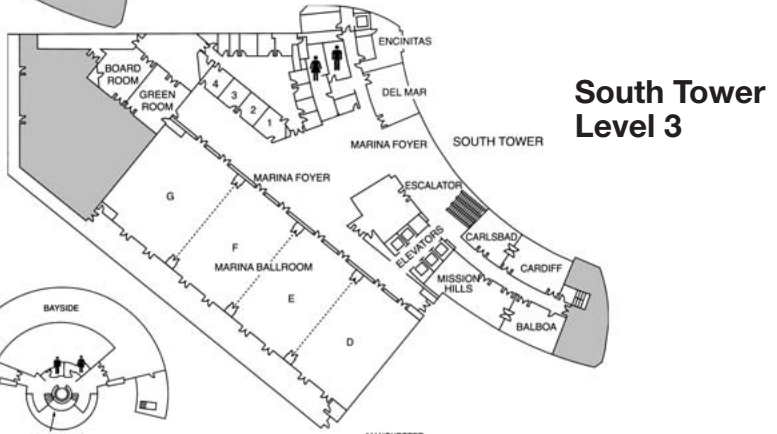
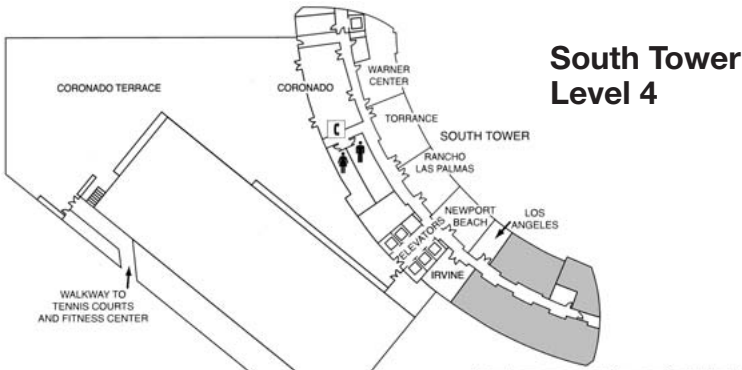
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Optics + Photonics 2007 Promotional Partners

The European Physical Journal Applied Physics	Optics & Laser Europe optics.org
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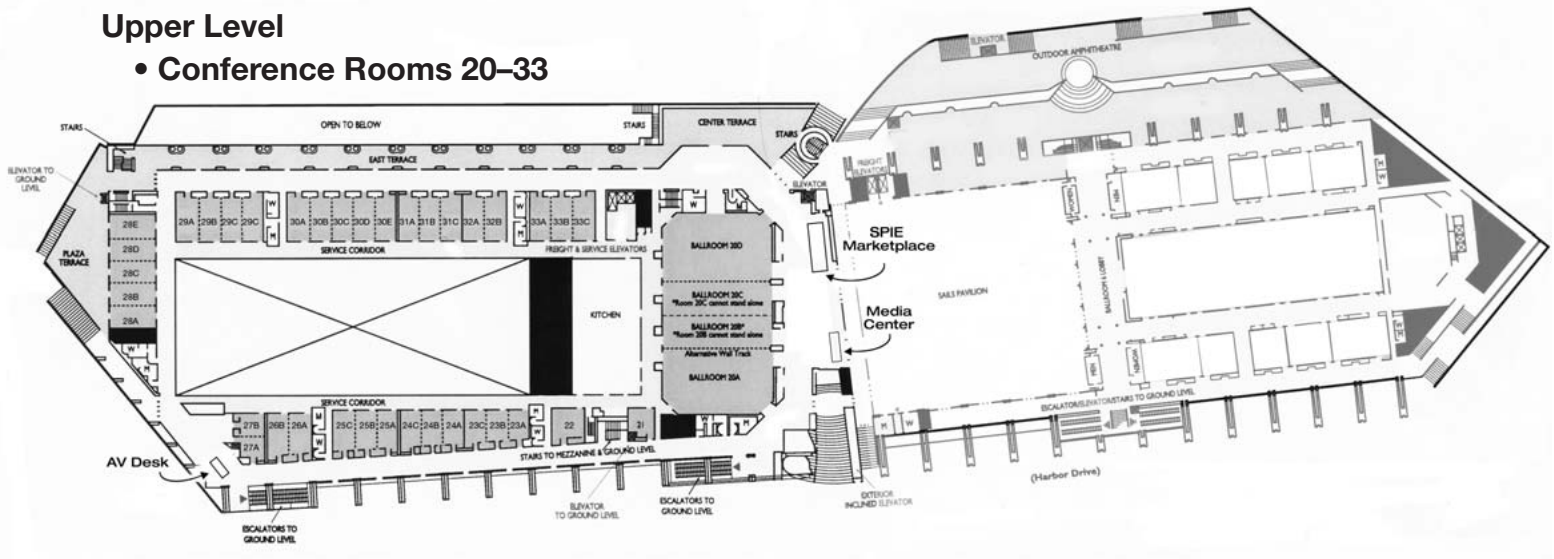
Marriott Floor Plans



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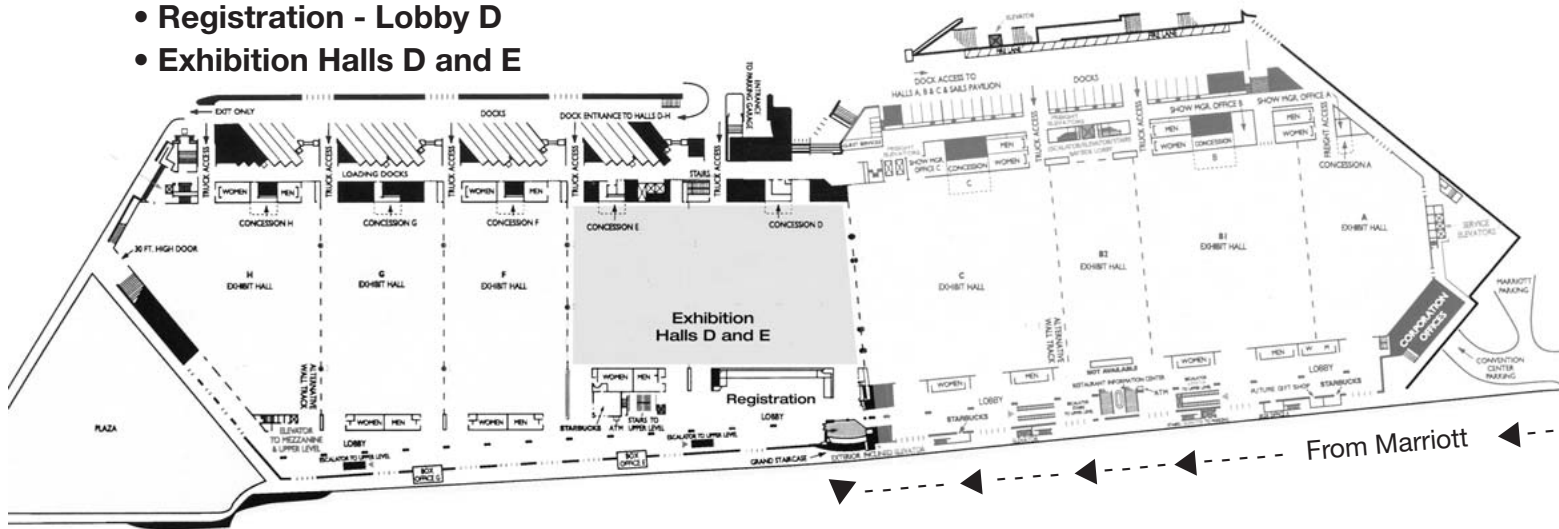
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NanoScience +Engineering

Part of SPIE Optics+Photonics

Symposium Chairs:



David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)



James G. Grote, Air Force Research Lab.



Kevin J. Liddane, Oerlikon Optics USA, Inc.

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Part of SPIE Optics+Photonics

Symposium Chair:



Ravi Durvasula, Lightfleet Corp.

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Part of SPIE Optics+Photonics

Symposium Chair:



Zakya H. Kafafi, Naval Research Lab.

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Optical Engineering + Applications

Part of **SPIE Optics+Photonics**

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Optical Engineering +Applications

Part of **SPIE** Optics+Photonics

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Special Events Daily Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday
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Student Chapter Leadership Workshop Lunch , 12:30 to 1:30 pm, p. 32	<i>Plenary Presentation: Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices, (Dai)</i> 9:00 am, p. 14	SPIEWorks Career Fair , p. 21, 33 11:00 am to 3:00 pm	SPIEWorks Career Fair , p. 21, 33 11:00 am to 3:00 pm	Workshop: Optics in Entertainment (Johnson, Robinson), 8:30 am to 12:00 pm, p. 23
<i>All-Conference Plenary Session: Technology to Enable our Solar Technology Future (Feist)</i> 6:00 pm, p. 13	<i>Plenary Presentation: Brave New Nanoworld, without Apologies to Aldous Huxley, (Lakhtakia)</i> 9:30 am, p.15	Volunteer for SPIE Committees! , p. 33 8:00 to 10:00 pm	Volunteer for SPIE Committees! , p. 33 5:30 to 7:00 pm	
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Early Career Networking Social , 5:30 to 7:00 pm, p. 33	<i>Plenary Presentation: Nanotechnology: New Tool for Diagnostics and Treatment of Cancer, (Heller)</i> , 11:00 am, p.16	<i>Plenary Presentation: Organic LEDs for Lighting Applications, (Kido)</i> , 9:15 am, p. 20	The Craft of Scientific Presentations: A Workshop on Technical Presentations, (Krages) 8:30 am to 12:30 pm, p. 33	
	<i>Plenary Presentation: Commercialization of Nanotechnology: A Business Perspective (Murdock)</i> , 11:30 am, p.16	Fellows Luncheon , Noon to 2:00 pm, p. 11	Polarization Technical Event (Lompadó) , 11:50 am to 1:20 pm, p. 23	
	Student Lunch with the Experts , 12:30 to 1:30 pm, p. 32	Annual General Meeting of the SPIE Corporation , 6:00 to 7:00 pm, p. 11	The Craft of Scientific Writing: A Workshop on Technical Writing, (Krages) 1:30 to 5:30 pm, p. 33	
	<i>Plenary Presentation: The Solar-hydrogen Economy: An Analysis, (Reynolds)</i> , 1:30 pm, p.17	SPIE Members Reception , 7:00 pm to 8:30 pm, p. 11	Essential Skills for Engineering Project Leaders (Hinkle) 1:30 to 5:30 pm p. 33	
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	<i>Plenary Presentation: Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell, (Arakawa)</i> , 2:00 pm, p.17	Adaptive Optics Technical Event (Olivier), 8:00 to 10:00 pm, p. 22	SPIE 2007 Annual Awards Banquet , 7:30 pm, p. 11	
	Hands-On Optics: Making an Impact with Light (HOO): Terrific Telescopes Workshop , 2:00 to 5:00 pm, p. 32	Lens Design Technical Event (Turner, Johnston, Pfisterer), 8:00 to 10:00 pm, p. 22		
	<i>Plenary Presentation: New Opportunities in Concentrator Photovoltaics with Low-cost, 40% Efficient Multijunction III-V Solar Cells, (King)</i> , 2:30 pm, p. 18	Optomechanical/Instrument Technical Event (Hatheway), 8:00 to 10:00 pm, p. 22		
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	All-Conference Welcome Reception , 7:00 to 8:30 pm, p. 12			
	Illumination Technical Event (Koschel), 8:00 to 10:00 pm, p. 22			

Membership

Your Resource Your Society



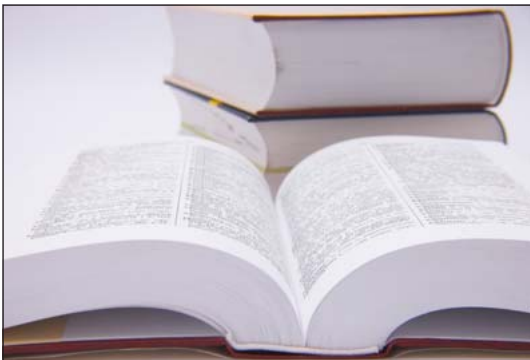
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*Located upstairs in the
Convention Center.*

SPIE Annual Meeting/Member Events



SPIE Members Reception

For SPIE Members Only. Membership will be checked at the entrance for admission.

Marriott Coronado Terrace, South Tower Level 4

Tuesday 28 August 7:00 pm to 8:30 pm

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.

SPIE Guest Hospitality Suite

San Diego Marriott Hotel and Marina, SPIE Suite 2573

Monday-Thursday, 27-30 August 8:30 to 10:00 am

Guests of attendees are invited to meet, relax, and enjoy a cup of coffee and breakfast breads in SPIE's Guest Hospitality Suite. This suite is for guests of attendees only. The hotel concierge will be available during a portion of this time to answer travel, shopping, and tourist questions.



SPIE 2007 Annual Awards Banquet

Marriott Marina Ballroom

Wednesday 29 August 7:30 to 9:30 pm

Banquet and Awards Presentations

SPIE President Prof. **Brian Culshaw** presiding

SPIE President Prof. Brian Culshaw will preside over the 2007 Awards Banquet that will include the presentation of the 2007 Society awards, scholarship awards, and new Fellows of the Society. Join us for this gala event and enjoy a presentation by the 2007 Society Gold Medal recipient Dr. Joseph Goodman.

Tickets for the banquet are not included in the registration fee but may be purchased on site at the SPIE Registration Desk until noon on Tuesday 28 August. Tickets are \$75 each.

Banquet Presentation

Foundations of a Successful and Satisfying Career: Education, Adaptability, Perspiration and Luck



Joseph W. Goodman, Stanford Univ.

This talk will give Dr. Goodman's opinions about the requirements for a successful and satisfying career. In a nutshell, the ingredients are the following: a broad and general undergraduate education with depth at the Masters or PhD level, adaptability and flexibility that will accommodate major changes of science and technology, hard work, and a large measure of luck. Examples from Dr. Goodman's experience will

illustrate his points.

Biography: **Joseph W. Goodman** received an A.B. Degree from Harvard in Engineering and Applied Physics, and M.S and Ph.D. degrees, both from Stanford University in Electrical Engineering. After 4 years on the research staff at Stanford, he joined the faculty of the Department of Electrical Engineering. He chaired the department from 1989 to 1996, following which he served as Senior Associate Dean of Engineering until 1999. He retired from Stanford in January of 2001.

Dr. Goodman is the author of the books *Introduction to Fourier Optics* (now in its 3rd edition), *Statistical Optics*, *Speckle Phenomena in Optics*, and is co-author of *Fourier Transforms: An Introduction for Engineers*. He is the author of more than 200 scientific and technical papers, and has been primary research supervisor for 49 Ph.D.s. He has received numerous awards from the IEEE, the OSA, SPIE and the ASEE, including the SPIE Dennis Gabor Award and the Frederick Ives Medal, the highest award of the OSA. He served on the SPIE Board of Governors for two terms, 1980-1982 and 1988-1990.

Dr. Goodman was a co-founder of Optivision, Inc., ONI Systems (now part of Ciena), and served as a member of the board of directors of E-TEK Dynamics (now part of JDS Uniphase).



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Annual General Meeting of the SPIE Corporation

The Society of Photo-Optical Instrumentation Engineers

Marriott Marina E

Tuesday 28 August 6:00 to 7:00 pm

Agenda:

1. Election Results
2. Report on the "State of the Society"
3. Treasurer's Report
4. Q&A with SPIE Officers

This is the general business meeting of the Society. All SPIE members are welcome and encouraged to attend. This is your forum for expressing your ideas about the Society. Results of the 2007 election will be announced and the President and the CEO will report on the State of the Society.

Fellows Luncheon

Marriott Marina G

Tuesday 28 August Noon to 2:00 pm

All Fellows of SPIE are invited to join your colleagues for an SPIE hosted luncheon. The 2007 Fellows will be introduced and receive their Fellows pins. Please join us for this informal gathering and a chance to interact with other Fellows.

Social and Networking Events



All-Conference Welcome Reception

Convention Center Upper Level Terrace

Monday 27 August 7:00 to 8:30 pm

All attendees are invited to relax, socialize, and enjoy refreshments and spectacular bay views. Please remember to wear your conference registration badge. Dress is casual.

Poster Sessions

Convention Center Ballroom 20C/D

Monday 27 August 6:00 to 7:30 pm

Tuesday 28 August 8:00 to 10:00 pm

Wednesday 29 August 5:30 to 7:00 pm

Conference attendees are invited to attend the poster sessions on Monday, Tuesday, and Wednesday evenings. Each evening will represent a different set of conferences. Come view the posters, ask questions, and enjoy the refreshments. 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: See setup instructions on p. 28

Women in Optics Presentation & Reception

Convention Center Room 33C

Monday 27 August 5:00 to 6:30 pm

Open to all conference attendees; refreshments will be served. Look for location information in the Final conference program.



Dr. Jean Morrison, Vice Provost for Graduate Programs, Professor of Earth Sciences, Director of the Women in Science and Engineering (WiSE) Program, University of Southern California

The Women in Science and Engineering Program at USC: Programs and Progress 2000 - 2007

The establishment of the Women in Science and Engineering (WiSE) Program represents the serious commitment of the University of Southern California

to address the under-representation of women in science and engineering. Since the launch of the program in 2000 with a \$20 million gift to the endowment, WiSE has helped to more than double the number of tenured and tenure-track women faculty in the natural sciences, math, and engineering at USC through its faculty recruitment and retention programs. Its complimentary programs to address "pipeline issues" in support of undergraduates, graduate students, and postdoctoral scholars in these fields through a range of financial awards and activities have also grown in scope and impact. She will discuss the programs developed and administered by WiSE to address the obstacles to women's success in academic science and engineering. She will relay the perceived successes to date, and the challenges that remain in striving for gender equity in science and engineering at USC and beyond.

Biography: **Jean Morrison** is the vice provost for graduate programs with primary responsibility for oversight of the university's graduate affairs and of the USC Graduate School. Since 2002, she has overseen the Women in Science and Engineering (WiSE) program, which enables USC to address fundamental issues that hinder the hiring and retention of women in science and engineering. Since the program's inception in 2000, the number of tenured and tenure-track women in these fields at USC has doubled. A professor of earth sciences, Morrison is a metamorphic petrologist whose research addresses how the earth's crust evolves over time. In particular, she studies the isotopic composition of rocks and minerals to understand the role that fluids play in fault systems. She served as an editor of the *Journal of Metamorphic Geology* and as an associate editor of the *American Mineralogist* and the *Geological Society of America Bulletin*. She received her Ph.D. from the University of Wisconsin, Madison, in 1988; her M.S. from the University of Georgia in 1983; and her B.A. from Colgate University in 1980. In addition, she and her husband, Professor Lawford Anderson, have 2 young children, Sarah, age 11 and James, age 8.

All-Conference Plenary Session

Convention Center, Ballroom 20A

Sunday 26 August 6:00 to 7:30 pm

6:00 pm:

Technology to Enable our Solar Technology Future



Thomas Feist, Manager, Thin Films Laboratory

Tom currently manages the Thin Films Laboratory in Micro and Nano Structures Technologies at GE Global Research. He began his career at GE in 1996 as a materials scientist working in energy storage, dielectric materials development, and next generation data storage. Before coming to GE, Tom spent 5 years as a staff scientist at Dupont in Wilmington, DE.

In 1999, Tom was appointed Technical Manager of Global Media programs in GE Plastics, where he led a team responsible for the development and implementation of new technology for high density optical and magnetic data storage.

In February of 2003, Tom was named Manager of the Thin Films Lab, which is developing new photovoltaic device technology, as well as conducting research in areas such as flat panel detectors for medical x-ray imaging, flexible electronics, and novel semiconductor devices based on nanostructured materials.

Tom holds 16 patents and has authored numerous papers in the fields of materials science, solid state chemistry, and data storage. He received his B.A. degree in Chemistry from Williams College in 1985. He received his Ph.D. in Materials Science and Engineering from the University of Pennsylvania in 1991.

6:45 pm:

The Concept of the Photon: Updated



Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

Abstract: The photon concept is one of the most debated issues in the history of physical science. Some thirty years ago, Sargent and I published an article in *Physics Today* entitled "The Concept of the Photon," in which we described the "photon" as a classical electromagnetic field plus the fluctuations associated with the vacuum.

However, recent developments view basic photon physics as much deeper than simple 'classical wave plus vacuum fluctuations' picture. In this talk I revisit the photon concept based on examples from these sources as well as recent work on Dicke superradiance in the one photon limit.

Biography: **Marlan O. Scully** received undergraduate training in Engineering Physics and Nuclear Engineering from the University of Wyoming and Rensselaer Polytechnic Institute and the Ph.D. in Physics from Yale University in 1966. He has held faculty positions at Yale, MIT, University of Arizona, University of New Mexico and the Max-Planck-Institut für Quantenoptik. He presently holds a joint appointment between Texas A&M and Princeton Universities.

He has been instrumental in many seminal contributions to laser science and quantum optics. These include: The Scully-Lamb quantum theory of the laser, the classical theory of the free electron laser, the theory of the laser gyroscope and especially the theory of correlated spontaneous emission noise quenching in such devices, the first demonstration of lasing without inversion and the first utilization of coherence effects to generate ultraslow light in hot gases. Furthermore Scully's work on quantum coherence and correlation effects has shed new light on the foundations of quantum mechanics and yielded new insights into quantum thermodynamics. He has been elected to the National Academy of Sciences, the Academia Europaea, and the Max Planck Society and has received numerous awards including the Charles H. Townes Award of the OSA, the Quantum Electronics Award of IEEE, the Elliott Cresson Medal of the Franklin Institute, the Adolph E. Lomb Medal of the OSA, a Guggenheim Fellowship, the Alexander von Humboldt Distinguished Faculty Prize, and the APS Arthur L. Schawlow Prize.

Plenary Sessions

NanoScience + Engineering Plenary Session

Convention Center Ballroom 20A

Monday 27 August 8:30 am to 12:00 pm

8:30 am:

Optically Driven Mechanical Micro/ Nanosystems in Classical and Quantum Realms



Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

Abstract: The aim to build and apply optically driven mechanical systems at ever smaller scale runs into many problems. The use of the linear momentum and orbital and spin angular momentum solves many problems and provides means to drive such systems. Significant progress has been made by a number of groups in optically driven micromachines. The ultimate scale to which one can take such systems

according to classical mechanics depends on Brownian motion and fabrication. At increasingly smaller scale the quantum effects become more important. However these effects are not obstacles but rather represent resources to be exploited in order to provide a way to the development of novel quantum technologies. The ultimate case is a Bose-Einstein Condensate that can be created and manipulated on an atom chip.

Biography: Professor **Halina Rubinsztein-Dunlop** is Head of the School of Physical Sciences and a Director of the Centre for Biophotonics and Laser Science at the University of Queensland. She obtained her PhD degree from the University of Gothenburg and Chalmers University of Technology in Sweden in 1978. She also holds a Docent Degree from the same University. At the University of Gothenburg she worked on the development of laser based methods for ultra-sensitive trace element analysis and established a strong research group in this area. Halina moved to the University of Queensland in 1989 where she today leads a large research group in experimental atom optics, laser micromanipulation and nano-optics. She also leads a program within which advanced single photon sources suitable for use in all-optical quantum computing and other quantum technologies will be developed. Halina's research interests are in laser physics, atom optics, laser micromanipulation, linear and nonlinear high resolution spectroscopy, and nano-optics. She is an expert in laser spectroscopy, atom optics and is internationally recognised for her work in laser micromanipulation. She is one of the originators of laser enhanced ionisation spectroscopy. She has over 160 publications in international peer refereed journals, six book chapters and a large number of international conference contributions and several invited talks. The work in atom optics under her leadership culminated in the demonstration of dynamical tunneling in a BEC in a modulated standing wave. Halina's group in laser micromanipulation was the first to demonstrate the transfer of angular momentum of light to microscopic particles.

9:00 am:

Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices



Liming Dai, Univ. of Dayton

Abstract: Polymers have long been used as electrically insulating materials: after all, metal wires are coated in plastics to insulate them. Various conjugated polymers with alternating single and double bonds can now be synthesized with unusual electrical, magnetic, and optical properties owing to the substantial π -electron delocalization along the polymer backbone. We have elucidated the mechanism through which the conductivity of "I2-

doped" non-conjugated polydiene rubbers arises and demonstrated photolithographic generation of conducting polybutadiene patterns for optoelectronic applications. We have also developed various polymeric light-emitting diodes with novel features for multi-color emissions at ordinary household current and synthesized novel dendritic and C[₆₀]-containing optoelectronic materials for flexible photovoltaic cells. Additionally, the discovery of carbon nanotubes has created new opportunities for material science and nanotechnology. Having conjugated all-carbon structures, carbon nanotubes also possess certain similar physicochemical characteristics as conjugated polymers, apart from their superior thermal and mechanical properties. For some practical applications, however, carbon nanotubes need to be aligned/micropatterned, in a similar fashion as conducting polymers in optoelectronic devices. We have developed simple methods for the large-scale synthesis and micropatterning of highly aligned carbon nanotubes for various potential applications ranging from chemical/bio-sensors to field emitters for panel displays. We have also prepared novel aligned nanowires by either electrochemically depositing a concentric layer of an appropriate conducting polymer onto the individual aligned carbon nanotubes or chemically grafting polymer chains onto plasma-activated carbon nanotube surfaces whilst largely retaining the nanotube structural integrity. The combination of the unique physicochemical properties of fullerenes and carbon nanotubes with comparable optoelectronic properties of conjugated polymers has yielded some interesting synergetic effects. In this talk, the above work will be summarized, along with an overview of some recent developments in the field.

Biography: **Liming Dai** joined the University of Dayton in 2004 as the Wright Brothers Institute Endowed Chair Professor of Nanomaterials in the Department of Chemical and Materials Engineering with joint appointments as chemistry professor in the Department of Chemistry, and as Distinguished Research Scientist at the University of Dayton Research Institute. Dr. Dai received a bachelor's degree in chemical engineering from Zhejiang University in 1983 and a doctorate in chemistry from the Australian National University in 1990. He was a postdoctoral fellow in physics in the Cavendish Laboratory at the University of Cambridge from 1990 to 1992 and a visiting fellow in the Department of Materials Science and Engineering at the University of Illinois at Urbana-Champaign in 1992. Thereafter, Dai spent 10 years with the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia, where he built a world-renowned research team in nanomaterials. Before joining the University of Dayton, he was a polymer engineering faculty at the University of Akron.

Dr. Dai's expertise lies across several fields, including the synthesis, chemical modification, and device fabrication of conjugated polymers, fullerene-containing polymers, and carbon nanotubes. He has published about 180 scientific papers, a research monograph on intelligent macromolecules, and an edited book on carbon nanotechnology. He also holds about 20 issued or filed patent applications. He is on the editorial board of two international journals and has received several awards including, IUPAC Young Observer Award in 2003, 2006 Sigma Xi's George Noland Research Award, and 2006 Outstanding Engineers and Scientists Award from the Affiliate Societies Council of Dayton.

9:30 am:

Brave New Nanoworld, without Apologies to Aldous Huxley



Akhlesh Lakhtakia, The Pennsylvania State Univ.

Abstract: Scientific progress has inspired futurists for centuries to conjure visions of utopias and dystopias. The emergence of nanosciences and nanotechnologies, and their confluence with life sciences as well as information science and technology, is bringing us closer to realizations of both types of visions. After succinctly surveying the salient features of nanosciences and nanotechnologies, and mapping out societal

perspectives thereof, I will discuss the social and ethical implications of the emerging developments and suggest an educational strategy to properly harness their socially transformative power.

Biography: **Akhlesh Lakhtakia** is the Charles Grover Binder (Endowed) professor of engineering science and mechanics at the Pennsylvania State University. He earned the BTech and DSc degrees in electronics engineering from the Banaras Hindu University in 1979 and 2007, respectively, and the MS and PhD degrees in electrical engineering from University of Utah in 1981 and 1983, respectively. A Fellow of SPIE and OSA, he is currently the editor-in-chief of SPIE's online Journal of Nanophotonics. He has published widely on many topics in optics and electromagnetics, elastodynamics, materials sciences, and nanotechnologies.

10:30 am:

High Performance Organic Electronic Devices Based on Nano-Scale Engineering



Yang Yang, Univ. of California/Los Angeles

Abstract: Conjugated organic molecules and polymers have known to have semiconductor property with solution processing capability. This unique combination enables a new class of electronic and opto-electronic materials and devices. In this presentation, a detail investigation on the physical properties of conjugated molecules and polymers will be presented. The understandings of the basic optical and electrical properties of these molecules and

polymers have leaded us to the invention novel devices and/or improvements of performance on existed device. For example, by controlling the interfacial dipole moment and the trap-state in luminescent materials, we are able to achieve nearly 40% internal quantum efficiency polymer LEDs. The concept of interface engineering is similar to the quantum well structure adopted in inorganic LEDs; however, with the simple solution possessing capability in polymer devices. On the other hand, the charge transfer and trapping concept in "donor-acceptor" system leads to a novel nonvolatile organic memory devices, which challenge traditional silicon flash memory. Finally, by controlling the polymer morphology, we have achieved the balance of carrier mobility between electrons and holes in our polymer solar cells, which has resulted 4.4% power conversation efficiency. In this presentation, we will present the results from those devices and their correlation with nano-scale engineering.

Biography: **Yang Yang** received his B.S. in Physics from the National Cheng Kung University in Taiwan in 1981, and his M.S. and Ph.D. in Physics from University of Massachusetts-Lowell, 1988 and 1992 respectively. He joined Prof. Bryan Kohler's group at UC-Riverside as a post-doc researcher from December 1991 to September 1992. He joined UNIAX Corporation (now du Pont Display) as a device physicist in October 1992. Yang joined the Department of Materials Science and Engineering of UCLA as an Assistant Professor in January 1997 and subsequently became Associate Professor in July 1998, and Professor in 2002. His research focuses on conjugated polymers, polymer LEDs, Memory devices, solar cells. He has published more than 120 refereed papers and given more than 50 invited presentations on his research work and has filed/granted 30 US patents. He received the following awards and honors: NSF Career Award: 1998; 3M Young Investigator Award, 1998; Who is Who in America, (1997- present); Professional Development Award, University of Massachusetts-Lowell, (1991). In the year of 2007, his group has achieved the following achievements: 4.4% efficiency polymer solar cell, 20 lm/watt white color polymer LED, organic transistor can be operated in less than 5V and reach several mA current.

Plenary Sessions

NanoScience + Engineering Plenary Session continued

Convention Center Ballroom 20A

11:00 am:

Nanotechnology: New Tool for Diagnostics and Treatment of Cancer



Michael J. Heller, Univ. of California/San Diego

Abstract: Generally, molecular or nanoelectronic devices and systems are envisioned as the more revolutionary application of nanotechnology. Many examples of individual molecular components with appropriate basic properties including carbon nanotubes and various organic molecules with electronic switching capabilities exist now. The research focus is now on the development of a viable technology that would allow billions of molecular/

nanoelectronic components to be assembled and interconnected into useful logic/memory devices and systems. In addition to electronic applications, nanodevices and nanosystems with higher order photonic, mechanical, mechanistic, sensory, chemical, catalytic, and therapeutic properties are also envisioned. To date, it has not been possible to design a synthetic model of these solid-state photonic transfer systems with the efficiency of the biological system. The acceleration of a "molecular engineering" perspective may be key to enabling nanotechnology for cancer and other disease therapeutics, particularly if self-organization or self-assembly based scenarios are required for the integration of components into the higher order devices and systems.

Biography: **Professor Michael J. Heller** began at UCSD in July 2001. He has a joint appointment between the departments of Bioengineering and Electrical and Computer Engineering. Dr. Heller received his Ph.D. in Biochemistry from Colorado State Univ. His rich scientific experience includes working as an NIH Postdoctoral Fellow at Northwestern Univ., supervising the DNA Technology Group at Amoco Corp., and serving as the Director of Molecular Biology at Molecular Biosystems, Inc. In 1987 Dr. Heller was elected President and Chief Operating Officer at Integrated DNA Technologies. He was also a co-founder and the Chief Technical Officer at Nanogen, Inc., located in San Diego, California and the principal inventor of Nanogen's microelectronic-based DNA chip technology. His experience includes many areas of biotechnology, with particular expertise in DNA molecular diagnostics and fluorescent/optoelectronic based detection technologies. Dr. Heller's most recent work involved the development of integrated DNA chip devices and systems for genomic and biomedical research and clinical diagnostic applications.

11:30 am:

Commercialization of Nanotechnology: A Business Perspective



Sean Murdock, Nano Business Alliance

Abstract: Moving a theory or concept to the marketplace is a long process fraught with economic and financial challenges that can be equally as daunting as the technical challenges. Working to identifying applications that provide satisfactory return on investment for both the user community and the investment community is the focus of many organizations including the Nano Business Alliance.

During this talk, the executive director of Nano Business Alliance will share his insights regarding those most promising applications spanning medicine, engineering, consumer products, and more. He will share the perspectives of business people and Wall Street where no matter how novel a new material may be, if it doesn't produce economic advantage for investors and shareholders, it is unlikely to survive the brutal reality of the marketplace. He will also discuss the key new nanotechnologies that will have the most global economic impact.

Biography: Prior to becoming the Executive Director of the NanoBusiness Alliance, **Sean Murdock** was the Executive Director and a founding board member of AtomWorks, an initiative formed to foster nanotechnology in Illinois and more broadly throughout the Midwest. Before that, Sean had more than 7 years experience in management consulting, most recently as Engagement Manager at McKinsey & Company. Sean served a variety of Fortune 500 companies, focusing primarily upon the industrial and chemicals sectors.

Sean has been very active in nanotechnology trade and economic development issues. He helped to organize and execute the first Nanotechnology Trade Mission to Europe in conjunction with the NanoBusiness Alliance and the U.S. Department of Commerce. He has also been engaged with senior officials of the U.S. Department of Commerce's Technology Administration on the potential impact of export control issues on nanotechnology development and commercialization.

He received his Masters in Business Administration and Masters in Engineering Management from Northwestern University. He holds a BA in Economics from the University of Notre Dame.

Solar Energy Plenary Session

Convention Center Ballroom 20A

Monday 27 August 1:30 to 5:30 pm

1:30 pm:

The Solar-hydrogen Economy: An Analysis



Warren Reynolds, CEO, Eco-Engineers, Inc.

Abstract: The 20th Century was the age of the Petroleum Economy while the 21st Century is certainly the age of the Solar-Hydrogen Economy. The global Solar-Hydrogen Economy that is now emerging follows a different logic. Under this new economic paradigm, new machines and methods are once again being developed while companies are restructuring.

The Petroleum Economy will be briefly explored in relation to oil consumption, Hubbert's curve, energy ratio, and oil reserves.

There are four major driving factors for the establishment of the Solar Hydrogen Economy, i.e. global warming, air pollution, national security and the coming "Oil Crash". The New Energy decentralization pathway has developed many progressive features, e.g., reducing the dependence on oil, reducing the air pollution and CO₂.

The technical and economic aspects of the various Solar-Hydrogen energy options and pathways will be analyzed as well as debunking some the "hydrogen myths".

There are emerging Solar Hydrogen energy infrastructures in the U.S., Europe, China and Japan. Some of the major infrastructure projects in the transportation and energy sectors will be shown. An estimated logistic time-curve for the total conversion to the New Economy through 2045 will be given.

A proposed 200 MWe solar-hydrogen power plant for Las Vegas with selected energy options will be discussed.

Biography: **Dr. Reynolds** has over 35 years experience in the nuclear, chemical and pharmaceutical industries. For 10 years, he was a nuclear engineer for GE's Nuclear Energy Division doing work on nuclear fuel reprocessing and breeder reactor R&D. At the National Center for Toxicology Research, he conducted instrumentation development in mass spectrometry and a photodiode array detector as well as carcinogen detection. He was a division manager at Lockheed's Engineering and Management Services Company managing an EPA contract for the National Superfund Project. He was technical advisor to San Diego County's Hazardous Waste Enforcement Division. He has received an "IR-100" award for development of an air pollution monitoring instrument. He has over 280 technical reports and published papers as well as over 30 technical presentations

2:00 pm:

Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell



Hironori Arakawa, Professor, Tokyo Univ. of Science (Japan)

Abstract: Water splitting by photoelectrochemical cell has such merits compared with powder photocatalyst as a separate gas evolution of H₂ and O₂, a suppression of backward reaction of water splitting and an efficient charge separation under applied bias. We have investigated solar hydrogen production using mesoporous and transparent oxide semiconductor films such as TiO₂ and WO₃ film photoelectrodes.

Photoelectrode composed of TiO₂ film with 10μm thickness on FTO glass showed the photocurrent of 0.39mA/cm² under both applied bias of 0.4V vs RHE and solar simulator (100mW/cm², AM1.5). This is equal to 0.32% STH and about 1L/m² of H₂ will be produced under this condition. On the other hand, WO₃ film photoelectrode showed the photocurrent of 1.3mA/cm² under applied bias of 0.9V vs RHE and solar simulator. This is equal to 0.43% STH and about 1.3L/m² of H₂ will be produced under this condition. Solar energy conversion efficiency to H₂ production (STH) was obtained from the following equation (1), $\eta(\%) = J(1.23-E)/I \times 100$ (1) where $\eta(\%)$ is a STH in %, and J is a produced photocurrent in mA/cm² at E. E is an applied potential in voltage. I is solar irradiance, that is, 100mW/cm², AM1.5.

Then, tandem cell system was applied for water splitting under solar simulator. Tandem cell system is composed of Pt wire, mesoporous and transparent oxide semiconductor photoelectrode such as TiO₂ and WO₃, and a Black-dye-sensitized solar cell (BDSC). We prepared two types of BDSC. The one was a single unit cell having Voc of 0.7V. The other was two-series connected cell having Voc of 1.4V. In case of tandem cell composed of a TiO₂ photoelectrode and a single BDSC, both H₂ and O₂ gas evolution were observed without any applying bias under solar simulated light. STH was 0.52%, showing 1.5 times higher than that of TiO₂ photoelectrode system. A two-series connected BDSC did not improve much in photocurrent and STH compared with those of a single BDSC. However, in the case of tandem cell composed of a WO₃ photoelectrode and a two-series connected BDSC, photocurrent and STH were much improved compared with that of a single BDSC system. The best STH was 2.4%, which was about 5 times higher than that of TiO₂ tandem cell system. Other metal oxide semiconductor systems will be also introduced.

Biography: **Hironori Arakawa** is currently a professor of Industrial Chemistry, Faculty of Engineering at Tokyo University of Science. He received his Doctor of Engineering Degree from Tokyo Institute of Technology in 1976. After this, he joined National Chemical Laboratory, one of National Institutes under AIST Japan. He moved to Tokyo University of Science in 2004. His research is concerned with development of catalytic technologies with an artificial photosynthetic process. This includes catalytic hydrogenation of CO₂ to alcohols, hydrogen production from water by powder oxide semiconductor photocatalysts and photoelectrodes, and dye-sensitized solar cell. He received some awards such as Award of Japan Institute of Energy, Merits of Minister of Science and Technology Agency Japan and The Best Paper Award of ISEC/ASME and so on. He is the author and co-author of over 250 peer-reviewed publications in the areas of CO and CO₂ conversion, water splitting photocatalysis and dye-sensitized solar cell.

Plenary Sessions

Solar Energy Plenary Session continued

Convention Center Ballroom 20A

2:30 pm:

New Opportunities in Concentrator Photovoltaics with Low-cost, 40% Efficient Multijunction III-V Solar Cells



Richard R. King, Principal Scientist, Photovoltaic Cell R&D, Spectrolab, Inc.

Abstract: Photovoltaics for solar electricity generation has been growing at a rate of over 30% per year for the last decade, with over 1.6 GW of solar cells produced in 2005. Concentrator photovoltaic (CPV) systems using very-high efficiency multijunction solar cells, with roughly double the efficiency of conventional flat-plate silicon solar panels, offer a path to bring the cost of solar electricity down still

further, to the point at which it is cost-effective to replace conventional fossil fuel and nuclear power plants with non-polluting concentrator photovoltaics. Recent experimental advances in III-V multijunction solar cell design have resulted in a metamorphic, or lattice-mismatched, GaInP/ GaInAs/ Ge 3-junction cell with 40.7% efficiency (AM1.5D, low-AOD, 240 suns, 25°C), the first solar cell to reach over 40% efficiency, and the highest solar conversion efficiency yet demonstrated for any type of photovoltaic device. Device improvements in lattice-matched CPV multijunction cells have now resulted in 40.1% efficiency, also exceeding the 40% milestone. Many of the high-efficiency device structures from the experiments leading to these record performance cells have been incorporated in lattice-matched production concentrator cells, increasing the power output of fielded CPV systems, with further experimental efficiency advances planned for future generations of mass-produced concentrator cells. The value of these very high efficiencies is that they reduce the cost of all area-related components of a photovoltaic system, such as glass, encapsulation materials, metal support structures, and semiconductor material of the cells themselves, opening wide market areas for photovoltaics. Efficiency data from large-volume production and long-term field tests of concentrator III-V multijunction solar cells will be presented. The impact of very high cell efficiency on overall PV system cost is analyzed, plotting a route to large-scale, cost-effective implementation of concentrator photovoltaics at the multi-GW/year production level, and ultimately to meet a significant part of the world's ~1.7 TW demand for electric power.

Biography: **Dr. King** is a Boeing Technical Fellow, and Principal Scientist responsible for Photovoltaic Cell R&D at Spectrolab, Inc. He did his Ph.D. research on recombination in silicon solar cells at Stanford University. Dr. King's research on photovoltaics over the last 20 years includes work on high-efficiency multijunction cell designs, and metamorphic III-V materials for solar cells. Dr. King has led Spectrolab's development of multijunction terrestrial concentrator solar cells, recognized with R&D 100 and Scientific American 50 awards, and most recently achieving a record 40.7% efficiency, the first solar cell of any type to reach over 40%. Dr. King was inducted into the Space Technology Hall of Fame in 2004, and has over 80 publications on photovoltaics and semiconductor device physics.

3:00 pm:

Module Design and Development: Progress and Opportunities



Doug Rose, Director of Module R&D, SunPower Corporation

Abstract: Worldwide production of flat-plate photovoltaic modules has increased dramatically, from 0.2 GW in 1999 to 2.4 GW in 2006, and is forecast to be 10GW in 2010. These production volumes, along with the recognition that module design has a large impact on module value, cost, and ease of production ramp, have greatly increased the interest in module conversion (i.e., the processes

for taking cells and making a package suited for outdoor use). Module design impacts the value of a solar module by affecting its energy production per area, life span, and physical suitability (e.g., mounting ease and aesthetics) for its intended application.

This talk provides a brief overview of module conversion approaches and their impact on module value and cost. Analysis includes the impact of module efficiency and ease of mounting in various market segments. Results from SunPower Corporation are used to illustrate the many areas of intersection between the topics of this conference and module design and development. A production module with >19% total-area efficiency, a new interconnect approach, optical modeling, measurement of high capacitance modules, energy production of modules, module reliability testing, and reliability prediction are all described.

Biography: **Doug Rose** is Director of Module R&D at SunPower Corporation. He received an MSME from Stanford University and a Ph.D. in EE from the University of Colorado. His career spans 20 years of manufacturing technology development, thin-film PV research, and crystalline silicon cell and module development at GTE, NREL, First Solar, and SunPower Corp. Dr. Rose has 2 patents and 54 publications in the field of solar energy.

4:00 pm:

Delivering Service at Scale: Old Requirements for the New Energy Industry



Mark Culpepper, VP/Strategic Marketing, SunEdison

Biography: **Mark Culpepper**, VP/Strategic Marketing, has an extensive background in strategic marketing, working with companies such as Symbol, Cable & Wireless, Digital Island, Cisco and Montgomery Securities. Prior to SunEdison, Mark worked as VP of Business Development for Team Solar Inc., an installer of utility scale solar solutions based in Sacramento, California. Mark holds a BSFS from Georgetown University School of Foreign Service.

Solid State Lighting and OLED Plenary Session

Convention Center Room 32A

Tuesday 28 August 8:30 to 10:00 am

8:30 am:

Solid State Lighting: Illumination and Communication



Ian E. Ashdown, Senior Research Scientist for TIR Systems Ltd. (Canada), Senior Software Engineer for Lighting Analysts Inc., and President of byHeart Consultants Ltd. (Canada)

Abstract: The solid-state lighting (SSL) market is in transition from glitzy color-changing displays to practical white light luminaires that will compete with incandescent and fluorescent lamps for general illumination applications.

With this change in focus, the SSL industry needs to better understand the needs of the architectural lighting community. More than just high-flux LEDs, we need to present SSL in the context of a lighting system that includes:

- Light-emitting diodes
- Thermal management
- Optics
- Drivers
- Power conversion

We also need to understand what industry standards for photometry, colorimetry, lifetime and electrical safety requirements will be applied to these systems, and to design SSL products that satisfy the luminaire designer's needs.

Most important, we need to communicate what high-flux LEDs can do, and to listen to what the architectural lighting community is saying.

Biography: **Ian Ashdown** is well known and widely respected for his contributions to the advancement of lighting technology. He is a Fellow of the Illuminating Engineering Society of North America who has written extensively over the past 30 years on lighting research and development. He holds over 40 patents and patent applications related to solid state lighting.

His professional and personal interests have two common themes: an enduring love of mathematics and an endless fascination with light. These have led to explorations ranging from photometric theory and eigenanalysis to genetic algorithms and holographic techniques.

Ian is currently hard at work on two projects: 1) solid-state lighting research and development for TIR Systems; and 2) the next version of Lighting Analysts' AGI32 and AGI Light lighting design software. When he is not working, he prefers to hike at elevations above 8,000 feet in the Canadian Rockies, where you can almost see his home in West Vancouver some 500 miles away.

4:30 pm:

PV Solar Electricity Market and Technology Development



Winfried Hoffmann, CTO, Solar Business Group, Applied Materials, Inc.

Biography: **Dr. Winfried Hoffmann** graduated in physics and did his PhD thesis in biophysics. He joined the just formed photovoltaic R&D group for thin film solar cells of NUKEM in 1979 and took over its leadership in 1985.

He initiated the Joint Venture in the photovoltaic field between NUKEM and Daimler-Benz Aerospace to form "Angewandte Solarenergie - ASE GmbH" in

1994 where he served as Managing Director. In the same year the acquisition of 100% shares of Mobil Solar as a subsidiary company was done. In October 2002 the Joint Venture between RWE Solutions and SCHOTT Glas, the RWE SCHOTT Solar GmbH, was formed, where he served as Chairman of the Board. Effective in 2005 SCHOTT acquired the shares of RWE Solutions and the company was renamed SCHOTT Solar GmbH where he was Member of the Management Committee.

In 2007 he joined Applied Materials to become Chief Technology Officer of the Solar Business Group and member of the Management Board of the German based Applied Materials GmbH.

He is currently President of the European Photovoltaic Industry Association (EPIA) and of the German Solar Industry Association (BSW) and member of the Scientific Board of the Fraunhofer institute for solar energy (FHG-ISE) and member of the Supervisory Board of the institute for solar energy research in Hameln (ISFH).

5:00 pm:

The Solar Industry-DOE and NREL Programs to Accelerate Growth



Stephen J. Eglash, Consultant to the National Renewable Energy Laboratory

Abstract: As solar energy approaches grid parity, the solar industry faces tremendous opportunities and major challenges. Economic, environmental, political, and social interests are powerfully aligned in support of renewable energy and energy efficiency. Examples include the President's Solar America Initiative, new Department of Energy funding initiatives, and reshaped and re-energized programs at the National

Labs. The SAI will inject \$148 million into solar R&D in 2007. New DOE initiatives run the gamut from basic research on materials, devices, and processes, to applied research such as the Photovoltaic Component / System Incubator for component prototype and pilot scale production, to commercialization activities such as the Technology Pathway Partnerships for system development and manufacturing. The National Renewable Energy Lab is rethinking its research programs and streamlining its intellectual property policies to assure alignment with industry.

This talk will examine these initiatives and describe opportunities for companies, universities, investors, and others to participate in these government programs.

Biography: **Steve Eglash** is presently a consultant to the National Renewable Energy Laboratory. Previously, Steve was a principal at the venture capital firm Worldview Technology Partners, a vice president at SDL / JDSU, and a member of the technical staff at MIT Lincoln Laboratory. Steve has a Ph.D. and M.S. from Stanford University and a B.S. from the University of California at Berkeley.

Plenary Sessions

Solid State Lighting and OLED Plenary Session continued

Convention Center Room 32A

9:15 am:

Organic LEDs for Lighting Applications



Junji Kido, Professor, Yamagata University (Japan) and General Director, Research Institute for Organic Electronics (Japan)

Abstract: Recent progress in organic light-emitting devices (OLEDs) will be discussed. High external quantum efficiencies (EQEs) of nearly 30% have been realized by using phosphorescent emitting materials. For the fabrication of such high efficiency devices, using wide-energy-gap organic materials, or high triplet excited energy materials, are very important

to maximize quantum efficiency of phosphorescent OLEDs. The high luminous efficiency of 130 lm/W for green OLED and 60 lm/W for white OLED have been achieved. We developed novel OLED structures, called multiphoton emission (MPE) structure, comprised of multiple emissive units and charge generation layers (CGLs) connecting the emissive units. In the device, each CGL injects electrons and holes to the adjacent emissive units, resulting in connecting the emissive units in series. Thus, electrons and holes are generated in the device and recombine to generate photons. Such charge generation process leads to the improvement the quantum efficiency of the device. White light-emitting OLEDs with stacked structures were developed to improve driving lifetime. In these OLEDs, required drive current can be much reduced and lifetime of over 300,000 hrs at 5000 cd/m² was achieved. Luminaires using such white OLED panels were demonstrated.

This work was financially supported in part by the New Energy and Industrial Technology Development Organization (NEDO) through the "Advanced Organic Device Project" and "Organic Lighting Project".

Biography: **Junji Kido** has received his B.S. degree from Waseda University, Japan, in 1984 and the M.S. and Ph. D. degrees from Polytechnic University, New York, in 1987 and 1989, respectively. In 1989, he joined the department of polymer chemistry in Yamagata University in Japan. He has been the General Director for Research Institute for Organic Electronics founded by the Yamagata prefectural government since 2003.

Image and Signal Processing Plenary Presentation

Convention Center Ballroom 20A

Wednesday 29 August 8:30 to 9:15 am

3D Home Theatre Systems



Kristina M. Johnson, Duke Univ.

Abstract: The future of home theatre entertainment is in delivering artifact-free, high-definition 3D imagery. Two-dimensional, theatre-sized display systems will be reviewed in terms of functional specifications such as size, weight, brightness, image and color quality, contrast, power consumption, human factors and pricing. The suitability for these systems to be adapted to three-dimensional home theatre applications will be presented. Reflective and

transmissive displays operating in direct view and projection can be integrated into single, dual and three panel 3D systems. Each technology and specific architecture will be discussed in the context of delivering artifact-free, true-color 3D imagery taking into account the user experience and overall system cost. The state of the art in stereoscopic and holographic 3D displays will be reviewed and compared. System challenges for realizing high quality, 3D displays in the home will also be discussed.

Biography: **Dr. Kristina M. Johnson** is the Dean of the Pratt School of Engineering at Duke University. She received her B.S., M.S. (with distinction) and Ph.D. in electrical engineering from Stanford University. After a NATO post-doctoral fellowship at Trinity College, Dublin, Ireland, she joined the University of Colorado-Boulder's faculty in 1985 as an Assistant Professor, promoted to full Professor in 1994. From 1994 until 1999 Johnson directed the NSF/ERC for Optoelectronics Computing Systems Center at University of Colorado and Colorado State University. She has published over 140 refereed papers and proceedings, and holds forty-three patents. Dr. Johnson received the NSF Presidential Young Investigator Award (1985), the IBM Faculty Award, and the Dennis Gabor Prize, for "creativity and innovation in modern optics" (1993), and the Photonics Spectra Circle of Excellence Award for her design of the 128 x 128 liquid-crystal-on-silicon spatial light modulator (1994). Dr. Johnson is a recipient of the Colorado Technology Transfer Award by the Colorado Advanced Technology Institute (1997), the Council for Entrepreneurial Development Infrastructure Award in North Carolina (2001), was inducted into the Women In Technology International (WITI) Hall of Fame (2003) and received the Achievement Award, the highest honor from the Society of Women Engineers in 2004. A fellow of the Optical Society of America, IEEE and a Fulbright Scholar, Dr. Johnson is a director of SPIE, has helped start several companies including founder of ColorLink, Inc. and sits on the Board of Directors of several publicly traded companies including Mineral Technologies Inc., Boston Scientific Corporation, AES Corporation and Nortel (and is a former director of Guidant Corporation and Dycom Industries). Dr. Johnson currently serves on the advisory boards of the Colorado School of Mines, the Georgia Institute of Technology School of Engineering, the Duke Childrens' Classic, and the North Carolina Institute for Emerging Issues. She has previously served on the advisory committee to the NSF Engineering Directorate (Chair, 2003-04), Science Foundation Ireland, Smith College Pickering School, and Carnegie Mellon University.



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Technical Special Events

Illumination Technical Event

Marriott Mission Hills

Monday 27 August 8:00 to 10:00 pm

Chair: **R. John Koshel**, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona

We will present two topics: étendue and state-of-the-art concepts for displays. For the former, speakers from display manufacturers, such as Philips, will be on hand to discuss such display topics as:

- LED displays,
- Visual experience of viewing displays, and
- Future trends in displays.

For the étendue topic, a panel with a moderator will be convened to discuss this very important topic of illumination system design. Étendue describes the geometrical propagation characteristics of optical systems, and for illumination systems it provides a metric for design analysis and limitations. This provides a physical limit analogous to that of the diffraction limit of imaging/lens design. For both topics, each presenter will give a short overview, followed by questions from the audience. If you would like to participate as a presenter in either of these areas, or possibly in another area, please contact John Koshel (john.koshel@osa.org). At the conclusion of the planned agenda the floor will be open to impromptu presentations and questions. Light refreshments will be served. We look forward to your participation.

Adaptive Optics Technical Event and Panel

Marriott Coronado

Tuesday 28 August 8:00 to 10:00 pm

Chair: **Scot Olivier**, Lawrence Livermore National Lab.

This meeting provides a forum for communication within the specialized fields of active and adaptive optics for scientists and engineers who are working or interested in these and related disciplines, including sensor technologies, control systems, real-time computing, optical and mechanical precision engineering.

This event will feature a keynote talk by Olivier Guyon from the Subaru Telescope on Adaptive Optics Techniques, Technology Developments and Future Needs for Extra-Solar Planet Detection. Adaptive Optics systems dedicated to the direct detection and characterization of exoplanets, (“Extreme-AO”) are now being developed for 8m-class telescopes. More capable systems are also planned for the next generation of large telescopes on the ground as well as for coronagraphic space telescope missions. These highly specialized AO systems incorporate very innovative techniques and hardware, and will be quite different from current “general-purpose” AO systems. Dr. Guyon will review the current state of “Extreme-AO” development and show that several promising techniques, especially in high sensitivity wavefront sensing and coronagraphy, point to a bright future for extrasolar planet science with AO, both from the ground and in space.

A panel discussion with Dr. Guyon and other experts in this field will follow.

Lens Design Technical Event

Marriott Marina D

Tuesday 28 August 8:00 to 10:00 pm

Chairs: **Mary Turner**, Breault Research Organization, Inc.; **Steve Johnston**, Photon Engineering, LLC; **Rich Pfisterer**, Photon Engineering, LLC

Modern Lens Design Methods

Six completely different methods for designing and optimizing optical systems, starting from scratch, will be discussed. Many design examples will illustrate these methods of generating new designs, and some will be demonstrated in real time during the talk. Systems shown range in complexity from a 27 element lithographic lens to a very simple new type of stereo viewer designed for Salvador Dali. Some design methods, like starting from a set of parallel plates, show a very surprising sensitivity to the exact initial conditions. A new and very simple type of perfect optical system (no aberrations of any kind and it forms a flat real image of a flat real object) was invented using no computations of any kind, using one of the six design methods. This material should lead to some interesting discussions by the group.

About the author: **David Shafer** has been a lens designer for 41 years. He is a Fellow of the O.S.A. and received the SPIE Conrady Award in 2005. Dave has had his own design and consulting business since 1980 and mainly works with lithographic and wafer inspection designs. He has a special interest in using aberration theory to generate new types of optical designs and in optimization methods. Dave is 64, but he reads on a 66 year old level.

Optomechanical/Instrument Technical Event

Marriott Cardiff

Tuesday 28 August 8:00 to 10:00 pm

Chair: **Alson E. Hatheway**, Alson E. Hatheway Inc.

This is the annual meeting of the premier group of optomechanical engineers that design and analyze the world’s optical instruments and systems. Our feature speaker will be Larry Stepp who will discuss,

Optomechanical Challenges of the Thirty Meter Telescope

The Thirty Meter Telescope (TMT) will be an extremely large, ground-based segmented-mirror optical-infrared telescope. Although similar in concept to the Keck Observatory 10-meter telescopes, each Keck telescope has just 36 hexagonal segments, while TMT will have 492! TMT faces new technical challenges because of its size and complexity and new programmatic challenges because of the strong pressure to limit its cost and complete its construction as quickly as possible. Larry Stepp is the TMT Telescope Department Head. His department is responsible for the telescope structure, optics and controls.

This gathering is open to all attendants to the Optics and Photonics Symposium. Anyone who wishes to put an item on the agenda should contact the Chair [Al Hatheway: aeh@aehinc.com]. One agenda item will certainly be the advance planning of our biennial conference on Optomechanics for year-after-next’s (2009’s) Optics and Photonics Symposium.

Following the speakers and other agenda items the floor will be open for our traditional ‘Problems and Solutions Workshop’ session so bring some challenges for the group.

Penetrating Radiation Technical Event

Marriott Balboa

Tuesday 28 August 8:00 to 10:00 pm

Chair: **Warnick J. Kernan**, National Security Technologies, LLC

The event brings together those with interests in neutron, x- and gamma-ray detection, spectroscopy, and imaging for all applications.

This meeting will feature a special presentation on “Exciting Results from the Swift Gamma-Ray Burst Explorer,” Dr. Ann M. Parsons, NASA Goddard Space Flight Ctr.

X-Ray/EUV Optics Technical Event

Marriott Mission Hills

Tuesday 28 August 8:00 to 10:00 pm

Chair: **Forbes R. Powell**, Luxel Corp.

The X-Ray/UV Optics Technical Community is comprised of scientists and engineers involved in the design, development, and application of X-Ray/UV optical technologies. This meeting will feature a fast moving series of brief informal presentations in a format similar to that used at some conferences to preview poster session papers. Speakers will be allowed 2 viewgraphs and 5 minutes including questions to present whatever they think might be of interest to those present. Presenters will speak in the order they sign up at the meeting. After the last presentation we will open the meeting to a general discussion with no preset rules. We have used this meeting format for the last five years with good success.

In the past we have had an interesting mix of senior people giving brief updates on their current activities, and young scientists and engineers asking for help in finding information that might aid them in their work. For this reason, we would like to encourage broad attendance and participation in this meeting. It provides a good vehicle for "networking" and "mentoring" within this Technical Group's areas of endeavor. There will be two prizes for the best talks as judged by the audience present. One prize will be for the best talk by a senior person, and one prize will be for the best talk by a young person. Deciding on the winners has always added to the fun.

Panel Discussion: Life in the Cosmos

Marriott Marina F

Tuesday 28 August 8:00 to 10:00 pm

Panel Moderators:

Paul C. W. Davies, BEYOND - Ctr. for Fundamental Concepts in Science, Arizona State Univ.

Richard B. Hoover, NASA/National Space Science and Technology Ctr.

Panel Members:

Eric M. Galimov, V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry (Russia)

François C. Raulin, GDR CNRS Exobio (France)

Alexei Yu. Rozanov, Paleontological Institute (Russia)

David S. McKay, NASA Johnson Space Ctr.

Gilbert V. Levin, Spherix Inc.

Michael Storrie-Lombardi, Kinohi Institute

Jere H. Lipps, Univ. of California/Berkeley

David Deamer, Univ. California/Santa Cruz

Joseph Seckbach, The Hebrew Univ. of Jerusalem (Israel)

Polarization Technical Event

Convention Center Room 28B

(No-Host Lunch)

Wednesday 29 August 11:50 am to 1:20 pm

Chair: **Art Lompadó**, Polaris Sensor Technologies, Inc.

Cochair: **Derek Sabatke**, Ball Aerospace & Technologies Corp.

This event is focused on research, development, engineering, and applications in fields of optics where polarization and its measurement are key issues. Held in conjunction with Conference 6682: Polarization Science and Remote Sensing III.

Workshop: Optics in Entertainment

Convention Center Room 25B

Thursday 30 August 8:30 am to 12:00 pm

Chairs: **Kristina M. Johnson**, Duke Univ; **Michael G. Robinson**, ColorLink, Inc.

The evolution of visual entertainment systems has relied on advances in optical materials, devices, and hardware/software systems to capture, transmit, store and display pictures with ever increasing clarity, resolution, color gamut, and brightness. With the advent of improved three-dimensional display technology, 3D high definition home and cinema projection will explode in the next decade.

This workshop will focus on the enabling optical technologies for future entertainment systems including, novel illumination devices, optical system design, digital and analog reflective, transmissive, transmission and emissive displays, making animation realistic, games for training, education and entertainment, image capture, processing storage and display. The ergonomic and human factors associated with visualizing new and innovative technologies will also be emphasized.

8:30 am: **Motion picture workflow pipeline for 3D stereoscopic content generation from high-dynamic-range images for flat and hemispherical theaters**, Mark J. Prusten, Optical Design Labs.; Michelle K. McIntyre, Total Eclipse Studios; Michael Magee, The Univ. of Arizona [WK1-1]

9:00 am: **Optical systems in entertainment**, Olha V. Malinochka, Kiev Univ. of Economy and Transport Technology (Ukraine) [WK1-2]

9:30 am: **Performance improvements in back panel display lighting using near Lambertian diffuse high-reflectance materials**, Bob, Y., Chang, Christina, M., Chase, Labsphere, Inc., [WK1-3]

Coffee Break 10:00 to 10:30 am

10:30 am: **Tele-counseling and social skill trainings using JGN-||; optical network and a mirror interface system**, Sayuri Hashimoto, Univ. of Tsukuba (Japan); Nobuyuki Hashimoto, Citizen Active Co., Ltd. (Japan); Akira Onozawa, Eiich Hosoya, Ikuo Harada, NTT Microsystem Integration Labs. (Japan); Junzo Okunaka, National Institute of Information and Communications Technology (Japan) [WK1-4]

11:00 am: **Examples of subjective image quality enhancement in multimedia**, Milos Klima, Czech Technical Univ. (Czech Republic) [WK1-5]

11:30 am: **Optically accelerated indicator based on multi-ring moiré patterns**, Emin Gabrielyan, Switernet (Switzerland) [WK1-6]

2007 SPIE Award Recipients

Since 1959, SPIE has honored outstanding achievements and excellence in the optics and photonics community through its prestigious awards program. The Awards Committee is pleased to announce the 2007 SPIE award recipients.



Gold Medal of the Society

Joseph W. Goodman

The Gold Medal of the Society is the highest honor that SPIE bestows. It is presented annually in recognition of outstanding engineering or scientific accomplishments in optics, electro-optics, or photographic technologies or applications, without which the technology would not have progressed to its present state.

Joseph W. Goodman, Stanford University (Stanford, CA), is the 2007 recipient of the Gold Medal of the Society in recognition of his seminal contributions to the field of Fourier optics, optical signal processing, optical interconnects and speckle, as well as his effective and stimulating teachings through three classical textbooks and his leadership roles in promoting optics research, technology transfer from academia to industry, and entrepreneurship.

Read a profile of Goodman on page 24 of July SPIE Professional.



Dennis Gabor Award

Ichirou Yamaguchi

The Dennis Gabor award is presented annually in recognition of outstanding accomplishments in diffractive wavefront technologies, especially those which further the development of holography and metrology applications.

Ichirou Yamaguchi, RIKEN and Gunma University (rtd.), Toyoseiki (consult.), Japan, is the 2007 recipient of the Dennis Gabor Award in recognition of his eminent contributions to the development of holography and speckle metrology through pioneering work in the analysis of correlation properties of diffusely reflected light from laser-illuminated rough surfaces, and the inventions of a laser speckle strain gauge and phase-shifting digital holography.



George W. Goddard Award

Alan Title

The George W. Goddard Award is presented annually in recognition of exceptional achievement in optical or photonic instrumentation for aerospace applications, without which the technology would not have progressed to its present state.

Alan Title, Lockheed Martin Advanced Technology Center (Palo Alto, CA), is the 2007 recipient of the George W. Goddard Award in recognition of his contributions and leadership as the principle investigator for NASA's TRACE mission, as well as his design and operations of space optics instruments throughout his career, which has had a major impact on probing the hydrodynamics of the Sun's solar interior and mapping the Sun's surface magnetic field.

Nominate a Colleague for an SPIE Award

SPIE presents awards each year that recognize outstanding individual and team technical accomplishments and meritorious service to the Society.

Nominations for a 2008 SPIE Award may be made through 1 October 2007. Anyone may nominate an individual for an award of the Society, and the nominee does not have to be a member of SPIE to be eligible for an award.

For more information on the nomination process and nomination forms, visit SPIE.org/nominate.



Educator Award

Valery Tuchin

The SPIE Educator Award is presented annually in recognition of outstanding contributions to optics education by an SPIE instructor or an educator in the field.

Valery Tuchin, Saratov State University (Saratov, Russia) is the 2007 recipient of the Educator Award in recognition of his unparalleled global contributions to education and dissemination of technical information in the field of biomedical optics and biophotonics, and his pioneering work for SPIE biomedical optics educational programs.



A. E. Conrady Award

Ellis Betensky

The A. E. Conrady Award is presented annually in recognition of exceptional contributions in design, construction, and testing of optical systems and instrumentation, without which the technology would not have progressed to its present state.

Ellis Betensky, Light Capture Inc. (Ottawa, Canada), is the 2007 recipient of the A. E. Conrady Award in recognition of his significant contributions to expanding the state of the art in zoom lens design.



Frits Zernike Award for Microlithography

David M. Williamson

The Frits Zernike Award is given for outstanding accomplishments in microlithographic technology, especially those furthering the development of semiconductor lithographic imaging solutions.

David M. Williamson, Nikon Research Corp. of America (Tucson, AZ), is the 2007 recipient of the Frits Zernike Award for Microlithography in recognition of his outstanding contributions to the advancement of imaging optics for microlithography.



G. G. Stokes Award

Russell Chipman

The G. G. Stokes Award is given annually for exceptional contribution to the field of optical polarization. The award can be presented for a specific achievement, development, or invention of significant importance to optical science and society, or may be given for lifetime achievement.

Russell Chipman, University of Arizona (Tucson, AZ), is the 2007 recipient of the G. G. Stokes Award in recognition of his many contributions to the fundamental understanding of polarization, development of polarization mathematics, and advancement of the field of polarization engineering.



SPIE Technology Achievement Award

Ali Adibi

The SPIE Technology Achievement award is awarded annually to recognize outstanding technical accomplishment in optics, electro-optics, photonic engineering, or imaging. The recipient(s) shall have contributed significantly to the advancement of one or more of these areas with specific demonstrations or applications.

Ali Adibi, Georgia Institute of Technology (Atlanta, GA), is the 2007 recipient of the SPIE Technology Achievement Award in recognition of his outstanding achievements in the areas of volume holography and photonic crystals.

Rudolf Kingslake Medal and Prize

The Rudolf Kingslake Medal and Prize is awarded annually by the Kingslake Award Committee to recognize the most noteworthy original paper to appear in the SPIE journal *Optical Engineering* on the theoretical or experimental aspects of optical engineering. The 2006 Rudolf Kingslake Medal and Prize will be announced at the Optics + Photonics symposium and in the October issue of *SPIE Professional*.

President's Award

The President's Award, a discretionary award plaque, may be given to an individual who, in the opinion of the President and the Board of Directors, has rendered a unique and meritorious service of outstanding benefit to the Society. The 2007 President's Award will be announced at the Optics + Photonics symposium and in the October issue of *SPIE Professional*.

Directors' Award

The Directors' Award, a service award certificate, may be given to an individual who, in the opinion of the Board of Directors, has rendered a significant service of outstanding benefit to the Society. This year's Directors' Award will be announced at the Optics + Photonics symposium and in the October issue of *SPIE Professional*.



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Supporting SPIE Membership



56 New SPIE Fellows Elected

SPIE will honor 56 new Fellows of the Society this year. Fellows are members of distinction who have made significant scientific and technical contributions in the multidisciplinary fields of optics, photonics, and imaging. They are honored for their technical achievement, for their service to the general optics community, and to SPIE in particular. More than 480 SPIE

members have become Fellows since the Society's inception in 1955.

"The annual recognition of Fellows provides an opportunity for us to acknowledge outstanding members for their service to the general optics community," says Brian Culshaw, SPIE President.



**Sos S.
Agaian**

University of Texas at San Antonio, USA, for specific achievements in image processing, target detection and recognition, and multimedia security.



**A.F. Mehdi
Anwar**

University of Connecticut, USA, for specific achievements in modeling of quantum-size-effect optical devices.



**Timothy J.
Bunning**

Air Force Research Lab., USA, for specific achievements in organic-based photonic materials and components.



**Jan P.
Allebach**

Purdue University, USA, for specific achievements in electronic imaging.



**Jaakko T.
Astola**

Tampere University of Technology, Finland, for specific achievements in electronic imaging and image processing.



**Edward M.
Carapezza**

Defense Advanced Research Projects Agency, USA, for specific achievements in air, ground, and ocean sensors and sensor networks.



**Moeness G.
Amin**

Villanova University, USA, for specific achievements in radar and microwave imaging.



**David J.
Brady**

Duke University, USA, for specific achievements in novel methods for optical sensing, imaging, and spectroscopy.



**Britton
Chance**

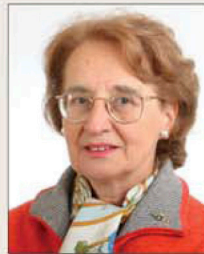
University of Pennsylvania, USA, for specific and pioneering achievements in biomedical optics.

New SPIE Fellows



**Chang Wen
Chen**

Florida Institute of Technology, USA, for specific achievements in electronic imaging and visual communications.



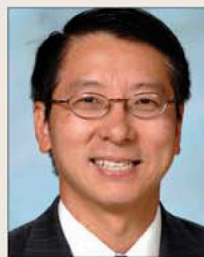
**Anna
Consortini**

Università degli Studi di Firenze, Italy for specific achievements in Laser propagation through atmospheric turbulence, theory, experiments, and applications and for her long lasting services to the international optical community.



**Ari T.
Friberg**

Kungliga Tekniska Högskolan, Sweden, for specific achievements in electromagnetic coherence, near-field optics, and nanophotonics.



**Wei R.
Chen**

University of Central Oklahoma, USA, for specific achievements in laser applications for cancer research and biomedical imaging.



**Henri-Jean M.
Drouhin**

École Polytechnique, France, for specific achievements in spin filters and spin-polarized electrons in solids, photocathode physics, and technology.



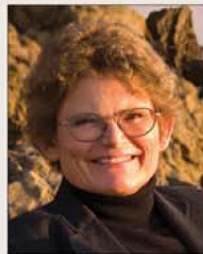
**James G.
Fujimoto**

Massachusetts Institute of Technology, USA, for specific achievements in biomedical optics and biophotonics.



**Carol J.
Cogswell**

University of Colorado, Boulder, USA, for specific achievements in optical microscopy and digital image processing.



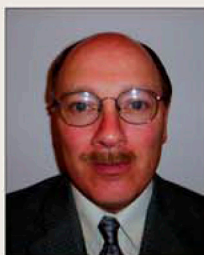
**Colleen
Fitzpatrick**

LightWorks Optics Inc., USA, for specific achievements in optical diagnostic techniques and devices.



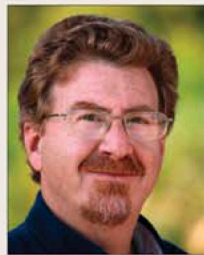
**Guillermo C.
Gaunaud**

Army Research Lab., USA, for specific achievements in direct and inverse electromagnetic and acoustic interactions with matter.



**Willard E.
Conley**

Freescale Semiconductor Inc., USA, for specific achievements in photolithography materials and processes.



**Donis G.
Flagello**

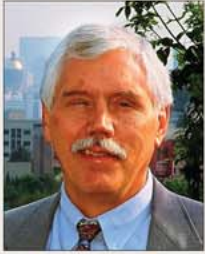
ASML US, USA, for specific achievements in photolithography materials and processes.



**G. Charmaine
Gilbreath**

Naval Research Lab., USA, for specific achievements in nonlinear optics, laser ranging, sparse apertures, and atmospheric effects.

New SPIE Fellows



**Gary G.
Gimmestad**

Georgia Institute of Technology, USA, for specific achievements in atmospheric remote sensing in the area of lidar.



**Naomi J.
Halas**

Rice University, USA, for specific achievements in nanophotonics and plasmonics.



**Satoshi
Kawata**

Osaka University, Japan, for specific achievements in nanophotonics and near-field optics.



**William A.
Goodman**

Schafer Corporation, USA, for specific achievements in silicon mirror technologies for high-power and lightweight optics.



**Juergen
Jahns**

FernUniversität Hagen, Germany, for specific achievements in micro-optics and micro-optic systems integration.



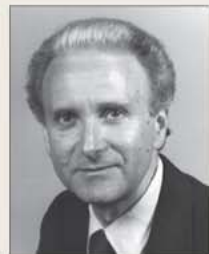
**Yuri N.
Kulchin**

Institute for Automation and Control Processes, Russia, for specific achievements in optics, laser physics, optical measuring, and information processing techniques.



**Claire
Gu**

University of California, Santa Cruz, USA, for specific achievements in information photonics.



**Ivan
Kadar**

Interlink Systems Sciences Inc., USA, for specific achievements in sensing systems design, information fusion, and image processing and recognition.



**Charles Y.C.
Lee**

Air Force Office of Scientific Research, USA, for specific achievements in next-generation photonics materials.



**Robert C.
Guyer**

BAE Systems, USA, for specific achievements in optical instrumentation for military, aerospace, and commercial applications.



**Yehoshua Y.
Kalisky**

Negev Nuclear Research Centre, Israel, for specific achievements in laser physics, laser spectroscopy, solid-state and diode-pumped lasers, electro-optics, and nonlinear optics.



**Qingming
Luo**

Huazhong University of Science and Technology, China, for specific achievements in biomedical optics and medical imaging.

New SPIE Fellows



Gabriel G. Marcu

Apple Computer Inc., USA, for specific achievements in electronic imaging.



Scot S. Olivier

Lawrence Livermore National Laboratory, USA, for specific achievements in adaptive optics.



James F. Riker

Air Force Research Lab., USA, for specific achievements in laser tracking, laser radar, and adaptive optics for astronomical applications.



Seth R. Marder

Georgia Institute of Technology, USA, for specific achievements in nonlinear optical properties of organic and metal-organic materials.



Thrasyvoulos N. Pappas

Northwestern University, USA, for specific achievements in electronic imaging.



Timothy J. Schulz

Michigan Technological University, USA, for specific achievements in blind deconvolution methods for optical imaging.



John C. Mather

NASA Goddard Space Flight Center, USA, for specific achievements in optics instrumentation for space science and cosmology.



Seung-Han Park

Yonsei University, South Korea, for specific achievements in nonlinear optics and laser spectroscopy.



Ali Serpengüzel

Koç University, Turkey, for specific achievements in micro-photonics, nanophotonics, biophotonics, eco-photonics, nonlinear optics, and laser diagnostics.



Robert A. Norwood

University of Arizona, USA, for specific achievements in organic and polymeric materials for photonics and electronics.



Eli Peli

Schepens Eye Research Institute, USA, for specific achievements in image understanding and perception, visual psychophysics, and physiological optics for the visually impaired.



Bruce W. Smith

Rochester Institute of Technology, USA, for specific achievements in optical micro- and nanolithography.

New SPIE Fellows



**Morley O.
Stone**

Air Force Research Lab., USA, for specific achievements in bio-organic materials and device research for photonics applications.



**Wacław
Urbanczyk**

Politechnika Wroclawska, Poland, for specific achievements in fiber optics and fiber-optic sensors.



**C. Grant
Willson**

University of Texas at Austin, USA, for specific achievements in semiconductor photolithography.



**Thomas J.
Suleski**

University of North Carolina at Charlotte, USA, for specific achievements in diffractive and micro-optics.



**Valentin I.
Vlad**

National Institute for Lasers, Plasma, and Radiation Physics, Romania, for specific achievements in photorefractive crystals, holography, and interferometry.



**Shin-Tson
Wu**

University of Central Florida, USA, for specific achievements in liquid crystal optics and electro-optics.



**Bruce J.
Tromberg**

University of California, Irvine, USA, for specific achievements in biomedical optics.



**Ge
Wang**

University of Iowa, USA, for specific achievements in bioluminescence tomography and x-ray computed tomography.



**Cynthia Y.
Young**

University of Central Florida, USA, for specific achievements in laser propagation through random media, in particular Earth's atmosphere.



**Walter J.
Trybula**

The Trybula Foundation Inc., USA, for specific achievements in emerging optical lithography technologies.



**Jinxue
Wang**

Raytheon Santa Barbara Remote Sensing, USA, for specific achievements in satellite optical remote sensing technology.

Events for Students

Student Chapter Leadership Workshop Day 1

Saturday 25 August 8:00 am to 4:00 pm
Event by Invitation Only

Join us for engaging speakers, professional development opportunities, and a chance to connect with Student Chapter Leaders from around the world! Collaborate with your peers, find new colleagues, and learn how to get the most from your Student Chapter involvement. You'll also learn the nuts and bolts of SPIE Student Membership Benefits such as Student Chapter funding, scholarships, travel grants, and visiting lecturers.

Student Chapter Leadership Workshop Day 2

Marriott Hotel - various rooms

Sunday 26 August 9:00 am to 2:00 pm
Open to all Students

The Leadership Workshop continues Sunday with break-out sessions focusing on specific member-requested topics. Come ready to share your thoughts and ideas.

Keynote Speaker

Marina D/E

Colleen O'Laughlin, Technology Leadership Development at GE, speaks about finding what you really want to do with your career and how to go about it. Take this opportunity to learn some valuable life lessons from a dedicated GE employee.

Session Topics:

Presentations and Public Speaking

Marriott Hotel - Boardroom

Sunday 26 August 10:00 am to 12:30 pm
Guest Speakers:

- **Dr. Yoseph Bar-Cohen**, Jet Propulsion Lab.
- **Dr. Richard Youngworth**, Ball Aerospace Corp.
- **Dr. Akhlesh Lakhtakia**, The Pennsylvania State Univ.

Optics Outreach and Pedagogy

Marriott Hotel - Carlsbad

Sunday 26 August 10:00 am to 12:30 pm
Guest Speakers:

- **Ms. Celeste Baine**, Engineering Education Service Center
- And other distinguished guests

Career Development and Leadership

Sunday 26 August 10:00 am to 12:30 pm
Marriott Hotel - Coronado

Guest Speakers:

- **Dr. Marc Himel**, Tessera Inc.
- **Mrs. Roxanne Farkas**, UCSD Career Services
- And other distinguished guests

"No Ties" Student Social

Sunday 26 August 7:00 to 9:00 pm
Marriott Hotel - Poolside

Relax and hang out with new friends and peers while enjoying the warm weather and a west coast sunset. No ties required but please bring photo ID — this is a licensed event.

Lunch and Student Congress

Marriott Hotel - Marina D/E

Sunday 26 August 12:30 to 2:00 pm
The day concludes with lunch and an open-floor forum for you to voice suggestions and feedback on the SPIE Student Services program.

Student Lunch with the Experts

Monday 27 August 12:30 to 1:30 pm
Advance sign-up in the Marketplace by 5:00 pm Sunday required. Seating is limited.

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 optics and photonics, and an awards presentation for Newport Spectra-Physics scholarship winners. Lunch is complimentary to all students; attendee bios can be viewed at the Marketplace.

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.

Student Exhibit Hall Section

Tuesday to Thursday Exhibition Hours
Visit the student section of the exhibit, and see what our Student Chapters have accomplished in research, outreach, and more this year.

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

WS852 • Course Level: Introductory
CEU: .20 \$20/\$25 USD • Register at the SPIE Cashier

Monday 27 August 2:00 to 5:00 pm

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. It was developed as part of HOO, a four year program funded by a \$1.7 million dollar grant from the U.S. National Science Foundation (NSF) to design and implement a science enrichment program for children ages 11 to 14 years old.

Intended Audience

Optics professionals, university students, and pre-college teachers.

Instructor

Robert T. Sparks earned an M.S. in Physics from Michigan State University and is a Science Education Specialist at the National Optical Astronomy Observatory in Tucson, AZ. He taught high school physics, math and astronomy for 11 years before joining the HOO Team. He has been revising the HOO modules, planning and delivering HOO professional development workshops, and working on the development of new modules.

Events for Early Career Professionals

The Craft of Scientific Presentations: A Workshop on Technical Presentations

WS667 • Course level: Introductory
CEU .35 \$75/\$125 USD • Register at the SPIE Cashier

Wednesday 29 August 8:30 am to 12:30 pm

This course provides attendees with an overview of what distinguishes the best scientific presentations. The course introduces a new design for presentation slides that is both more memorable and persuasive from what is typically shown at conferences.

Intended Audience

This material is intended for anyone who needs to present scientific research. Those who either have not yet presented or have made several presentations will find this course valuable.

Instructor

Kathryn Pyle Krages, AMLS, MA, is assistant professor of medical informatics & clinical epidemiology at Oregon Health & Science University in Portland, where she teaches a scientific writing and communication course to OHSU graduate students, both on campus and via the Internet.

Free to Student
Members

The Craft of Scientific Writing: A Workshop on Technical Writing

WS668 8 Course level: Introductory
CEU .35 \$75/\$125 USD • Register at the SPIE Cashier

Wednesday 29 August 1:30 to 5:30 pm

This course provides an overview on writing a scientific paper. The course focuses on the structure, language, and illustration of scientific papers.

Intended Audience

This material is intended for anyone who needs to write about scientific research. Those who either have not yet written a paper or have written several papers will find this course valuable.

Instructor

Kathryn Pyle Krages, AMLS, MA, is assistant professor of medical informatics & clinical epidemiology at Oregon Health & Science University in Portland, where she teaches a scientific writing and communication course to OHSU graduate students, both on campus and via the Internet.

Free to Student
Members

Optimizing Your Resume

WS777 • Course level: Introductory
CEU .20 \$50/\$100 USD • Register at the SPIE Cashier

Monday 27 August 1:30 to 3:30 pm

Today's job market pits you against hundreds, if not thousands, of candidates who have approximately the same credentials as you do. How do you stand out in the crowd? This workshop, which concentrates on students and recent graduates, will review a number of strategies, tips, and tools that you can use to increase the impact of your resume and cover letter. We'll examine ways to translate your educational experience into a format that is attractive to potential employers, and how to create tailored versions of your job search materials for multiple targets. The process of creating your resume will be discussed, with a focus on both layout/formatting and writing style. We'll also look at cover letters, lists of references, and other materials used in your job search.

Intended Audience

This material is intended primarily for students, recent graduates, and early-career professionals who want to improve the quality and effectiveness of their job search materials.

Instructor

John Cain is a former professional resume writer, and has written more than 500 resumes and cover letters for multiple industries and professions, focusing primarily on technical fields. He currently develops technical education programs for SPIE.

Free to Student
Members

SPIEWorks Career Fair

Exhibition Hall D

Tuesday 28 August 11:00 am to 3:00 pm

Wednesday 29 August 11:00 am to 3:00 pm

Whether you're an experienced professional or a student just starting out, the SPIEWorks Career Fair provides you with an ideal opportunity to launch or advance your career. Meet directly with recruiters from top employers, learn more about employment opportunities, and interview for positions. Remember to post your resume online at SPIEWorks.com!

Early Career Networking Social

Marriott Hotel - Poolside

Sunday 26 August 5:30 to 7:00 pm

Enjoy a casual outdoor networking opportunity with distinguished SPIE contributors.

Attendees include:

- **Dr. Yoseph Bar-Cohen**, Jet Propulsion Lab
- **Prof. Ian Ferguson**, Georgia Institute of Technology
- **Dr. Ralph James**, Brookhaven National Lab
- **Dr. Zakya Kafafi**, Naval Research Lab
- **Dr. Ali Khounsary**, Argonne National Lab
- **Prof. Zhenan Bao**, Stanford Univ.
- And other distinguished guests!

Essential Skills for Engineering Project Leaders

WS846 • Course level: Introductory
CEU .35 \$95/\$115 USD • Register at the SPIE Cashier

Wednesday 29 August 1:30 to 5:30 pm

This workshop teaches skills needed to lead technical projects, drive innovation, and influence others. Attendees learn the difference between leadership and management, and how to develop specific leadership skills that are important to technical professionals who lead projects or need assistance from others to get things done. Participants engage in exercises that assess their individual leadership abilities and provide guidance for further skill development.

Intended Audience

This material is intended for early-career technical professionals who can benefit from improving leadership skills.

Instructor

Gary C. 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. Gary led several high-profile projects including the development of a U.S. Army vehicle maintenance system, and he directed the development of 9-1-1 systems used in the majority of Public Safety Answering Points in the U.S. He also served as engineering manager for the world's best selling oscilloscope product line at Tektronix. His design and management experience spans the electronics, mechanical and software engineering disciplines.

Volunteer for SPIE Committees!

Convention Center Ballroom 20 C/D

Tuesday 28 August 8:00 to 10:00 pm

Wednesday 29 August 5:30 to 7:00 pm

Interested in becoming more involved with SPIE conferences? Talk with SPIE staff and learn more about SPIE volunteer opportunities in conferences and governance. Show us your enthusiasm by filling out a committee interest form, which will be sent to conference chairs. Forms will be available on-site, bring your resume or CV.

Design Your Future

It's your career—take charge of shaping it.

Professional development options with SPIE will help you:

- Improve your job performance
- Meet changing job demands
- Increase your value to your organization

Students save 50% on Course Registration

Proof of student status is required; please include your student ID number or proof of student status with your registration. Offer applies to undergraduate/graduate students who are not also full-time employees in the industry, government, or academia.

SPIE reserves the right to cancel a course due to insufficient advance registration.

Money-back Guarantee

We are confident that once you experience an SPIE course for yourself you will look to SPIE for your future education needs. However, if for any reason you are dissatisfied, SPIE will gladly refund your money. We just ask that you tell us what you did not like; suggestions for improvement are always welcome.

Continuing Education Units



SPIE is an authorized provider of Continuing Education Units (CEUs) through IACET—The International Association of Continuing Education and Training. SPIE awards CEUs to participants who successfully attend courses, and complete and return the evaluation form within 30 days of the course presentation. SPIE maintains a record of all CEUs earned for each participant for seven years.

Professional Development from SPIE
spie.org/education

Courses

Workshops

In-Company Training

DVDs/CD-ROMs/Videos



Course Daily Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
NanoEngineering					
SC496 Fabrication and Processing of Nanostructures (Cao) 8:30 am to 5:30 pm, \$450 / \$535		SC655 Introduction to Optical Tweezers and Optical Micromanipulation (Dholakia, Spalding) 6:00 to 10:00 pm, \$230 / \$275	WS851 Nanotechnology: Science & Applications (Brahmbatt) 8:30 am to 5:30 pm, \$410 / \$495		
SC497 Nanophotonics (Prasad) 1:30 to 5:30 pm, \$230 / \$275					
NanoScience					
		SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (Johnson) 1:30 to 5:30 pm, \$230 / \$275		SC727 Nanoplasmonics (Stockman) 8:30 am to 5:30 pm, \$410 / \$495	
Solar Energy & Its Applications					
SC798 Practical Radiometry (Strojnik-Scholl) 8:30 am to 5:30 pm, \$410 / \$495	SC388 Non-Imaging Optics (Winston) 8:30 am to 12:30 pm, \$230 / \$275	SC797 The Science and Technology of Organic Solar Cells (Peumans) 1:30 to 5:30 pm, \$230 / \$275			
Organic Photonics and Electronics					
SC798 Practical Radiometry (Strojnik-Scholl) 8:30 am to 5:30 pm, \$410 / \$495		SC797 The Science and Technology of Organic Solar Cells (Peumans) 1:30 to 5:30 pm, \$230 / \$275			
SC799 Solid State Lighting Phosphors (Summers) 8:30 am to 12:30 pm, \$230 / \$275					
SC490 Solid State Lighting I (Ferguson) 1:30 to 5:30 pm, \$230 / \$275					
				<div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> Register for Courses at the SPIE Cashier. </div>	
				Price Key SPIE Member/Non-Member	

SPIE Foundation Courses

Look for this symbol to identify SPIE Foundation Courses

What are SPIE Foundation Courses?

Foundation courses provide an introduction to and overview of the technical area they address. They are an ideal entry point for understanding core concepts and tools if you're new to a field, looking to brush up your knowledge in a specific area, or want to take a closer look at a specialization you're considering pursuing. Courses are taught by instructors with deep knowledge and years of in-the-field experience, and offer the unique opportunity to learn from some of the most accomplished optics professionals in their respective industries.

SPIE Foundation Courses are ideal for:

- Technical sales professionals looking to increase their knowledge to better work with customers
- Early career professionals who need an in-depth background in their specialization
- Mid-career professionals interested in changing focus to a new field
- Companies looking for training for their entry-level engineers
- Professionals seeking to broaden their skills with interdisciplinary training
- Anyone looking to gain a fundamental understanding of the subject

Course Daily Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Illumination Engineering					
<p>SC798 Practical Radiometry (<i>Strojnik-Scholl</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC799 Solid State Lighting Phosphors (<i>Summers</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC490 Solid State Lighting I (<i>Ferguson</i>) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC388 Non-Imaging Optics (<i>Winston</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC011 Design of Efficient Illumination Systems (<i>Cassarly</i>) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC657 Accurate Measurement of LED Optical Properties (<i>Tirpak</i>) 8:30 am to 12:30 pm, \$230 / \$275</p>			
Astronomical Optics and Instrumentation					
<p>SC134 Optical Design Fundamentals for Infrared Systems (<i>Riedl</i>) 8:30 am to 5:30 pm, \$450 / \$535</p> <p>SC798 Practical Radiometry (<i>Strojnik</i>) 8:30 am to 5:30 pm, \$410 / \$495</p>	<p>SC504 Introduction to CCD and CMOS Imaging Sensors and Applications (<i>Janesick</i>) 8:30 am to 5:30 pm, \$530 / \$615</p>	<p>SC135 Adaptive Optics (<i>Tyson</i>) 8:30 am to 5:30 pm, \$445 / \$530</p> <p>SC218 Advanced Composite Materials for Optomechanical Systems (<i>Zweben</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC561 Optomechanics for Space Applications (<i>Shipley</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC017 Principles of Fourier Optics and Diffraction (<i>Gaskill</i>) 8:30 am to 5:30 pm, \$515 / \$600</p>	<p>SC219 Materials: Properties and Fabrication for Stable Optical Systems (<i>Paquin</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC068 Use of CCD and CMOS Sensors in Visible Imaging Applications (<i>Lomheim</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC194 Multispectral and Hyperspectral Image Sensors (<i>Lomheim</i>) 1:30 to 5:30 pm, \$230 / \$275</p>		
Atmospheric and Space Optical Systems					
		<p>SC135 Adaptive Optics (<i>Tyson</i>) 8:30 am to 5:30 pm, \$445 / \$530</p> <p>SC561 Optomechanics for Space Applications (<i>Shipley</i>) 8:30 am to 5:30 pm, \$410 / \$495</p>			
Remote Sensing Instrumentation					
<p>SC134 Optical Design Fundamentals for Infrared Systems (<i>Riedl</i>) 8:30 am to 5:30 pm, \$450 / \$535</p> <p>SC798 Practical Radiometry (<i>Strojnik</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC152 Infrared Focal Plane Arrays (<i>Dereniak, Hubbs</i>) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC504 Introduction to CCD and CMOS Imaging Sensors and Applications (<i>Janesick</i>) 8:30 am to 5:30 pm, \$530 / \$615</p>	<p>SC835 Infrared Systems - Technology & Design (<i>Daniels</i>) 8:30 am to 5:30 pm/8:30 am to 12:30 pm, \$840 / \$965</p> <p>SC561 Optomechanics for Space Applications (<i>Shipley</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC206 Polarized Light: A Practical Hands-on Introduction (<i>Fisher</i>) 8:30 am to 5:30 pm, \$410 / \$495</p>	<p>SC068 Use of CCD and CMOS Sensors in Visible Imaging Applications (<i>Lomheim</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC194 Multispectral and Hyperspectral Image Sensors (<i>Lomheim</i>) 1:30 to 5:30 pm, \$230 / \$275</p>		

Price Key
SPIE Member/Non-Member

Course Daily Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Image and Signal Processing					
	<p>SC661 Advanced Image Processing and Applications (<i>Iftekharuddin</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC728 Network Centric Target Tracking and Classification (<i>Drummond</i>) 8:30 am to 5:30 pm, \$410 / \$495</p>	<p>SC017 Principles of Fourier Optics and Diffraction (<i>Gaskill</i>) 8:30 am to 5:30 pm, \$515 / \$600</p>			
Detectors and Imaging Devices					
<p>SC152 Infrared Focal Plane Arrays (<i>Dereniak, Hubbs</i>) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC504 Introduction to CCD and CMOS Imaging Sensors and Applications (<i>Janesick</i>) 8:30 am to 5:30 pm, \$530 / \$615</p>		<p>SC068 Use of CCD and CMOS Sensors in Visible Imaging Applications (<i>Lomheim</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC194 Multispectral and Hyperspectral Image Sensors (<i>Lomheim</i>) 1:30 to 5:30 pm, \$230 / \$275</p>		
Optomechanics					
<p>SC014 Introduction to Optomechanical Design (<i>Vukobratovich</i>) 8:30 am to 5:30 pm, \$780 / \$985</p>		<p>SC218 Advanced Composite Materials for Optomechanical Systems (<i>Zweber</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC220 Optical Alignment Mechanisms (<i>Guyer</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC781 Optomechanical Analysis (<i>Hatheway</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC561 Optomechanics for Space Applications (<i>Shipley</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC447 Principles for Mounting Optical Components (<i>Yoder, Jr.</i>) 8:30 am to 5:30 pm, \$850 / \$1055</p>	<p>SC254 Integrated Opto-Mechanical Analysis (<i>Doyle, Michels</i>) 8:30 am to 5:30 pm, \$455 / \$540,</p> <p>SC219 Materials: Properties and Fabrication for Stable Optical Systems (<i>Paquin</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC015 Structural Adhesives for Optical Bonding (<i>Daly</i>) 8:30 am to 12:30 pm, \$230 / \$275</p>		
Optical Design					
<p>SC156 Basic Optics for Engineers (<i>Ducharme</i>) 8:30 am to 5:30 pm, \$445 / \$530</p> <p>SC134 Optical Design Fundamentals for Infrared Systems (<i>Riedl</i>) 8:30 am to 5:30 pm, \$450 / \$535</p> <p>SC001 Optical System Design: Layout Principles and Practice (<i>Smith</i>) 8:30 am to 5:30 pm, \$480 / \$565</p> <p>SC792 Polarization in Optical Design (<i>Chipman</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC003 Practical Optical System Design - EXPANDED 2 Day Format (<i>Fischer</i>) 8:30 am to 5:30 pm, \$855 / \$1060</p> <p>SC020 Optical Scattering: Measurement and Analysis (<i>Stover</i>) 1:30 to 5:30 pm, \$285 / \$330</p>	<p>SC010 Introduction to Optical Alignment Techniques (<i>Ruda</i>) 8:30 am to 5:30 pm, \$780 / \$985</p> <p>SC492 Predicting, Modeling, and Interpreting Light Scattered by Surfaces (<i>Germer</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC659 Understanding Reflective Optical Design (<i>Contreras</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC384 The Design of Plastic Optical Systems (<i>Schaub</i>) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC206 Polarized Light: A Practical Hands-on Introduction (<i>Fisher</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC017 Principles of Fourier Optics and Diffraction (<i>Gaskill</i>) 8:30 am to 5:30 pm, \$515 / \$600</p>	<p>WS609 Basic Optics for Non-Optics Personnel (<i>Harding</i>) 8:30 to 11:00 am, \$50 / \$100</p> <p>SC552 Aspheric Optics: Design, Fabrication, and Test (<i>Fischer</i>) 1:30 to 5:30 pm, \$305 / \$350</p>		

Register for Courses at the SPIE Cashier.

Price Key
SPIE Member/Non-Member

Course Daily Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Optical Systems Engineering					
<p>SC560 Exploring Optical Aberrations (<i>Mahajan</i>) 8:30 am to 5:30 pm, \$560 / \$640</p> <p>SC134 Optical Design Fundamentals for Infrared Systems (<i>Riedl</i>) 8:30 am to 5:30 pm, \$450 / \$535</p> <p>SC001 Optical System Design: Layout Principles and Practice (<i>Smith</i>) 8:30 am to 5:30 pm, \$480 / \$565</p> <p>SC792 Polarization in Optical Design (<i>Chipman</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC003 Practical Optical System Design - EXPANDED 2 Day Format (<i>Fischer</i>) 8:30 am to 5:30 pm, \$855 / \$1060</p> <p>SC798 Practical Radiometry (<i>Strojnik-Scholl</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC849 Introduction to Wave Optics (<i>Ghatak</i>) 1:30 to 5:30 pm, \$250 / \$295</p> <p>SC020 Optical Scattering: Measurement and Analysis (<i>Stover</i>) 1:30 to 5:30 pm, \$285 / \$330</p>	<p>SC010 Introduction to Optical Alignment Techniques (<i>Ruda</i>) 8:30 am to 5:30 pm, \$780 / \$985</p> <p>SC492 Predicting, Modeling, and Interpreting Light Scattered by Surfaces (<i>Germer</i>) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC659 Understanding Reflective Optical Design (<i>Contreras</i>) 8:30 am to 5:30 pm, \$410 / \$495</p> <p>SC384 The Design of Plastic Optical Systems (<i>Schaub</i>) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC835 Infrared Systems - Technology & Design (<i>Daniels</i>) 8:30 am to 5:30 pm/8:30 am to 12:30 pm, \$840 / \$965</p> <p>SC017 Principles of Fourier Optics and Diffraction (<i>Gaskill</i>) 8:30 am to 5:30 pm, \$515 / \$600</p>	<p>SC325 An Introduction to Lasers (<i>Fisher</i>) 1:30 to 5:30 pm, \$230 / \$275</p>		

SPIE In-Company Training

Any SPIE Course Can Be Held at Your Company—Anytime, Anywhere

SPIE offers over 800 different courses that run from one-day to three-day sessions, taught by world-renowned experts from industry and academia. SPIE can schedule any course to fit your timeframe and training budget.

Interested in learning more? Contact SPIE today!



Contact: Gayle Lemieux, SPIE Education Services · gaylel@spie.org · Tel: +1 360 685 5537

Course Daily Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Optical Manufacturing and Testing					
	<p>SC850 Metrology for Modern Optical Manufacturing (Murphy) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC720 Cost-Conscious Tolerancing of Optical Systems (Youngworth) 1:30 to 5:30 pm, \$230 / \$275</p> <p>SC848 Fundamentals of Single Point Diamond Turning (Schaefer) 1:30 to 5:30 pm, \$230 / \$275</p> <p>SC384 The Design of Plastic Optical Systems (Schaub) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>SC321 Thin Film Optical Coatings (Macleod) 8:30 am to 5:30 pm, \$410 / \$495</p>	<p>SC552 Aspheric Optics: Design, Fabrication, and Test (Fischer) 1:30 to 5:30 pm, \$305 / \$350</p>		
<div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> Register for Courses at the SPIE Cashier. </div>					
Advanced Metrology					
<p>SC020 Optical Scattering: Measurement and Analysis (Stover) 1:30 to 5:30 pm, \$285 / \$330</p>	<p>SC213 Introduction to Interferometric Optical Testing (Wyant) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC850 Metrology for Modern Optical Manufacturing (Murphy) 8:30 am to 12:30 pm, \$230 / \$275</p> <p>SC492 Predicting, Modeling, and Interpreting Light Scattered by Surfaces (Germer) 8:30 am to 12:30 pm, \$230 / \$275</p>	<p>SC017 Principles of Fourier Optics and Diffraction (Gaskill) 8:30 am to 5:30 pm, \$515 / \$600</p>	<p>SC211 Practical Interferometry and Fringe Analysis (Creath) 8:30 am to 12:30 pm, \$230 / \$275</p>		
Thin Films					
		<p>SC321 Thin Film Optical Coatings (Macleod) 8:30 am to 5:30 pm, \$410 / \$495</p>			
Applications					
			<p>SC325 An Introduction to Lasers (Fisher) 1:30 to 5:30 pm, \$230 / \$275</p> <p>SC552 Aspheric Optics: Design, Fabrication, and Test (Fischer) 1:30 to 5:30 pm, \$305 / \$350</p>		
The Business Side					
				<p>WS756 How to Start a Small High Tech Business Almost Anywhere (Udd) 8:30 am to 12:30 pm, \$230 / \$275</p>	
Professional Development					
	<p>WS777 Optimizing Your Resume (Cain) 1:30 to 3:30 pm, \$50 / \$100</p> <p>WS852 Hands-On Optics: Making an Impact with Light (HOO): Terrific Telescopes Work (Walker, Sparks) 2:00 to 5:00 pm, \$20 / \$25</p>	<p>WS827 Off the Beaten Path: Career Opportunities for Engineers in the Patent Boom (Law Degree Not Required) (Honeyman) 1:30 to 5:30 pm, \$230 / \$275</p>	<p>WS609 Basic Optics for Non-Optics Personnel (Harding) 8:30 to 11:00 am, \$50 / \$100</p> <p>WS667 The Craft of Scientific Presentations: A Workshop on Technical Presentations (Krages) 8:30 am to 12:30 pm, \$75 / \$125</p> <p>WS668 The Craft of Scientific Writing: A Workshop on Technical Writing (Krages) 1:30 to 5:30 pm, \$75 / \$125</p> <p>WS846 Essential Skills for Engineering Project Leaders (Hinkle) 1:30 to 5:30 pm, \$90/\$115</p>		
				<p>Price Key SPIE Member/Non-Member</p>	

Make time for the Exhibition!

Exhibition Hours

Tuesday 28 August 10:00 am to 5:00 pm
Wednesday 29 August 10:00 am to 5:00 pm
Thursday 30 August 10:00 am to 2:00 pm

Exhibiting companies:

4D Technology Corp
Abet Technologies
Aerotech, Inc.
Agilent Technologies, Inc.
ALIO Industries
Alpine Research Optics Corp.
Andor Technology
Andover Corp
AOptix Technologies Inc.
APIC Corp.
APS Optics
ASML Optics
asphericon GmbH
Astrium GmbH (Dornier)
Avantes, Inc.
Axsys Technologies IR Systems
Axsys Technologies, Inc.
B&W Tek, Inc.
Bach Research Corp.
Bandwidth Semiconductor, LLC
Bauman Moscow State Technical University Chapter
Beijing Guojing Infrared Optical Technology Co., Ltd.
Beijing Institute of Technology Chapter
Boulder Nonlinear Systems, Inc.
Breaault Research Organization
Brush Wellman Inc.
Brussels Student Chapter
Carl Hanser Verlag GmbH & Co KG
Centro de Investigaciones en Óptica Chapter
CeramOptec Industries
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Chroma Technology Corp
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Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
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6639 Nanophotonic Materials IV (Gaburro/Cabrini), p. 46		6640 Active Photonic Crystals (Weiss/Subramania/Garcia-Santamaria), p. 40			
6641 Plasmonics: Metallic Nanostructures and their Optical Properties V (Stockman), p. 50					
		6642 Plasmonics: Nanoimaging, Nanofabrication, and their Applications III (Kawata/Shalaev/Tsai), p. 54			
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6644 Optical Trapping and Optical Micromanipulation IV (Dholakia/Spalding), p. 59					
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6647 Nanocoatings (Smith/Cortie), p. 69					
EXHIBITION, p. 40-41					
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Don't miss the Special Events, Plenaries, Receptions, Technical Workshops, Courses, Poster Sessions – and more!

See pages 9-41.



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Conference 6638 • Conv. Ctr. 23C

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6638

Photonic Metamaterials

Conference Chairs: **Mikhail A. Noginov**, Norfolk State Univ.; **Nikolay I. Zheludev**, Univ. of Southampton (United Kingdom); **Allan D. Boardman**, Univ. of Salford (United Kingdom); **Nader Engheta**, Univ. of Pennsylvania

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Sunday 26 August

SESSION 1

Conv. Ctr. 23C Sun. 9:00 to 10:00 am

Keynote Session I

Chair: **Mikhail A. Noginov**, Norfolk State Univ.

9:00 am: **Plasmonic metamaterials: the tale of two phenomena (Keynote)** (*Invited Paper*), N. Engheta, A. Alu, M. Silveirinha, J. Li, A. Salandrino, B. Edwards, Univ. of Pennsylvania [6638-01]

Coffee Break 10:00 to 10:20 am

SESSION 2

Conv. Ctr. 23C Sun. 10:20 am to 12:10 pm

Surface Plasmons

Chair: **Martin W. McCall**, Imperial College London (United Kingdom)

10:20 am: **Two-dimensional plasmonic metamaterials (Invited Paper)**, I. I. Smolyaninov, Univ. of Maryland/College Park [6638-02]

10:50 am: **Strips, wires and grooves as plasmonic waveguides (Invited Paper)**, A. Boltasseva, Danmarks Tekniske Univ. (Denmark); K. Leosson, T. Rosenzweig, Univ. of Iceland (Iceland); J. Jung, T. Søndergaard, S. I. Bozhevolnyi, Aalborg Univ. (Denmark); R. B. Nielsen, K. B. Jørgensen, R. H. Pedersen, A. Kristensen, Danmarks Tekniske Univ. (Denmark); I. Fernandez-Cuesta, Univ. Autònoma de Barcelona (Spain) [6638-32]

11:20 am: **Optical metamaterials based on thin metal films: from negative index of refraction to enhanced transmission and to surface wave guidance (Invited Paper)**, V. Lomakin, Y. Fainman, Univ. of California/San Diego; Y. A. Urzhumov, G. Shvets, The Univ. of Texas at Austin [6638-04]

11:50 am: **En route to low-loss nanoplasmonics: improving silver**, M. A. Noginov, G. Zhu, M. Mayy, M. Bahoura, V. I. Gavrilenko, Norfolk State Univ. [6638-05]

Lunch Break 12:10 to 1:30 pm

SESSION 3

Conv. Ctr. 23C Sun. 1:30 to 3:20 pm

Optical Magnetism and NIMs

Chair: **Nikolay I. Zheludev**, Univ. of Southampton (United Kingdom)

1:30 pm: **Optical metamaterials: from metamagnetics with rainbow colors to negative refractive index (Invited Paper)**, V. M. Shalaev, W. Cai, A. V. Kildishev, V. P. Drachev, U. K. Chettiar, H. Yuan, V. de Silva, Purdue Univ.; A. Boltasseva, Danmarks Tekniske Univ. (Denmark) [6638-06]

2:00 pm: **Photon tunneling at material boundary by positive permeability metamaterials**, A. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Osaka Univ. (Japan); T. Tanaka, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Japan Science and Technology Corp. (Japan); S. Kawata, The Institute of Physical and Chemical Research (RIKEN) (Japan) and Osaka Univ. (Japan) [6638-07]

2:20 pm: **Causality principle and negative refraction with illustrations from surface plasmon polaritonics (Invited Paper)**, M. I. Stockman, Georgia State Univ. [6638-09]

2:50 pm: **Slow light in negative-index waveguide-heterostructures (Invited Paper)**, K. L. Tsakmakidis, O. G. Hess, Univ. of Surrey (United Kingdom) [6638-10]

Coffee Break 3:20 to 3:40 pm

SESSION 4

Conv. Ctr. 23C Sun. 3:40 to 5:10 pm

Metamaterials in IR Range

Chair: **Akhlesh Lakhtakia**, The Pennsylvania State Univ.

3:40 pm: **Electromagnetic modes of silicon carbide microstructures and their relevance to metamaterial design (Invited Paper)**, J. A. Schuller, T. Taubner, M. L. Brongersma, Stanford Univ. [6638-11]

4:10 pm: **Optical properties of sub-wavelength hole arrays in SiC membranes (Invited Paper)**, G. Shvets, Y. A. Urzhumov, D. V. Korobkin, B. Neuner III, The Univ. of Texas at Austin; C. A. Zorman, Case Western Reserve Univ. [6638-12]

4:40 pm: **Spoof plasmon THz metamaterials (Invited Paper)**, S. Maier, Univ. of Bath (United Kingdom) [6638-13]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

Lunch Break 12:00 to 1:30 pm

SESSION 5

Conv. Ctr. 23C Mon. 1:30 to 3:00 pm

NIMS

Chair: Larry R. Dalton, Univ. of Washington

1:30 pm: **Ambidextrous light in a nonlinear left-handed world (Invited Paper)**, N. M. Litchinitser, Univ. of Michigan; I. R. Gabitov, The Univ. of Arizona; A. I. Maimistov, Moscow Engineering Physics Institute (Russia); V. M. Shalaev, Purdue Univ. [6638-14]

2:00 pm: **The effects of dispersion, diffraction and nonlinearity management in negative index materials**, P. P. Banerjee, G. T. Nehmetallah, Univ. of Dayton [6638-15]

2:20 pm: **Mean field theory of metallo-dielectric photonic crystals with magnetic components: the long-wavelength limit**, E. Reyes-Ayona, P. P. Halevi, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6638-16]

2:40 pm: **Fabrication and applications of negative refractive index metamaterials with chiral properties**, E. Bahar, N. J. Ianno, Univ. of Nebraska/Lincoln [6638-17]

Coffee Break 3:00 to 3:20 pm

SESSION 6

Conv. Ctr. 23C Mon. 3:20 to 5:10 pm

Composites, Interfaces and Materials

Chair: Akhlesh Lakhtakia, The Pennsylvania State Univ.

3:20 pm: **Organic electro-optic/silicon photonic materials and devices (Invited Paper)**, L. R. Dalton, P. A. Sullivan, Univ. of Washington ... [6638-18]

3:50 pm: **Differential optical reflectance of water molecules absorbed on Au(111) surface**, S. N. Williams, V. I. Gavrilenko, Norfolk State Univ. [6638-19]

4:10 pm: **Effect of interchain interaction on linear optical properties of conjugated polymers**, A. V. Gavrilenko, T. D. Matos, C. E. Bonner, C. Zhang, S. Sun, V. I. Gavrilenko, Norfolk State Univ. [6638-21]

4:30 pm: **Optical properties of metamaterials based on porous channel photonic structures and applications for optical devices**, E. Y. Glushko, Institute of Semiconductor Physics (Ukraine) [6638-23]

4:50 pm: **Semiclassical description of hyperlensing and cloaking**, Z. Jacob, L. V. Alekseyev, E. E. Narimanov, Princeton Univ. [6638-41]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Electrically controlled Bragg resonances of an ambichiral electro-optic structure: oblique incidence**, M. Dixit, A. Lakhtakia, The Pennsylvania State Univ. [6638-38]
- ✓ **Equilibrium geometries and electronic structure calculations of divalent lead Pb(II) complexes with paramagnetic organic ligands**, H. Li, R. Bah, R. R. Rakhim, V. I. Gavrilenko, Norfolk State Univ. [6638-39]
- ✓ **Far-field focusing properties of 2D rod-type honeycomb lattice photonic crystals**, Y. Li, G. Li, Univ. of Science and Technology of China (China) [6638-40]

Courses of Related Interest

See SPIE Cashier for information.

SC496 **Fabrication and Processing of Nanostructures** (Cao)
Sunday 26, 8:30 am - 5:30 pm

SC497 **Nanophotonics** (Prasad) Sunday 26, 1:30 - 5:30 pm

Tuesday 28 August

SESSION 7

Conv. Ctr. 23C Tues. 9:00 to 10:10 am

Fundamentals and Concepts

Chair: F. J. Garcia de Abajo, Consejo Superior de Investigaciones Científicas (Spain)

9:00 am: **Light pressure on chiral sculptured thin films (Invited Paper)**, B. M. Ross, A. Lakhtakia, The Pennsylvania State Univ. [6638-25]

9:30 am: **Optical pulse dynamics in nanostructured Bragg gratings**, I. R. Gabitov, The Univ. of Arizona [6638-26]

9:50 am: **Swamping of circular Bragg phenomenon revealed by durations and average speeds of videopulses transmitted through chiral sculptured thin films**, J. B. Geddes III, Univ. of Illinois at Urbana-Champaign; A. Lakhtakia, The Pennsylvania State Univ. [6638-27]

Coffee Break 10:10 to 10:30 am

SESSION 8

Conv. Ctr. 23C Tues. 10:30 am to 12:20 pm

Luminescence, Gain and Lasing

Chair: Vladimir M. Shalaev, Purdue Univ.

10:30 am: **On the possibility of gain control and special solitons in metamaterials (Invited Paper)**, A. D. Boardman, N. J. King, Univ. of Salford (United Kingdom); Y. Rapoport, National Taras Shevchenko Univ. of Kyiv (Ukraine) [6638-28]

11:00 am: **Diffraction and dispersion management in active nanostructured metamaterials (Invited Paper)**, V. A. Podolskiy, A. Goyvadinov, Oregon State Univ. [6638-29]

11:30 am: **Limits of luminescence efficiency enhancement by surface plasmon polaritons (Invited Paper)**, J. B. Khurgin, Johns Hopkins Univ. [6638-30]

12:00 pm: **Dye doped porous silica as an all solid state device for random lasing**, M. Berard, École Polytechnique (France) and Thales Research and Technology (France); V. Racht, Thales Research and Technology (France); L. Khalid, T. Gacoin, École Polytechnique (France); J. Galaup, Lab. Aimé Cotton (France); J. Boilot, École Polytechnique (France) [6638-31]

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

SESSION 9

Conv. Ctr. 23C Tues. 1:30 to 4:20 pm

Devices and Systems

Chair: TBD

1:30 pm: **The plasmonic Talbot effect (Invited Paper)**, F. J. Garcia de Abajo, Consejo Superior de Investigaciones Científicas (Spain); N. I. Zheludev, M. Dennis, Univ. of Southampton (United Kingdom) [6638-03]

2:00 pm: **Surface plasmon-polariton based ultra-short contra-directional coupler at optical frequencies (Invited Paper)**, Y. Wang, A. Hemly, G. V. Eleftheriades, Univ. of Toronto (Canada) [6638-33]

2:30 pm: **Metamaterials in information systems (Invited Paper)**, Y. Fainman, Univ. of California/San Diego [6638-34]

Coffee Break 3:00 to 3:20 pm

3:20 pm: **Optical hyperlens far field imaging beyond the diffraction limit (Invited Paper)**, Z. Jacob, L. V. Alekseyev, E. E. Narimanov, Princeton Univ. [6638-35]

3:50 pm: **Rationally-engineered nanostructures for single-molecule SERS (Invited Paper)**, M. Moskovits, S. Lee, G. Braun, N. Reich, Univ. of California/Santa Barbara [6638-36]

SESSION 10

Conv. Ctr. 23C Tues. 4:20 to 5:20 pm

Keynote Session II

Chair: Allan D. Boardman, Univ. of Salford (United Kingdom)

4:20 pm: **Chirality in photonic meta-materials (Keynote) (Invited Paper)**, N. I. Zheludev, V. A. Fedotov, M. Rose, N. Papisimakis, Univ. of Southampton (United Kingdom); S. L. Prosvirnin, Institute of Radio Astronomy (Ukraine) [6638-37]

Conference 6639 • Conv. Ctr. 24A

Sunday 26 August 2007 • Proceedings of SPIE Vol. 6639

Nanophotonic Materials IV

Conference Chairs: **Zeno Gaburro**, Univ. degli Studi di Trento (Italy); **Stefano Cabrini**, Lawrence Berkeley National Lab.

Program Committee: **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Angus J. Bain**, Univ. College London (United Kingdom); **Mireille H. Blanchard-Desce**, Univ. de Rennes I (France); **Robert W. Boyd**, Univ. of Rochester; **Aaron W. Harper**, Univ. of Southern California; **Ghassan E. Jabbour**, Arizona State Univ.; **Francois Kajzar**, Commissariat à l'Energie Atomique (France); **Dmitri I. Kovalev**, Univ. of Bath (United Kingdom); **Paras N. Prasad**, Univ. at Buffalo; **Younan Xia**, Univ. of Washington

Sunday 26 August

SESSION 1

Conv. Ctr. 24A Sun. 8:30 to 10:00 am

Chair: **Stefano Cabrini**, Lawrence Berkeley National Lab.

8:30 am: **Electric field controlled photoluminescence spectroscopy on asymmetric semiconductor nanorods (Invited Paper)**, A. L. Rogach, Ludwig-Maximilians-Univ. München (Germany) [6639-01]

9:00 am: **Large nonlinear optical properties in ternary quantum dots and nanorods**, H. I. Elim, National Univ. of Singapore (Singapore) [6639-02]

9:20 am: **UV to red cooperative enhanced upconversion in nanocrystalline BaZrO₃: r³⁺, Yb³⁺**, J. S. Perez-Huerta, L. A. Diaz-Torres, E. De la Rosa, Ctr. de Investigaciones en Óptica, A.C. (Mexico); P. Salas, C. Angeles-Chavez, Instituto Mexicano del Petróleo (Mexico) [6639-03]

9:40 am: **Infrared characteristics of magnetic iron oxide nanoparticles**, N. B. Singh, D. J. Knuteson, D. A. Kahler, A. Berghmans, B. Wagner, S. McLaughlin, J. J. Hawkins, Northrop Grumman Corp. [6639-04]

Coffee Break 10:00 to 10:20 am

SESSION 2

Conv. Ctr. 24A Sun. 10:20 to 11:50 am

Chair: **Andrey L. Rogach**, Ludwig-Maximilians-Univ. München (Germany)

10:20 am: **Plasma induced formation of metal nanodots for enhanced Raman application (Invited Paper)**, Z. Li, Hewlett-Packard Labs. . [6639-05]

10:50 am: **Optical processes of organic emitters in optical microcavity**, C. Wu, K. Tien, H. Lin, C. Lin, H. Chang, T. Cho, C. Yang, C. Chang, National Taiwan Univ. (Taiwan) [6639-06]

11:10 am: **The role of surface states in a-axis GaN nanowires**, A. H. Chin, NASA Ames Research Ctr. and ELORET Corp.; T. S. Ahn, Univ. of California/Riverside; H. Li, Univ. of Louisville and Lehigh Univ.; S. Vaddiraju, Univ. of Louisville and Massachusetts Institute of Technology; C. J. Bardeen, Univ. of California/Riverside; C. Ning, Arizona State Univ. and NASA Ames Research Ctr.; M. K. Sunkara, Univ. of Louisville [6639-08]

11:30 am: **High index of refraction TiO₂ nanoparticle and silicone composites**, T. C. Monson, D. L. Huber, A. F. Emery, J. L. Crandall, D. E. Fish, Sandia National Labs. [6639-09]

Lunch Break 11:50 am to 1:30 pm

SESSION 3

Conv. Ctr. 24A Sun. 1:30 to 2:20 pm

Chair: **Zhiyong Li**, Hewlett-Packard Labs.

1:30 pm: **Luminescence properties of rare earth doped ZrO₂ nanocrystals (Invited Paper)**, E. De la Rosa, L. A. Díaz-Torres, D. Solís, T. Lopez-Luke, V. H. Romero, O. Meza, P. Segovia, Ctr. de Investigaciones en Óptica, A.C. (Mexico); P. Salas, Instituto Mexicano del Petróleo (Mexico); R. A. Rodríguez, Univ. de Guadalajara (Mexico) [6639-10]

2:00 pm: **Influence of hydrogen passivation on the erbium excitation efficiency in silicon nanocrystal doped silica films**, O. Savchyn, F. R. Ruhge, P. G. Kik, College of Optics & Photonics/Univ. of Central Florida; R. M. Todi, K. R. Coffey, Univ. of Central Florida [6639-11]

SESSION 4

Conv. Ctr. 24A Sun. 2:20 to 3:30 pm

Chair: **Rainer F. Mahrt**, IBM Zürich Research Lab. (Switzerland)

2:20 pm: **Electrically driven thermal light emission from suspended carbon nanotube transistors (Invited Paper)**, Y. K. Kato, Japan Science and Technology Agency (Japan); X. Wang, D. M. Mann, A. A. Kinkhabwala, E. Pop, J. Cao, L. Zhang, Q. Wang, Stanford Univ.; J. Guo, Univ. of Florida; H. Dai, Stanford Univ. [6639-12]

2:50 pm: **Carbon nanotube PIN diodes**, K. Bosnick, National Institute for Nanotechnology (Canada); N. Gabor, P. McEuen, Cornell Univ. [6639-13]

3:10 pm: **Electrical and optical characterization of carbon nanotube-polyimide nanocomposites**, J. H. Kang, C. Park, S. E. Lowther, J. S. Harrison, National Institute of Aerospace [6639-14]

Coffee Break 3:30 to 3:50 pm

SESSION 5

Conv. Ctr. 24A Sun. 3:50 to 5:40 pm

Chair: **Yuichiro K. Kato**, Stanford Univ.

3:50 pm: **Resonant energy transfer within a colloidal nanocrystal polymer host system (Invited Paper)**, R. F. Mahrt, IBM Zürich Research Lab. (Switzerland); S. Kaufmann, ETH Zürich (Switzerland); T. Stoefler, N. Moll, IBM Zürich Research Lab. (Switzerland) [6639-15]

4:20 pm: **Nanoscale optical properties of nanocapped colloidal silica particle arrays**, K. A. Tetz, J. Ziegler, R. Bekele, J. Y. Suh, E. U. Donev, R. F. Haglund, Jr., Vanderbilt Univ. [6639-16]

4:40 pm: **MOVPE growth and characterization of ZnCdS/ZnSse QW structures**, V. I. Kozlovsky, P.N. Lebedev Physical Institute (Russia); V. I. Kuntsevich, Moscow Engineering Physics Institute (Russia); D. Sannikov, P.N. Lebedev Physical Institute (Russia) [6639-17]

5:00 pm: **Hydrothermal growth of periodic ZnO nanorod arrays using polystyrene sphere templates**, Y. F. Hsu, Y. Y. Xi, A. B. Djuricic, W. Chan, C. Yip, The Univ. of Hong Kong (Hong Kong China) [6639-18]

5:20 pm: **Synthesis of zinc oxide nanoparticles by hydrothermal method**, A. N. Pacheri Madathil, V. Kuzhikattil Achuthan, M. K. Jayaraj, Cochin Univ. of Science & Technology (India) [6639-19]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Structural and photoluminescence characterization of nanocrystalline YAG: Yb³⁺-Er³⁺ prepared with the addition of PVA and UREA**, R. A. Rodriguez, E. H. Tobar, Univ. de Guadalajara (Mexico); E. De la Rosa, L. A. Diaz-Torres, Ctr. de Investigaciones en Óptica, A.C. (Mexico); P. Salas, Instituto Mexicano del Petróleo (Mexico); A. Torres, The Univ. of Texas at Austin; M. Felix, J. Castañeda-Contreras, Univ. de Guadalajara (Mexico); M. J. Yacamán, The Univ. of Texas at Austin [6639-20]
- ✓ **Nanostructured SnO₂-SiO₂ glass ceramic thin film as electroluminescent material: the impedance spectroscopy analysis**, N. Chiodini, M. Giussani, A. Lauria, A. Paleari, Univ. degli Studi di Milano-Bicocca (Italy) [6639-21]
- ✓ **Nonlinear optical properties of free standing films of PbS quantum dots in the nonresonant femtosecond regime**, P. A. Kurian, V. Cherianath, Indian Institute of Technology Madras (India); A. nag, D. Goswami, Indian Institute of Technology Kanpur (India) [6639-22]
- ✓ **Solid thin films of CdSe/ZnS nanoparticles: new ways for fabrication and application**, S. V. Dayneko, A. A. Chistyakov, I. P. Druginin, A. O. Helmut, Moscow Engineering Physics Institute (Russia); V. A. Oleinikov, Shemyakin and Ovchinnikov Institute of Bioorganic Chemistry (Russia); K. V. Zaharchenko, Moscow Engineering Physics Institute (Russia); V. A. Kolesnikov, M. G. Tedoradze, Institute of Physical Chemistry (Russia) [6639-23]
- ✓ **Dopant concentration effect on the TL and OSL response of ZrO₂:Lu³⁺ nanocrystals under β-ray irradiation**, V. H. Romero, Ctr. de Investigaciones en Óptica, A.C. (Mexico); R. A. Rodriguez, Univ. de Guadalajara (Mexico); E. De la Rosa, Ctr. de Investigaciones en Óptica, A.C. (Mexico); R. Melendrez, M. Barboza-Flores, Univ. de Sonora (Mexico) [6639-24]
- ✓ **3D ordered nanogels and nanocomposites of polyacetylene: self-organisation, structure, properties**, V. M. Kobryanskii, Supermat International and Institute of Chemical Physics (Russia) [6639-25]
- ✓ **Preparation of europium doped tin oxide, indium oxide and ITO nanocomposites**, P. Psuja, W. Strek, Polska Akademia Nauk (Poland) [6639-26]
- ✓ **Electronic polarizabilities of ions in lithium tantalate (litao3) optical wave guide from natural birefringence data**, C. P. Vardhani, Andhra Mahila Sabha Arts and Science College for Women (India) [6639-27]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

Conference 6640 • Conv. Ctr. 24B

Tuesday-Wednesday 28-29 August 2007 • Proceedings of SPIE Vol. 6640

Active Photonic Crystals

Conference Chairs: Sharon M. Weiss, Vanderbilt Univ.; Ganapathi S. Subramania, Sandia National Labs.; Florencio Garcia-Santamaria, Univ. of Illinois at Urbana-Champaign

Program Committee: Paul V. Braun, Univ. of Illinois at Urbana-Champaign; Shanhui L. Fan, Stanford Univ.; Stephen H. Foulger, Clemson Univ.; Rachel Jakubiak, Air Force Research Lab.; Michal F. Lipson, Cornell Univ.; Ceferino López, Instituto de Ciencia de Materiales de Madrid (Spain); Michael J. Sailor, Univ. of California/San Diego; Ralf B. Wehrspohn, Univ. Paderborn (Germany); Pierre Wiltzius, Univ. of Illinois at Urbana-Champaign

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

SESSION 3

Conv. Ctr. 24B Tues. 1:30 to 2:50 pm

Novel Effects and Applications of Active Photonic Crystal Structures II

Chair: Florencio García-Santamaria, Univ. of Illinois at Urbana-Champaign

1:30 pm: **Enhanced power conversion efficiency in solar cells coupled to photonic crystals (Invited Paper)**, H. R. Miguez, A. Mihi, S. Colodrero, M. Ocaña, Instituto de Ciencia de Materiales de Sevilla (Spain) [6640-07]

2:00 pm: **Tunable defect modes in chiral liquid crystals based on laser-induced modulation of helix**, H. Yoshida, C. H. Lee, Y. Miura, A. Fujii, M. Ozaki, Osaka Univ. (Japan) [6640-08]

2:20 pm: **Enhanced light emission from silicon photonic crystals (Invited Paper)**, M. Galli, D. Gerace, A. Politi, M. Belotti, M. Liscidini, M. Patrini, L. C. Andreani, Univ. degli Studi di Pavia (Italy); M. Miritello, A. Irrera, F. Priolo, Univ. degli Studi di Catania (Italy); Y. Chen, Ecole normale supérieure (France) [6640-09]

Coffee Break 2:50 to 3:20 pm

SESSION 4

Conv. Ctr. 24B Tues. 3:20 to 5:20 pm

Fabrication and Characterization of Active Photonic Crystal Structures II

Chair: Paul V. Braun, Univ. of Illinois at Urbana-Champaign

3:20 pm: **Fabrication techniques for photonic crystals (Invited Paper)**, P. Wiltzius, Univ. of Illinois at Urbana-Champaign [6640-10]

3:50 pm: **Computational inverse design of structures fabricated via interference lithography**, J. W. Rinne, P. Wiltzius, Univ. of Illinois at Urbana-Champaign [6640-11]

4:10 pm: **A novel method of photonic band-gap lithography of porous silicon heterostructures**, H. Park, A. Stramel, D. Harju, S. M. Weiss, J. Dickerson, Vanderbilt Univ. [6640-12]

4:30 pm: **Characterization and functionalization of 3D visible photonic crystals with omnidirectional bandgap (Invited Paper)**, Y. Lee, G. S. Subramania, A. J. Fischer, T. Luk, I. Brener, P. G. Clem, Sandia National Labs. [6640-13]

5:00 pm: **PbTe quantum dots multilayer for optical switching device**, E. Rodriguez, Univ. Estadual de Campinas (Brazil); G. Kellermann, Lab. Nacional de Luz Sincrotron (Brazil); L. Moya, R. Sis Moreira, Univ. Estadual de Campinas (Brazil); A. F. Craievich, Univ. de São Paulo (Brazil); C. L. César, L. C. Barbosa, Univ. Estadual de Campinas (Brazil) [6640-14]

Tuesday 28 August

SESSION 1

Conv. Ctr. 24B Tues. 8:30 to 10:00 am

Novel Effects and Applications of Active Photonic Crystal Structures I

Chair: Sharon M. Weiss, Vanderbilt Univ.

8:30 am: **Self-collimation photonic crystal based modulator and switching elements in silicon (Invited Paper)**, D. W. Prather, A. S. Sharkawy, C. Chen, B. Miao, T. R. Hodson, S. Shi, Univ. of Delaware [6640-01]

9:00 am: **Passive and active nanophotonic devices for optical interconnect applications (Invited Paper)**, R. T. Chen, The Univ. of Texas at Austin [6640-02]

9:30 am: **Negative index photonic crystals: new concepts in imaging and negative refraction (Invited Paper)**, S. Sridhar, W. Lu, Northeastern Univ. [6640-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Conv. Ctr. 24B Tues. 10:30 to 11:50 am

Fabrication and Characterization of Active Photonic Crystal Structures I

Chair: Rachel Jakubiak, Air Force Research Lab.

10:30 am: **Adding function to photonic crystals through optical trapping, multiphoton polymerization and spatially regulated electrochemistry (Invited Paper)**, P. V. Braun, Univ. of Illinois at Urbana-Champaign [6640-04]

11:00 am: **Independently adjustable silicon Bragg wavelength selector**, F. B. Koné, Y. Peter, École Polytechnique de Montréal (Canada) [6640-05]

11:20 am: **Three-dimensional photonic crystal templates: contrasts in laser diffractive holography and direct-write femtosecond writing (Invited Paper)**, P. R. Herman, D. Chanda, L. Abolghasemi, Univ. of Toronto (Canada) [6640-06]

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

Wednesday 29 August

SESSION 5

Conv. Ctr. 24B Wed. 8:10 to 10:20 am

Modeling and Simulation of Active Photonic Crystal Structures I

Chair: Kai-Ming Ho, Iowa State Univ.

8:10 am: **Photonic crystal: dynamic, quantum and nonlinear properties (Invited Paper)**, S. L. Fan, Stanford Univ. [6640-15]

8:40 am: **Ultrafast all-optical switching of 3D photonic band gap crystals (Invited Paper)**, T. G. Euser, FOM Institute for Atomic and Molecular Physics (Netherlands) [6640-16]

9:10 am: **Functional photonic band gap structures based on electromagnetically induced transparency in the conduction intersubband transitions of quantum wells**, S. M. Sadeghi, McMaster Univ. (Canada); W. Li, Univ. of Wisconsin/Platteville; X. Li, W. Huang, McMaster Univ. (Canada) [6640-17]

9:30 am: **Gain-transfer-matrix method for photonic crystal laser simulations (Invited Paper)**, X. Hu, M. Li, Z. Ye, K. Ho, Iowa State Univ.; J. Cao, M. Miyawaki, Canon Development Americas, Inc. [6640-18]

10:00 am: **Localization and the invariant probability measure for photonic bandgap structures**, G. J. Kissel, Univ. of Southern Indiana [6640-19]

Coffee Break 10:20 to 10:40 am

SESSION 6

Conv. Ctr. 24B Wed. 10:40 to 11:20 am

Modeling and Simulation of Active Photonic Crystal Structures II

Chair: Shanhui L. Fan, Stanford Univ.

10:40 am: **Magnetophotonic crystals: photonic band structure, eigenmodes and boundary effects**, A. Khanikaev, A. V. Baryshev, Toyohashi Univ. of Technology (Japan); A. B. Granovsky, M.V. Lomonosov Moscow State Univ. (Russia); M. Inoue, Toyohashi Univ. of Technology (Japan) [6640-20]

11:00 am: **Self-collimation in photonic crystals with anisotropic constituents**, M. M. Siraj, J. W. Haus, Univ. of Dayton; P. N. Prasad, P. P. Markowicz, Univ. at Buffalo [6640-21]

SESSION 7

Conv. Ctr. 24B Wed. 11:20 am to 12:40 pm

Novel Effects and Applications of Active Photonic Crystal Structures III

Chair: Ganapathi S. Subramania, Sandia National Labs.

11:20 am: **Subwavelength-thick dielectric gratings for bulk sensing**, D. A. Fattal, M. Sigalas, Z. Li, R. G. Beausoleil, Hewlett-Packard Labs. [6640-22]

11:40 am: **Dynamic lasing of pyrromethene 597 in 2D holographic-polymer dispersed liquid crystals (H-PDLCs): influence of columnar conformation (Invited Paper)**, R. Jakubiak, Air Force Research Lab.; V. Tondiglia, L. Natarajan, R. Sutherland, Science Applications International Corp.; R. Vaia, T. Bunning, Air Force Research Lab. [6640-23]

12:10 pm: **Absolute emissivity measurements of 3D photonic crystal (Invited Paper)**, T. Luk, I. F. El-Kady, R. A. Ellis, T. McLellan, G. S. Subramania, J. C. Verley, W. W. Chow, Sandia National Labs. [6640-24]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

✓ **(Ba,Sr)TiO₃-based planar photonic bandgap crystal**, K. Jim, D. Wang, C. Leung, C. Choy, L. H. Chan, The Hong Kong Polytechnic Univ. (Hong Kong China) [6640-25]

✓ **Coherent control of multiple quantum well active photonic band gaps via infrared dressing of superradiant excitons**, S. M. Sadeghi, McMaster Univ. (Canada); W. Li, Univ. of Wisconsin/Platteville; X. Li, W. Huang, McMaster Univ. (Canada) [6640-27]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (Johnson) Tuesday 28, 1:30 - 5:30 pm

Conference 6641 • Conv. Ctr. 22

Sunday-Wednesday 26-29 August 2007 • Proceedings of SPIE Vol. 6641

Plasmonics: Metallic Nanostructures and Their Optical Properties V

Conference Chair: **Mark I. Stockman**, Georgia State Univ.

Program Committee: **David J. Bergman**, Tel Aviv Univ. (Israel); **Sergey I. Bozhevolnyi**, Aalborg Univ. (Denmark); **Jochen Feldmann**, Ludwig-Maximilians-Univ. München (Germany); **Naomi J. Halas**, Rice Univ.; **Teruya Ishihara**, The Institute of Physical and Chemical Research (Japan); **Satoshi Kawata**, Osaka Univ. (Japan); **Fritz Keilmann**, Max-Planck-Institut für Biochemie (Germany); **Victor I. Klimov**, Los Alamos National Lab.; **Aaron Lewis**, The Hebrew Univ. of Jerusalem (Israel); **Olivier J. F. Martin**, École Polytechnique Fédérale de Lausanne (Switzerland); **Martin Moskovits**, Univ. of California/Santa Barbara; **Peter J. Nordlander**, Rice Univ.; **Lukas Novotny**, Univ. of Rochester; **Motoichi Ohtsu**, The Univ. of Tokyo (Japan); **John B. Pendry**, Imperial College London (United Kingdom); **Lewis J. Rothberg**, Univ. of Rochester; **Vahid Sandoghdar**, ETH Zürich (Switzerland); **George C. Schatz**, Northwestern Univ.; **Tigran V. Shahbazyan**, Jackson State Univ.; **Vladimir M. Shalaev**, Purdue Univ.; **Gennady Shvets**, The Univ. of Texas/Austin; **Yung Doug Suh**, Korea Research Institute of Chemical Technology (South Korea); **Din-Ping Tsai**, National Taiwan Univ. (Taiwan); **Nikolay I. Zheludev**, Univ. of Southampton (United Kingdom)

Sunday 26 August

SESSION 1

Conv. Ctr. 22 Sun. 8:10 to 10:10 am

Special Invited Session: Trends in Nanoplasmonics

Chair: **Mark I. Stockman**, Georgia State Univ.

- 8:10 am: **Surface plasmon generation, propagation and detection (Invited Paper)**, A. Polman, FOM Institute for Atomic and Molecular Physics (Netherlands) [6641-01]
- 8:40 am: **Quantum mechanics and electrodynamics studies of the optical properties of metal nanoparticles (Invited Paper)**, G. C. Schatz, Northwestern Univ. [6641-02]
- 9:10 am: **Active plasmonic structures and metamaterials (Invited Paper)**, H. A. Atwater, Jr., H. J. Lezec, J. A. Dionne, C. E. Ross, L. A. Sweatlock, D. Pacifici, K. Diest, M. Dicken, V. Ferry, California Institute of Technology [6641-03]
- 9:40 am: **Coupled molecular and plasmon resonances (Invited Paper)**, R. P. Van Duyne, Northwestern Univ. [6641-04]
- Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 22 Sun. 10:30 am to 12:10 pm

Developments in SERS and Surface Enhancement

Chair: **Albert Polman**, FOM Institute for Atomic and Molecular Physics (Netherlands)

- 10:30 am: **Two photon vibrational probing using surface enhanced hyper Raman scattering (Invited Paper)**, J. Kneipp, Harvard Medical School and Federal Institute for Materials Research and Testing (Germany); H. Kneipp, Harvard Medical School; K. D. Kneipp, Harvard Medical School and Harvard-MIT Division of Health Sciences and Technology [6641-05]
- 11:00 am: **Local enhanced fields in DNA templated plasmonic molecules**, S. Bidault, A. Polman, FOM Institute for Atomic and Molecular Physics (Netherlands) [6641-06]
- 11:20 am: **Analysis of metal enhanced fluorescence on near-IR fluorophores**, J. P. Anderson, M. Griffiths, V. R. Boveia, LI-COR Biosciences [6641-07]
- 11:40 am: **Plasmonic enhancement of organic photovoltaic devices (Invited Paper)**, L. J. Rothberg, S. Pan, Univ. of Rochester [6641-08]
- Lunch Break 12:10 to 1:30 pm

SESSION 3

Conv. Ctr. 22 Sun. 1:30 to 3:10 pm

Nonlinear and Active Nanoplasmonics

Chair: **Martti Kauranen**, Tampere Univ. of Technology (Finland)

- 1:30 pm: **Routes to active plasmonics: nanoparticle-molecule assemblies (Invited Paper)**, N. J. Halas, Rice Univ. [6641-09]
- 2:00 pm: **Interacting localized-delocalized plasmonic nanostructures**, M. Knight, F. Hao, P. J. Nordlander, N. J. Halas, Rice Univ. [6641-10]
- 2:20 pm: **Sum frequency generation from alkanethiol capped metallic nanoparticles and vibrational mode specific enhancement in nanoparticle aggregates**, A. N. Bordenyuk, C. Weeraman, A. Benderskii, Wayne State Univ. [6641-11]
- 2:40 pm: **Nonlinear plasmonics with coupled gold nanoparticles (Invited Paper)**, L. Novotny, M. Danckwerts, Univ. of Rochester [6641-12]
- Coffee Break 3:10 to 3:30 pm

SESSION 4

Conv. Ctr. 22 Sun. 3:30 to 5:50 pm

Propagation Phenomena and Nanoplasmonics I

Chair: **Harry A. Atwater, Jr.**, California Institute of Technology

- 3:30 pm: **Sub-wavelength localizations of light through optical super-oscillations (Invited Paper)**, N. I. Zheludev, F. M. Huang, Univ. of Southampton (United Kingdom); Y. Chen, Rutherford Appleton Lab. (United Kingdom); F. J. Garcia de Abajo, Consejo Superior de Investigaciones Científicas (Spain) [6641-13]
- 4:00 pm: **Coupling into slow surface plasmons**, M. J. Preiner, N. A. Melosh, Stanford Univ. [6641-14]
- 4:20 pm: **Optical excitation of surface plasmons by tilted J₀ Bessel beams**, A. Carbajal-Domínguez, Univ. Juárez Autónoma de Tabasco (Mexico) [6641-15]
- 4:40 pm: **Novel metal-dielectric structures for guiding ultra-long range surface plasmon-polaritons at optical frequency**, R. Adato, J. Guo, The Univ. of Alabama in Huntsville [6641-16]
- 5:00 pm: **Optical cloaking (Invited Paper)**, V. M. Shalaev, W. Cai, U. K. Chettiar, A. V. Kildishev, Purdue Univ. [6641-17]
- 5:30 pm: **Non-adiabatic nano-focusing in tapered metallic rods**, M. W. Vogel, D. K. Gramotnev, Queensland Univ. of Technology (Australia); D. F. P. Pile, Univ. of California/Berkeley; M. I. Stockman, Georgia State Univ.; R. C. McPhedran, The Univ. of Sydney (Australia); X. Zhang, Univ. of California/Berkeley [6641-18]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

- 6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research
- 6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

NanoScience and Engineering Plenary Session Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

- 8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)
- 9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton
- 9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.
- Coffee Break 10:00 to 10:30 am
- 10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles
- 11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego
- 11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance
- See pg. 14-16 for presentation overviews.*

SESSION 5

Conv. Ctr. 22 Mon. 1:30 to 3:10 pm

Spatial Control and Subwavelength Localization

- Chair: Nikolay I. Zheludev, Univ. of Southampton (United Kingdom)*
- 1:30 pm: **The time-reversal subwavelength control in acoustics and electromagnetics (Invited Paper)**, M. Fink, École Supérieure de Physique et de Chimie Industrielles (France) [6641-19]
- 2:00 pm: **Electromagnetic enhancements and hotspots in electromigrated gaps**, Y. Wu, D. Ward, D. Natelson, P. J. Nordlander, Rice Univ. [6641-20]
- 2:20 pm: **Controlled localization of optical energy in plasmon particle arrays**, R. de Waele, F. Koenderink, A. Polman, FOM Institute for Atomic and Molecular Physics (Netherlands) [6641-21]
- 2:40 pm: **Ultrafast nanoplasmonics (Invited Paper)**, M. I. Stockman, Georgia State Univ. [6641-22]
- Coffee Break 3:10 to 3:30 pm

SESSION 6

Conv. Ctr. 22 Mon. 3:30 to 5:30 pm

Nonlinear and Controlled Nanoplasmonic Phenomena

- Chair: Mathias Fink, École Supérieure de Physique et de Chimie Industrielles (France)*
- 3:30 pm: **Adaptive sub-wavelength control of nano-optical fields (Invited Paper)**, W. Pfeiffer, M. Aeschlimann, M. Bauer, T. Brixner, Univ. Bielefeld (Germany) [6641-23]
- 4:00 pm: **Gold nanorods for optimized two photon luminescence imaging of cancerous tissue**, N. J. Durr, T. Larson, D. K. Smith, B. A. Korgel, The Univ. of Texas at Austin; K. Sokolov, The Univ. of Texas at Austin and The Univ. of Texas M.D. Anderson Cancer Ctr.; A. Ben-Yakar, The Univ. of Texas at Austin [6641-24]
- 4:20 pm: **Gold nanorods as nano photothermal sensitizers in phase change memory media**, J. W. M. Chon, P. Zijlstra, M. Gu, Swinburne Univ. of Technology (Australia) [6641-25]
- 4:40 pm: **Local-field and multipole effects in second-harmonic generation from gold nanoparticles and nanodimers (Invited Paper)**, M. Kauranen, S. Kujala, H. Husu, B. K. Canfield, Tampere Univ. of Technology (Finland); J. Laukkanen, B. Bai, M. Kuittinen, Y. P. Svirko, J. P. Turunen, Joensuu Yliopisto (Finland) [6641-26]
- 5:10 pm: **Local field asymmetry drives second-harmonic generation from t-shaped gold nanodimers**, B. K. Canfield, H. Husu, Tampere Univ. of Technology (Finland); B. Bai, J. Laukkanen, M. Kuittinen, J. P. Turunen, Joensuu Yliopisto (Finland); M. Kauranen, Tampere Univ. of Technology (Finland) [6641-27]

Tuesday 28 August

SESSION 7

Conv. Ctr. 22 Tues. 8:10 to 10:10 am

Propagation Phenomena and Nanoplasmonics II

- Chair: Lewis J. Rothberg, Univ. of Rochester*
- 8:10 am: **Surface plasmon polariton waves and their applications (Invited Paper)**, Y. Fainman, Univ. of California/San Diego [6641-29]
- 8:40 am: **The role of phonon in the surface plasmon coupling with an InGaN/GaN quantum well**, Y. Lu, C. Chen, D. Yeh, C. Huang, T. Tang, J. Huang, C. Yang, National Taiwan Univ. (Taiwan) [6641-30]
- 9:00 am: **MOS compatible ultra long range surface plasmon modes**, C. G. Durfee III, T. E. Furtak, A. J. Sabbah, P. D. Flammer, Colorado School of Mines; R. E. Hollingsworth, ITN Energy Systems, Inc.; R. T. Collins, Colorado School of Mines [6641-31]
- 9:20 am: **Ultra small laser made of a semiconductor nanowire and a metal shell**, C. Ning, Arizona State Univ.; A. Maslov, Canon Development Americas, Inc. [6641-32]
- 9:40 am: **Plasmonic endoscope: guiding, magnifying, and focusing of infrared radiation on a nanoscale (Invited Paper)**, G. Shvets, S. Trendafilov, The Univ. of Texas at Austin; J. B. Pendry, Imperial College London (United Kingdom); A. K. Sarychev, Ethertronics Inc. [6641-33]
- Coffee Break 10:10 to 10:30 am

SESSION 8

Conv. Ctr. 22 Tues. 10:30 am to 12:10 pm

Concentration and Transformation of Energy on Nanoscale

- Chair: Yeshaiah Fainman, Univ. of California/San Diego*
- 10:30 am: **Nano-focusing of surface plasmons in metallic nano-structures (Invited Paper)**, D. K. Gramotnev, Queensland Univ. of Technology (Australia); D. F. P. Pile, X. Zhang, Univ. of California/Berkeley [6641-34]
- 11:00 am: **Environmental optical sensitivity of gold nanodecahedra**, I. Pastoriza-Santos, L. M. Liz-Marzan, Univ. de Vigo (Spain); F. J. Garcia de Abajo, Consejo Superior de Investigaciones Científicas (Spain) [6641-35]
- 11:20 am: **Accelerated Forster energy transfer between CdTe quantum dots in proximity to gold nanoparticles**, V. K. Komarala, A. L. Bradley, The Univ. of Dublin, Trinity College (Ireland) [6641-36]
- 11:40 am: **Thermal effects in and near gold nanoparticles (Invited Paper)**, J. Feldmann, T. A. Klar, Ludwig-Maximilians-Univ. München (Germany) [6641-37]
- Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 9

Conv. Ctr. 22 Tues. 1:30 to 3:10 pm

Control and Manipulation of Nanoplasmonic Phenomena

- Chair: Jochen Feldmann, Ludwig-Maximilians-Univ. München (Germany)*
- 1:30 pm: **Plasmonics: catalyzing the next wave of chip-scale technologies (Invited Paper)**, M. L. Brongersma, Stanford Univ. [6641-38]
- 2:00 pm: **Ultra-fast broadband response of photon-drag current at surface plasmon resonance**, X. Yin, L. Hesselink, Stanford Univ. [6641-39]
- 2:20 pm: **Time-resolved second-harmonic generation from gold nanoparticle arrays**, D. Ferrara, K. A. Tetz, M. D. McMahon, R. F. Haglund, Jr., Vanderbilt Univ. [6641-40]
- 2:40 pm: **Surface plasmon waveguiding and detection (Invited Paper)**, J. R. Krenn, Karl-Franzens-Univ. Graz (Austria) [6641-41]
- Coffee Break 3:10 to 3:30 pm

Conference 6641 • Conv. Ctr. 22

SESSION 10

Conv. Ctr. 22 Tues. 3:30 to 6:10 pm

Nanoplasmonic Eigenmodes and Nanoscale Phenomena

Chair: Mark L. Brongersma, Stanford Univ.

- 3:30 pm: **Plasmonic nanostructures: artificial molecules (Invited Paper)**, P. J. Nordlander, Rice Univ. [6641-42]
- 4:00 pm: **Plasmon resonance of a gold nanostar: numerical plasmon hybridization**, F. Hao, C. L. Nehl, J. H. Hafner, P. J. Nordlander, Rice Univ. [6641-43]
- 4:20 pm: **Atomic-scale plasmonics: how does plasmon behave in ultimately tiny systems?**, T. Nagao, S. Yaginuma, C. Liu, T. Nakayama, National Institute for Materials Science (Japan); T. Inaoka, Iwate Univ. (Japan) [6641-44]
- 4:40 pm: **Increased Landau damping of the surface plasmon resonance of gold nanoparticles at the onset of the interband transition**, F. Hubenthal, F. Träger, Univ. Kassel (Germany) [6641-45]
- 5:00 pm: **Plasmonics using electron microscopy (Invited Paper)**, F. J. Garcia de Abajo, Consejo Superior de Investigaciones Científicas (Spain) .. [6641-46]
- 5:30 pm: **Experimental observations and numerical calculations of a 3D structured plasmon coupler**, A. Ghoshal, G. Webb-Wood, P. G. Kik, College of Optics & Photonics/Univ. of Central Florida [6641-47]
- 5:50 pm: **Competition of surface plasmon modes for dipole emission in optically active plasmonic nano-films**, R. F. Oulton, D. A. Genov, D. F. P. Pile, V. Sorger, M. S. Ambati, X. Zhang, Univ. of California/Berkeley [6641-48]

Wednesday 29 August

SESSION 11

Conv. Ctr. 22 Wed. 8:30 to 10:10 am

Nanocircuits and Energy Localization

Chair: Peter J. Nordlander, Rice Univ.

- 8:30 am: **Optical nanocircuit loading of nanoantenna structures (Invited Paper)**, A. Alu, N. Engheta, Univ. of Pennsylvania [6641-49]
- 9:00 am: **Unifying model for giant enhancement and quenching of light emission from Au/CdSe**, Y. Hsieh, Y. Chen, C. T. Liang, National Taiwan Univ. (Taiwan) [6641-50]
- 9:20 am: **Semiconductor active plasmonics**, J. Gomez Rivas, FOM Institute for Atomic and Molecular Physics (Netherlands); J. A. Sanchez-Gil, Consejo Superior de Investigaciones Científicas (Spain) [6641-52]
- 9:40 am: **Mapping local field distribution at metal nanostructures by near-field second-harmonic generation (Invited Paper)**, M. Celebrano, M. Zavelani-Rossi, P. Biagioni, D. Polli, M. Finazzi, L. Duo', G. Cerullo, Politecnico di Milano (Italy); M. Labardi, M. Allegrini, Univ. di Pisa (Italy); J. Grand, P. Royer, P. Adam, Univ. de Technologie de Troyes (France) [6641-53]
- Coffee Break 10:10 to 10:30 am

SESSION 12

Conv. Ctr. 22 Wed. 10:30 am to 12:10 pm

Magnetic Phenomena and Molecular Nanoplasmonics

Chair: Nader Engheta, Univ. of Pennsylvania

- 10:30 am: **Magnetic moments and magnetization of EM eigenstates of a composite medium near the quasistatic limit (Invited Paper)**, D. J. Bergman, Tel Aviv Univ. (Israel) [6641-54]
- 11:00 am: **Optical and electronic properties of electrochemically active perylene tetracarboxylic diimide molecules**, N. Davani, K. Shimizu, M. J. Preiner, N. A. Melosh, Stanford Univ. [6641-55]
- 11:20 am: **Optical properties of nanostructured metallic films and surfaces containing magnetic media**, A. Khanikaev, A. V. Baryshev, Toyohashi Univ. of Technology (Japan); A. A. Fedyanin, A. B. Granovsky, M.V. Lomonosov Moscow State Univ. (Russia); M. Inoue, Toyohashi Univ. of Technology (Japan) [6641-56]
- 11:40 am: **Spinplasmonics: a new route for active plasmonics (Invited Paper)**, A. Y. Elezzabi, Univ. of Alberta (Canada) [6641-57]
- Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 13

Conv. Ctr. 22 Wed. 1:30 to 3:20 pm

Propagation Phenomena and Nanoplasmonics III

Chair: Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada)

- 1:30 pm: **Novel plasmonic dimple lens for nano-focusing of optical energy (Invited Paper)**, S. Vedantam, H. Lee, J. Tang, J. Conway, M. Staffaroni, J. Lu, E. Yablonovitch, Univ. of California/Los Angeles [6641-58]
- 2:00 pm: **Directional coupling between gap plasmon waveguides**, D. K. Gramotnev, K. C. Vernon, Queensland Univ. of Technology (Australia); D. F. P. Pile, X. Zhang, Univ. of California/Berkeley [6641-59]
- 2:20 pm: **Experimental study and analysis of passive plasmonic nanocavities**, V. Sorger, R. F. Oulton, S. Han, Z. Liu, D. F. P. Pile, D. A. Genov, C. Sun, X. Zhang, Univ. of California/Berkeley [6641-60]
- 2:40 pm: **Surface-plasmon enhancement of Brillouin light scattering from gold-nanodisk arrays on glass**, Z. N. Utegulov, National Institute of Standards and Technology; B. T. Draine, Princeton Univ.; S. A. Kim, J. M. Shaw, W. L. Johnson, National Institute of Standards and Technology [6641-61]
- 3:00 pm: **Comparisons of the surface plasmon sensitivities for nanohole and nanoslit arrays**, P. Wei, Research Ctr. for Applied Sciences (Taiwan) [6641-62]
- Coffee Break 3:20 to 3:40 pm

SESSION 14

Conv. Ctr. 22 Wed. 3:40 to 6:00 pm

New Developments in Nanoplasmonics

Chair: David J. Bergman, Tel Aviv Univ. (Israel)

- 3:40 pm: **Polarization-dependent dark-field microspectroscopy of individual plasmonic nanostructures**, J. B. Lassiter, N. A. Mirin, H. Wang, D. W. Brandl, T. Park, C. L. Nehl, J. H. Hafner, P. J. Nordlander, N. J. Halas, Rice Univ. [6641-63]
- 4:00 pm: **Fabrication of gold nanoparticles using nanosphere lithography in combination with laser tailoring - a flexible approach for nanostructuring of surfaces**, R. Morarescu, F. Hubenthal, F. Träger, Univ. Kassel (Germany) [6641-64]
- 4:20 pm: **2D hexagonal arrays of Au nanoshells as integrated substrates for surface enhanced spectroscopies**, F. Le, H. Wang, N. J. Halas, P. J. Nordlander, Rice Univ. [6641-65]
- 4:40 pm: **Screening process of the quantum-confined Stark effect of an InGaN/GaN quantum well in its coupling with surface plasmon for light emission enhancement**, C. Chen, Y. Lu, D. Yeh, C. Yang, National Taiwan Univ. (Taiwan) [6641-66]
- 5:00 pm: **Bloch mode analysis of transmission through periodic slit arrays in finite thickness metallic slabs**, Y. Xie, The Univ. of Arizona; A. R. Zakharian, College of Optical Sciences/The Univ. of Arizona; J. V. Moloney, The Univ. of Arizona; M. Mansuripur, College of Optical Sciences/The Univ. of Arizona [6641-67]
- 5:20 pm: **Modeling of core-shell silver nanoparticles in nanostructured sol-gel thin films**, G. Valverde-Aguilar, J. A. Garcia-Macedo, V. Rentería, Univ. Nacional Autónoma de México (Mexico) [6641-68]
- 5:40 pm: **Design and fabrication of gold nanostructures with nanosphere lithography for LSPR applications**, X. D. Zhou, W. Knoll, Institute of Materials Research and Engineering (Singapore); S. Virasawmy, National Univ. of Singapore (Singapore); S. S. Y. Oh, L. W. Yen, N. Zhang, Institute of Materials Research and Engineering (Singapore) [6641-69]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

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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.

- ✓ **Bloch mode analysis of transmission through periodic slit arrays in finite thickness metallic slabs**, Y. Xie, A. R. Zakharian, J. V. Moloney, M. Mansuripur, College of Optical Sciences/The Univ. of Arizona . . . [6641-70]
- ✓ **Optical properties of platinum-coated gold nanorods**, J. Perez-Juste, M. Grzelczak, Univ. de Vigo (Spain); F. J. García de Abajo, Consejo Superior de Investigaciones Científicas (Spain); L. M. Liz-Marzán, Univ. de Vigo (Spain) [6641-71]
- ✓ **Synthesis, optical properties and modeling of silver core-silver oxide shell nanostructures in silica films**, V. Rentería, J. A. García-Macedo, G. Valverde-Aguilar, Univ. Nacional Autónoma de México (Mexico) . . [6641-72]
- ✓ **Surface enhanced Raman spectroscopy on the tip of a plastic optical fiber**, J. M. Taguenang, K. Aschalew, A. Sharma, Alabama A&M Univ.; D. E. Diggs, Air Force Research Lab. [6641-73]
- ✓ **Amorphous and crystallized alloys analysis by Kramers-Kronig method**, O. O. Fedosenko, National Taras Shevchenko Univ. of Kyiv (Ukraine); E. A. Loza, National Antarctic Scientific Ctr. (Ukraine); L. V. Poperenko, National Taras Shevchenko Univ. of Kyiv (Ukraine) [6641-74]
- ✓ **Advanced Kramers-Kronig analysis method for ribbons of Fe-based amorphous and crystallized alloys**, O. O. Fedosenko, L. V. Poperenko, National Taras Shevchenko Univ. of Kyiv (Ukraine); E. A. Loza, National Antarctic Scientific Ctr. (Ukraine) [6641-75]
- ✓ **Analysis of Bragg gratings for long-range surface plasmon polaritons using the bidirectional beam propagation method based on scattering operators**, H. Zhang, J. Mu, W. Huang, McMaster Univ. (Canada) [6641-76]
- ✓ **Light focusing with tip formed array of plasmon-polariton waveguides**, W. M. Saj, Univ. Warszawski (Poland) [6641-77]
- ✓ **Finite difference time domain analysis and design of 2D silver nanoplasmonic waveguides**, M. Rasouli Disfani, K.N.Toosi Univ. of Technology (Iran) [6641-78]

Courses of Related Interest

See SPIE Cashier for information.

-
- SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm
-
- SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm
-
- SC727 Nanoplasmonics (Stockman) Thursday 30, 8:30 am - 5:30 pm



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Conference 6642 • Conv. Ctr. 21

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6642

Plasmonics: Nanoimaging, Nanofabrication, and Their Applications III

Conference Chairs: **Satoshi Kawata**, Osaka Univ. (Japan); **Vladimir M. Shalaev**, Purdue Univ.; **Din-Ping Tsai**, National Taiwan Univ. (Taiwan)

Program Committee: **David J. Bergman**, Tel Aviv Univ. (Israel); **Sergey I. Bozhevolnyi**, Aalborg Univ. (Denmark); **Che Ting Chan**, Hong Kong Univ. of Science and Technology (Hong Kong China); **Jochen Feldmann**, Ludwig-Maximilians-Univ. München (Germany); **Naomi J. Halas**, Rice Univ.; **Teruya Ishihara**, The Institute of Physical and Chemical Research (Japan); **Fritz Keilmann**, Max-Planck-Institut für Biochemie (Germany); **Victor I. Klimov**, Los Alamos National Lab.; **Aaron Lewis**, The Hebrew Univ. of Jerusalem (Israel); **Le-Wei J. Li**, National Univ. of Singapore (Singapore); **Olivier J. F. Martin**, École Polytechnique Fédérale de Lausanne (Switzerland); **Martin Moskovits**, Univ. of California/Santa Barbara; **Peter J. Nordlander**, Rice Univ.; **Masaya Notomi**, NTT Basic Research Labs. (Japan); **Lukas Novotny**, Univ. of Rochester; **Motoichi Ohtsu**, The Univ. of Tokyo (Japan); **John B. Pendry**, Imperial College London (United Kingdom); **Joseph W. Perry**, Georgia Institute of Technology; **Lewis J. Rothberg**, Univ. of Rochester; **Vahid Sandoghdar**, ETH Zürich (Switzerland); **George C. Schatz**, Northwestern Univ.; **Tigran V. Shahbazyan**, Jackson State Univ.; **Mark I. Stockman**, Georgia State Univ.; **Yung Doug Suh**, Korea Research Institute of Chemical Technology (South Korea); **Xiang Zhang**, Univ. of California/Berkeley; **Nikolay I. Zheludev**, Univ. of Southampton (United Kingdom)

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

Tuesday 28 August

SESSION 1

Conv. Ctr. 21 Tues. 8:30 to 10:10 am

Nano Fabrication and Lithography

Chair: **Thomas A. Klar**, Ludwig-Maximilians-Univ. München (Germany)

8:30 am: **Fabrication and application of custom-designed arrays of nanoparticles and nanowires on anodic alumina templates (Invited Paper)**, Y. Wang, Academia Sinica (Taiwan) [6642-01]

9:00 am: **DNA-mediated patterning of gold nanoparticles into discrete structures: modularity, write/erase and structural switching (Invited Paper)**, H. Sleiman, F. Aldaye, McGill Univ. (Canada) [6642-02]

9:30 am: **Surface-plasmons-assisted nanoscale photolithography**, S. Chen, The Univ. of Texas at Austin [6642-03]

9:50 am: **Focusing and manipulation of surface plasmon polaritons by laser fabricated dielectric structures**, C. Reinhardt, R. V. Kiyani, S. Passinger, A. Stepanov, B. N. Chichkov, Laser Zentrum Hannover e.V. (Germany) [6642-04]

Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 21 Tues. 10:30 am to 3:10 pm

Nano Imaging

Chair: **Satoshi Kawata**, Osaka Univ. (Japan)

10:30 am: **Hyperspectral cathodoluminescent imaging of plasmonic excitations with nanoscale resolution (Invited Paper)**, N. I. Zheludev, M. Bashevoy, A. Denisyuk, F. Jonsson, Univ. of Southampton (United Kingdom) [6642-05]

11:00 am: **Tip-enhanced Raman scattering: regulating the tip-sample distance (Invited Paper)**, P. Verma, T. Yano, T. Ichimura, Y. Inouye, S. Kawata, Osaka Univ. (Japan) [6642-06]

11:30 am: **Particle enhanced plasmonic NSOM**, Y. Wang, Univ. of California/Berkeley; B. M. Reinhard, Boston Univ.; C. Sun, X. Zhang, Univ. of California/Berkeley [6642-07]

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

1:30 pm: **Near field imaging of subwavelength plasmonic structures (Invited Paper)**, J. Wang, National Taiwan Univ. (Taiwan); J. Y. Chu, T. R. Wang, J. T. Yeh, M. Lin, Y. Chang, Industrial Technology Research Institute (Taiwan) [6642-08]

2:00 pm: **Imaging of optical field distributions and plasmon wavefunctions in metal nanoparticles (Invited Paper)**, H. Okamoto, K. Imura, Institute for Molecular Science (Japan) [6642-09]

2:30 pm: **Infrared antennas for near-field microscopy**, T. Taubner, J. A. Schuller, M. L. Brongersma, Stanford Univ. [6642-10]

2:50 pm: **A surface plasmon polariton phase microscope with a subwavelength grating structure**, Y. Su, S. Chen, National Cheng Kung Univ. (Taiwan) [6642-11]

Coffee Break 3:10 to 3:30 pm

SESSION 3

Conv. Ctr. 21 Tues. 3:30 to 5:30 pm

Plasmonics Spectroscopy

Chair: **Yuh-Lin Wang**, Academia Sinica (Taiwan)

3:30 pm: **Spectroscopy of Single Gold Nanoparticle Dimers (Invited Paper)**, T. A. Klar, J. Feldmann, Ludwig-Maximilians-Univ. München (Germany)[6642-12]

4:00 pm: **Tip-enhanced near-field Raman spectroscopy applied to nano-composite materials**, Y. Saito, Osaka Univ. (Japan); K. Yanagi, H. Kataura, National Institute of Advanced Industrial Science and Technology (Japan); N. Hayazawa, The Institute of Physical and Chemical Research (RIKEN) (Japan); S. Kawata, Osaka Univ. (Japan) [6642-15]

4:20 pm: **Tip-pressurized near-field Raman spectroscopy of carbon nanotubes**, T. Yano, P. Verma, Y. Inouye, Osaka Univ. (Japan); S. Kawata, Osaka Univ. (Japan) and RIKEN (Japan) [6642-14]

4:40 pm: **Nanoengineering of hotspots for surface enhanced spectroscopies (Invited Paper)**, P. J. Nordlander, Rice Univ. [664213]

5:10 pm: **Investigating the secondary structures for long oligonucleotides using attenuated-total-reflection nanoplasmon-enhanced Raman scattering**, K. Chiu, S. Chen, National Cheng Kung Univ. (Taiwan) [6642-17]

Wednesday 29 August

SESSION 4

Conv. Ctr. 21 Wed. 8:10 to 10:10 am

Nano Sensing

Chair: Mark L. Brongersma, Stanford Univ.

- 8:10 am: **Localized surface plasmon sensing with gold nanorods and nanostars (Invited Paper)**, K. M. Mayer, S. Lee, C. L. Nehl, J. H. Hafner, Rice Univ. [6642-18]
- 8:40 am: **Localized surface plasmon sensing platform (Invited Paper)**, K. Kajikawa, Tokyo Institute of Technology (Japan) [6642-19]
- 9:10 am: **Surface plasmon-enhanced photodetectors**, J. White, Z. Yu, G. Veronis, S. L. Fan, M. L. Brongersma, Stanford Univ. [6642-20]
- 9:30 am: **Effect of individual nanoparticles on the response of Si photodiodes**, N. K. Grady, S. P. Sundararajan, N. J. Halas, Rice Univ. [6642-21]
- 9:50 am: **Novel optical geometry for multi-analyte surface plasmon coupled emission (SPCE) based biosensors**, F. T. O'Neill, S. O'Sullivan, S. K. Vashist, B. D. MacCraith, Dublin City Univ. (Ireland) [6642-22]
- Coffee Break 10:10 to 10:30 am

SESSION 5

Conv. Ctr. 21 Wed. 10:30 am to 3:00 pm

Manipulation of Plasmonic Effect

Chair: Vladimir M. Shalaev, Purdue Univ.

- 10:30 am: **Hierarchy and energy dissipation in optical near-fields and their system applications (Invited Paper)**, M. Naruse, National Institute of Information and Communications Technology (Japan); M. Ohtsu, The Univ. of Tokyo (Japan) [6642-23]
- 11:00 am: **Plasmonic detection of local order in self-assembling metal nanoparticle materials (Invited Paper)**, A. A. Lazarides, D. S. Sebba, Duke Univ. [6642-24]
- 11:30 am: **Segmented metallic nanowires for optical antennas**, E. S. Barnard, M. L. Brongersma, Stanford Univ. [6642-25]
- Lunch/Exhibition Break 11:50 to 1:40 pm
- 1:40 pm: **Surface plasmons on SNOM probes: optical nanofocusing and fluorescence dynamics (Invited Paper)**, N. A. Issa, R. Guckenberger, Max-Planck-Institut für Biochemie (Germany); C. Bolwien, A. Brandenburg, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [6642-27]
- 2:10 pm: **Enhanced transmission efficiency of a nanoaperture in a designed complex (Invited Paper)**, S. Zou, H. Wang, Univ. of Central Florida [6642-28]
- 2:40 pm: **Far-field imaging of surface plasmon resonance modes on single gold nanorod**, H. J. Huang, National Taiwan Univ. (Taiwan) and Ctr. of Nanostorage Research (Taiwan); C. Yu, National Taiwan Univ. (Taiwan); K. Chiu, National Taiwan Univ. (Taiwan) and Ctr. of Nanostorage Research (Taiwan); H. Chang, R. S. Liu, National Taiwan Univ. (Taiwan); H. P. Chiang, National Taiwan Ocean Univ. (Taiwan); D. Tsai, National Taiwan Univ. (Taiwan) and Institute of Electro-optical Science and Technology (Taiwan) and Academia Sinica (Taiwan) [6642-30]
- Coffee Break 3:00 to 3:30 pm

SESSION 6

Conv. Ctr. 21 Wed. 3:30 to 5:10 pm

Plasmonic Metamaterials I

Chair: Xiang Zhang, Univ. of California/Berkeley

- 3:30 pm: **Terahertz plasmonics: guiding and focusing of far-infrared radiation using a metamaterials approach (Invited Paper)**, S. Maier, Univ. of Bath (United Kingdom) [6642-31]
- 4:00 pm: **Size effects in plasmonic metamaterials for the visible range (Invited Paper)**, V. P. Drachev, U. K. Chettiar, H. Yuan, W. Cai, A. V. Kildishev, V. M. Shalaev, Purdue Univ. [6642-32]
- 4:30 pm: **Experimental demonstration of an optical hyperlens**, Z. Liu, H. Lee, Y. Xiong, C. Sun, X. Zhang, Univ. of California/Berkeley [6642-33]
- 4:50 pm: **Plasmonic materials for cloaking structures**, A. Alu, N. Engheta, Univ. of Pennsylvania [6642-34]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

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- ✓ **Plasmonic nano-kaleidoscope**, S. Chen, Far East College (Taiwan); D. Tsai, National Taiwan Univ. (Taiwan) [6642-51]
- ✓ **Plasmonic optical fiber biosensor for small sample volume**, M. Inoue, M. Kimura, K. Kajikawa, Tokyo Institute of Technology (Japan) [6642-52]
- ✓ **Variation of the confocal parameters of silver nano superlens**, K. Lee, K. Kim, J. Kim, H. Park, Yonsei Univ. (South Korea) [6642-53]

Thursday 30 August

SESSION 7

Conv. Ctr. 21 Thurs. 8:40 to 10:00 am

Plasmonic Metamaterials II

Chair: Nader Engheta, Univ. of Pennsylvania

- 8:30 am: **Negative index materials based on plasmonic and polaritonic components (Invited Paper)**, G. Shvets, Y. A. Urzhumov, The Univ. of Texas at Austin; V. Lomakin, Univ. of California/San Diego; M. I. Davanco, Univ. of California/Santa Barbara; S. Forrest, Univ. of Michigan [6642-35]
- 9:00 am: **Magnifying superlens based on surface plasmon optics (Invited Paper)**, I. I. Smolyaninov, Univ. of Maryland/College Park [6642-36]
- 9:30 am: **Anomalous surface plasmon dispersion in metallodielectric multilayers**, P. G. Kik, G. Webb-Wood, A. Ghoshal, College of Optics & Photonics/Univ. of Central Florida [6642-37]
- Coffee Break 10:00 to 10:30 am

Conference 6642 • Conv. Ctr. 21

SESSION 8

Conv. Ctr. 21 Thurs. 10:30 am to 3:00 pm

Plasmonics

Chairs: **Che Ting Chan**, Hong Kong Univ. of Science and Technology (Hong Kong China); **Hirokazu Hori**, Univ. of Yamanashi (Japan)

10:30 am: **Multiple electric and magnetic resonances of nano spherical particles in light scattering (Invited Paper)**, H. She, L. J. Li, S. J. Chua, National Univ. of Singapore (Singapore) [6642-39]

11:00 am: **Function and fundamental processes of nano-optoelectronics devices (Invited Paper)**, H. Hori, Univ. of Yamanashi (Japan) [6642-40]

11:30 am: **FDTD studies of the optical properties of metallic tip/substrate systems**, F. Le, P. J. Nordlander, Rice Univ. [6642-41]

11:50 am: **Analysis of a long-range surface Plasmon polariton gratings using one dimensional finite difference mode matching method**, J. Mu, H. Zhang, W. Huang, McMaster Univ. (Canada) [6642-42]

Lunch Break 12:10 to 1:30 pm

1:30 pm: **Plasmonic modes in periodic metal nanoparticle structures (Invited Paper)**, C. T. Chan, K. H. Fung, Hong Kong Univ. of Science and Technology (Hong Kong China) [6642-43]

2:00 pm: **Strong coupling between nanoshell plasmons and organic excitons**, N. T. Fofang, N. J. Halas, Rice Univ. [6642-44]

2:20 pm: **Surface plasmon resonances on metallic nano-antennas, nano-stars and nano-trimers**, J. A. Sanchez-Gil, V. Giannini, J. V. Garcia-Ramos, Consejo Superior de Investigaciones Científicas (Spain); O. L. Muskens, J. Gomez Rivas, FOM Institute for Atomic and Molecular Physics (Netherlands) [6642-45]

2:40 pm: **Efficient parameterization of the dielectric response of Au and Ag nanostructures**, F. Hao, P. J. Nordlander, Rice Univ. [6642-46]

Coffee Break 3:00 to 3:20 pm

SESSION 9

Conv. Ctr. 21 Thurs. 3:20 to 4:30 pm

Nanoplasmonic Applications

Chair: **Din-Ping Tsai**, National Taiwan Univ. (Taiwan)

3:20 pm: **Compensation of loss by optical gain in localized and propagating surface plasmons (Invited Paper)**, M. A. Noginov, G. Zhu, M. Bahoura, M. Mayy, B. A. Ritzo, Norfolk State Univ.; V. A. Podolskiy, Oregon State Univ.; V. P. Drachev, V. M. Shalaev, Purdue Univ. [6642-47]

3:50 pm: **Plasmonic modification of adjacent molecules and materials: routes to active plasmonic devices**, R. Bardhan, S. P. Sundararajan, N. K. Grady, F. Tam, S. Grabtchak, N. J. Halas, Rice Univ. [6642-48]

4:10 pm: **Improvements of photo-thermal recording efficiency on phase-change optical recording media with metallic oxide nano thin film**, T. S. Kao, National Taiwan Univ. (Taiwan) and Ctr. for Nanostorage Research (Taiwan); J. W. M. Chon, Swinburne Univ. of Technology (Australia); Y. Yan, H. Hsu, Y. H. Fu, National Taiwan Univ. (Taiwan) and Ctr. for Nanostorage Research (Taiwan); M. Gu, Swinburne Univ. of Technology (Australia); D. Tsai, National Taiwan Univ. (Taiwan) and Ctr. for Nanostorage Research (Taiwan) and Academia Sinica (Taiwan) [6642-49]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

SC727 Nanoplasmonics (Stockman) Thursday 30, 8:30 am - 5:30 pm

Physical Chemistry of Interfaces and Nanomaterials VI

Conference Chairs: **Piotr Piotrowiak**, Rutgers Univ.; **Garry Rumbles**, National Renewable Energy Lab.

Acknowledgement is made to the Donors of the **American Chemical Society Petroleum Research Fund**, for partial support of this conference.

SPIE also wishes to thank the following sponsor for their generous support to this conference:  **NREL** National Renewable Energy Laboratory

Sunday 26 August

SESSION 1

Conv. Ctr. 28E Sun. 1:30 to 3:00 pm

Session 1

1:30 pm: **Nanoscale excitons and energy transfer (Invited Paper)**, G. D. Scholes, Univ. of Toronto (Canada) [6643-01]

2:00 pm: **Characterization of SWNT thin film electrodes with optical and THz spectroscopies, and the correlation of spectroscopy with electrical and device performance**, J. L. Blackburn, M. C. Beard, T. Barnes, T. McDonald, M. Heben, National Renewable Energy Lab. [6643-02]

2:20 pm: **Charge transfer studies of photosensitive ruthenium complexes with single walled carbon nanotubes**, H. Chaturvedi, J. C. Poler, The Univ. of North Carolina at Charlotte [6643-03]

2:40 pm: **Non-covalent functionalization of carbon nanotubes in polymer composites**, A. A. Hofstra, J. L. Sample, Johns Hopkins Univ. [6643-04]

Coffee Break 3:00 to 3:30 pm

SESSION 2

Conv. Ctr. 28E Sun. 3:30 to 4:50 pm

Session 2

3:30 pm: **Conducting polymer nanocomposites: interactions at interfaces (Invited Paper)**, H. He, Rutgers Univ. [6643-05]

4:00 pm: **Elucidating the influence of conducting polymer anodes by optical spectroscopy of devices**, P. A. Lane, Naval Research Lab.; P. J. Brewer, Imperial College London (United Kingdom); G. P. Kushto, Naval Research Lab.; J. C. de Mello, Imperial College London (United Kingdom) [6643-06]

4:20 pm: **Exciton diffusion and quenching in semiconducting polymers (Invited Paper)**, I. D. W. Samuel, P. Shaw, A. Ruseckas, Univ. of St. Andrews (United Kingdom) [6643-07]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

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

SESSION 3

Conv. Ctr. 28E Mon. 1:30 to 2:50 pm

Session 3

1:30 pm: **Tools to study interface photophysics in excitonic solar cells (Invited Paper)**, N. Kopidakis, J. Piri, A. J. Ferguson, W. L. Rance, D. C. Olson, D. Selmarten, S. E. Shaheen, D. S. Ginley, G. Rumbles, National Renewable Energy Lab. [6643-08]

2:00 pm: **Multiple exciton generation in films of chemically treated lead chalcogenide quantum dots**, J. Luther, M. C. Beard, Q. Song, M. Law, A. J. Nozik, National Renewable Energy Lab. [6643-09]

2:20 pm: **Analysis of single-molecule emission dynamics using photon interarrival time recording (Invited Paper)**, H. Fujiwara, S. Tamura, T. Chiba, S. Takeuchi, K. Sasaki, Hokkaido Univ. (Japan) [6643-10]

Coffee Break 2:50 to 3:20 pm

SESSION 4

Conv. Ctr. 28E Mon. 3:20 to 4:40 pm

Session 4

3:20 pm: **Interfacial structure and dynamics in molecular solar cells (Invited Paper)**, O. L. A. Monti, M. L. Blumenfeld, J. M. Tyler, L. K. Schirra, B. S. Tackett, The Univ. of Arizona [6643-11]

3:50 pm: **Imaging of resonant quenching of surface plasmons by quantum dots using scanning tunneling luminescence (Invited Paper)**, J. van de Lagemaat, M. J. Romero, National Renewable Energy Lab.; I. Mora-Sero, Univ. Jaume I (Spain); G. Rumbles, M. M. Al-Jassim, National Renewable Energy Lab. [6643-12]

4:20 pm: **Novel setup for time-resolved fluorescence microscopy**, L. Gundlach, P. Piotrowiak, Rutgers Univ. [6643-14]

Conference 6643 • Conv. Ctr. 28E

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Effect of preparation on the growth mode and structure in laser MBE grown multilayer of SrTiO₃ and YBa₂Cu₃O_y**, Z. Wu, J. L. Li, J. Hao, The Hong Kong Polytechnic Univ. (Hong Kong China) [6643-22]
- ✓ **Laser assisted surface modification of AISI 304 SS with SiC-Ti-Zr**, P. Rajarajan, S. Dillibabu, National Institute of Technology/Tiruchirappalli (India); J. Jamal Mohamed, Jamal Mohamed College (India); R. Kaul, H. Kumar, N. Asish Kumar, Ctr. for Advanced Technology (India) [6643-23]

Tuesday 28 August

SESSION 5

Conv. Ctr. 28E Tues. 8:30 to 10:00 am

Session 5

8:30 am: **Photovoltaic energy conversion utilizing the different photon energies in the solar spectrum (Invited Paper)**, F. Willig, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) [6643-15]

9:00 am: **Non-invasive directional diagnosis of surface/interface nanostructures via traceable x-ray diffraction procedures**, G. G. Berti, Univ. di Pisa (Italy) [6643-16]

9:20 am: **Nano-scale manipulation of interface in engineered titanate heterostructure with temperature gradient modulation**, J. L. Li, J. Hao, Z. Wu, The Hong Kong Polytechnic Univ. (Hong Kong China); Y. Li, Univ. of Electronic Science and Technology of China (China) [6643-17]

9:40 am: **Ultrafast interfacial electron transfer probed with two-photon-photoemission**, L. Gundlach, Rutgers Univ.; R. Ernstorfer, Univ. of Toronto (Canada); F. Willig, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) [6643-18]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 28E Tues. 10:30 to 11:30 am

Session 6

10:30 am: **Femtosecond visible-to-IR spectroscopy of TiO₂ nanocrystalline films: dynamics of UV-generated charge carrier relaxation and electron-injection from gold nano-dots (Invited Paper)**, A. Furube, National Institute of Advanced Industrial Science and Technology (Japan); Y. Tamaki, Univ. of the Ryukyus (Japan); M. Murai, K. Hara, R. Katoh, M. Tachiya, National Institute of Advanced Industrial Science and Technology (Japan) [6643-19]

11:00 am: **Sensitization of defined metal oxide semiconductor electrode surfaces by cyanine dyes (Invited Paper)**, M. T. Spittler, National Renewable Energy Lab.; B. A. Parkinson, Colorado State Univ. [6643-21]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm



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Optical Trapping and Optical Micromanipulation IV

Conference Chairs: **Kishan Dholakia**, Univ. of St. Andrews (United Kingdom); **Gabriel C. Spalding**, Illinois Wesleyan Univ.

Program Committee: **Elliot L. Botvinick**, Beckman Laser Institute; **Carlos L. César**, Univ. Estadual de Campinas (Brazil); **Arthur E. T. Chiou**, National Yang-Ming Univ. (Taiwan); **Eric R. Dufresne**, Yale Univ.; **Jesper Glückstad**, Risø National Lab. (Denmark); **Min Gu**, Swinburne Univ. of Technology (Australia); **Philippe J. Marchand**, Celula, Inc.; **Jens-Christian D. Meiners**, Univ. of Michigan; **Lene B. Oddershede**, Niels Bohr Institute (Denmark); **H. D. Ou-Yang**, Lehigh Univ.; **Rubén Ramos-García II**, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); **Alexander Rohrbach**, Albert-Ludwigs-Univ. Freiburg (Germany); **Halina H. Rubinsztein-Dunlop**, The Univ. of Queensland (Australia)

Sunday 26 August

SESSION 1

Conv. Ctr. 23A/B Sun. 8:00 to 10:10 am

Optical Traps and DNA

Chair: **Justin E. Molloy**, National Institute for Medical Research (United Kingdom)

8:00 am: **Visualizing single DNA-bound proteins using DNA as a scanning probe (Invited Paper)**, G. J. L. Wuite, Vrije Univ. Amsterdam (Netherlands) [6644-01]

8:30 am: **Stretching sub-micron DNA fragments with optical tweezers (Invited Paper)**, Y. Chen, G. A. Blab, J. D. Meiners, Univ. of Michigan [6644-02]

9:00 am: **Studies of viral DNA packaging motors with optical tweezers: a comparison of motor function in bacteriophages phi29, lambda, and T4**, D. E. Smith, D. N. Fuller, D. Raymer, J. P. Rickgauer, Univ. of California/San Diego; S. Grimes, P. J. Jardine, D. L. Anderson, Univ. of Minnesota; C. Catalano, Univ. of Washington; V. Kottadiel, V. Rao, The Catholic Univ. of America ... [6644-03]

9:20 am: **Mechanisms of DNA binding determined in optical tweezers experiments**, M. J. McCauley, M. C. Williams, Northeastern Univ. ... [6644-04]

9:40 am: **High-resolution single-molecule optical trapping measurements of transcription with basepair accuracy (Invited Paper)**, W. J. Greenleaf, E. A. Abbondanzieri, Stanford Univ.; M. T. Woodside, Stanford Univ. and National Research Council of Canada (Canada); R. Landick, Univ. of Wisconsin/Madison; S. M. Block, Stanford Univ. [6644-05]

Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 23A/B Sun. 10:30 to 11:20 am

Statistical Mechanics of Small Systems

Chair: **Kirstine Berg-Sørensen**, Danmarks Tekniske Univ. (Denmark)

10:30 am: **Fluctuation and dissipation theorems: theory and experiment (Invited Paper)**, D. J. Evans, E. M. Sevick, G. Wang, D. M. Carberry, J. C. Reid, The Australian National Univ. (Australia); D. J. Searles, Griffith Univ. (Australia) [6644-06]

11:00 am: **The determination of the second virial coefficient of colloidal particles by forced Rayleigh light scattering in the vicinity of a blinking optical trap**, J. Junio, E. Blanton, H. D. Ou-Yang, Lehigh Univ. [6644-08]

Lunch Break 11:20 am to 1:30 pm

SESSION 3

Conv. Ctr. 23A/B Sun. 1:30 to 3:10 pm

Single Molecule Studies

Chair: **Jens-Christian D. Meiners**, Univ. of Michigan

1:30 pm: **Optical trapping studies of acto-myosin motor proteins (Invited Paper)**, R. Farrow, J. Fielden, H. Jankevics, C. Mellor, N. Fili, T. Holder, J. E. Molloy, National Institute for Medical Research (United Kingdom) ... [6644-10]

2:00 pm: **Direct measurement of the intermolecular forces confining a single entangled polymer**, R. M. Robertson, D. E. Smith, Univ. of California/San Diego [6644-11]

2:20 pm: **Optically trapped water droplets as nanocontainers (Invited Paper)**, K. Helmersson, A. M. Jofre, J. Tang, R. B. Kishore, L. S. Goldner, National Institute of Standards and Technology [6644-12]

2:50 pm: **Hydrosomes: optically trapped femtoliter containers for single molecule studies**, A. M. Jofre, R. B. Kishore, National Institute of Standards and Technology; N. Hodas, California Institute of Technology; J. Tang, G. Lowman, L. S. Goldner, K. Helmersson, National Institute of Standards and Technology [6644-13]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Conv. Ctr. 23A/B Sun. 3:30 to 5:10 pm

Triggered Events in Biological Systems

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

3:30 pm: **Forced shape deformations of interfaces and biopolymer networks**, W. Losert, A. Pomerance, E. Rericha, Univ. of Maryland/College Park [6644-14]

3:50 pm: **A laser microscope system for mechanotransduction studies on cells**, S. K. Mohanty, Univ. of California/Irvine; H. H. Rubinsztein-Dunlop, The Univ. of Queensland; E. L. Botvinick, Univ. of California/Irvine [6644-15]

4:10 pm: **Optical tweezers and multiphoton microscopies integrated photonic tool for mechanical and biochemical cell processes studies**, A. A. de Thomaz, W. M. Faustino, Univ. Estadual de Campinas (Brazil); A. Fontes, Univ. Federal de Pernambuco (Brazil); H. P. Fernandes, M. d. L. Barjas-Castro, K. Metzke, S. Giorgio, L. C. Barbosa, C. L. Cesar, Univ. Estadual de Campinas (Brazil) [6644-16]

4:30 pm: **Optical tweezers guided control of neuronal cell growth: effect of beam asymmetry and power on different cell types**, S. K. Mohanty, C. Sun, M. W. Berns, Univ. of California/Irvine [6644-17]

4:50 pm: **Optical tweezers for studying DNA repair and ageing**, K. O. Greulich, Fritz Lipmann Institute (Germany); S. Monajembashi, Fritz Lipmann Institute (Germany) and Consultant (Germany); T. Keining, P. Grigaravicius, Fritz Lipmann Institute (Germany) [6644-18]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6644 • Conv. Ctr. 23A/B

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

Lunch Break 12:00 to 1:30 pm

SESSION 5

Conv. Ctr. 23A/B Mon. 1:30 to 3:20 pm

Optical Measurements of Viscosity/Rheology

Chair: Elliot L. Botvinick, Beckman Laser Institute

1:30 pm: **Quantitative force calibration in viscoelastic media and living cells**, K. Berg-Sorensen, Danmarks Tekniske Univ. (Denmark); M. Fischer, Danmarks Tekniske Univ. (Denmark) and Univ. of Copenhagen (Denmark); A. C. Richardson, N. Reihani, L. B. Oddershede, Niels Bohr Institute (Denmark) [6644-19]

1:50 pm: **Using optical traps to test materials by active microrheology (Invited Paper)**, C. F. Schmidt, D. Mizuno, Georg-August-Univ. (Germany) [6644-20]

2:20 pm: **Studying red blood cell agglutination by measuring membrane viscosity with optical tweezers**, A. Fontes, H. P. Fernandes, A. A. de Thomaz, L. C. Barbosa, M. d. L. Barjas-Castro, C. L. César, Univ. Estadual de Campinas (Brazil) [6644-21]

2:40 pm: **Mechanical inhomogeneity and anisotropy in mimetic microtubule networks**, J. Wang, Lehigh Univ.; Y. Liu, J. X. Tang, Brown Univ.; H. D. Ou-Yang, Lehigh Univ. [6644-22]

3:00 pm: **Microrheology of microlitre samples**, S. J. W. Parkin, G. G. Knoener, T. A. Nieminen, N. R. Heckenberg, H. H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia) [6644-23]

Coffee Break 3:20 to 3:30 pm

SESSION 6

Conv. Ctr. 23A/B Mon. 3:30 to 5:50 pm

Towards Lab-on-a-Chip

Chair: Jesper Glüeckstad, Risø National Lab. (Denmark)

3:30 pm: **Micro-optics for optical trapping in microfluidics**, F. Merenda, J. Rohner, J. R. Fournier, R. Salathé, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [6644-24]

3:50 pm: **Integrated optical manipulation within microfluidic systems**, D. W. M. Marr, R. W. Applegate, Jr., J. A. Squier, Colorado School of Mines; T. Vestad, J. S. Oakey, Metafluidics, Inc. [6644-25]

4:10 pm: **Optically driven particle separation**, W. Mu, Z. Li, L. Luan, Northwestern Univ.; G. Wang, Indiana Univ.-Purdue Univ. Fort Wayne; G. C. Spalding, Illinois Wesleyan Univ.; J. B. Ketterson, Northwestern Univ. [6644-26]

4:30 pm: **Transport and separation of microspheres with lensless imaging technique**, Y. Sun, J. Bu, L. Ong, X. Yuan, Nanyang Technological Univ. (Singapore) [6644-27]

4:50 pm: **Dispersion of carbon nanotubes and nanotube-assisted bubble formation using near infrared optical tweezers**, K. S. Mohanty, S. K. Mohanty, Univ. of California/Irvine [6644-28]

5:10 pm: **Optical microrotors: theory, design and fabrication**, V. L. Y. Loke, T. Asavei, T. A. Nieminen, N. R. Heckenberg, H. H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia) [6644-29]

5:30 pm: **Optically trapping lithoparticles of complex shapes: colloidal alphabet soup**, J. N. Wilking, C. Hernandez, T. G. Mason, Univ. of California/Los Angeles [6644-30]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

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✓ **The use of laser tweezers to analyze sperm motility and mitochondrial respiration**, J. M. Nascimento, L. Z. Shi, C. Chandsawangbhuwana, Univ. of California/San Diego; B. S. Durrant, Conservation and Research for Endangered Species; E. L. Botvinick, M. W. Berns, Univ. of California/Irvine [6644-73]

✓ **Improved measurement of the maximum transverse force applicable by OT, using the viscous drag method**, A. C. Richardson, N. Reihani, L. B. Oddershede, Niels Bohr Institute (Denmark) [6644-74]

✓ **Improving axial optical trapping efficiency by compensating spherical aberrations**, N. Reihani, L. B. Oddershede, Niels Bohr Institute (Denmark) [6644-75]

✓ **A holographic tweezers setup for force measurements on biological molecules**, A. van der Horst, N. R. Forde, Simon Fraser Univ. (Canada) [6644-76]

✓ **Smooth-moving holographic optical-tweezers**, E. Eriksson, M. Goksoer, Göteborg Univ. (Sweden); J. Leach, S. Keen, M. Padgett, Univ. of Glasgow (United Kingdom) [6644-77]

✓ **Forming standing vortex modes in opposite directed laser beams**, V. G. Shvedov, N. V. Shostka, V. Mykhaylov, Vernadskiy Tavricheskiy National Univ. (Ukraine) [6644-79]

✓ **Optical forces on asymmetric particles**, K. D. Bonin, D. Bonessi, Wake Forest Univ.; T. G. Walker, Univ. of Wisconsin/Madison [6644-80]

✓ **Laser cooling in flame synthesis of nanoparticles**, X. Liu, Rutgers Univ. [6644-81]

✓ **Flow-assisted collection of DNA molecules on silica beads**, R. Ramos-García, N. A. Korneev, J. C. Ramirez-San-Juan, E. Rodriguez-Aboytes, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); M. Cardenas-García, Benemérita Univ. Autónoma de Puebla (Mexico) [6644-82]

✓ **Micro-kinetics of the trapping of medium-sized particles: angular momentum transfer and force calibration**, Y. Zhao, J. S. Edgar, G. D. M. Jeffries, D. McGloin, D. T. Chiu, Univ. of Washington [6644-84]

Tuesday 28 August

SESSION 7

Conv. Ctr. 23A/B Tues. 8:00 to 10:10 am

Phun with Phase

Chair: Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

8:00 am: **Combining holographic optical tweezers with flexible image filtering (Invited Paper)**, M. A. Ritsch-Martel, A. Jesacher, C. Maurer, S. Bernet, Innsbruck Medical Univ. (Austria) [6644-31]

8:30 am: **Encoding arbitrary grey-level optical landscapes for trapping and manipulation using GPC (Invited Paper)**, C. A. C. Alonzo, P. J. L. Rodrigo, I. R. Perch-Nielsen, J. S. Dam, J. Glückstad, Risø National Lab. (Denmark) [6644-32]

9:00 am: **Optical coherence measurements of vortex light fields using optically manipulated micro-apertures**, W. M. Lee, K. Dholakia, Univ. of St. Andrews (United Kingdom) [6644-33]

9:20 am: **Rotating matter with optical and acoustical wavefields: new aspects of angular momentum transfer (Invited Paper)**, K. P. Volke-Sepulveda, A. Orozco-Santillán, A. Vásquez-Arzola, N. Hernández-Candia, R. Jauregui, Univ. Nacional Autónoma de México (Mexico); V. M. Arrizón, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6644-34]

9:50 am: **Vortical laser tweezers with predetermined intensity structure**, K. N. Afanasiev, E. G. Abramochkin, A. V. Korobtsov, S. P. Kotova, N. N. Losevsky, E. V. Razuveva, V. G. Volostnikov, P.N. Lebedev Physical Institute (Russia) [6644-35]

Coffee Break 10:10 to 10:30 am

SESSION 8

Conv. Ctr. 23A/B Tues. 10:30 am to 12:00 pm

Basic Science

Chair: Kristian Helmersson, National Institute of Standards and Technology

10:30 am: **All-optical manipulation and control of neutral atomic ensembles**, W. T. Hill III, I. A. Arakelyan, N. Chattrapiban, S. Mitra, Univ. of Maryland/College Park [6644-36]

10:50 am: **The world through a spinning window (Invited Paper)**, J. Leach, L. Allen, Univ. of Glasgow (United Kingdom); A. J. Wright, J. M. Girkin, S. M. Barnett, Univ. of Strathclyde (United Kingdom); M. J. Padgett, Univ. of Glasgow (United Kingdom) [6644-37]

11:20 am: **Radiation pressure on submerged mirrors: implications for the momentum of light in dielectric media**, M. Mansuripur, College of Optical Sciences/The Univ. of Arizona [6644-38]

11:40 am: **Theories of longitudinal optical binding**, E. M. Wright, College of Optical Sciences/The Univ. of Arizona; K. Metzger, M. Mazilu, K. Dholakia, Univ. of St. Andrews (United Kingdom); V. Karásek, P. Zemanek, Institute of Scientific Instruments (Czech Republic); P. Jakobsen, Univ. of Tromsø (Norway) [6644-39]

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

SESSION 9

Conv. Ctr. 23A/B Tues. 1:30 to 2:30 pm

Optical Binding

Chair: Gabriel C. Spalding, Illinois Wesleyan Univ.

1:30 pm: **Nonlinear optics perspective of optical binding of particles**, E. M. Wright, College of Optical Sciences/The Univ. of Arizona; P. J. Reece, K. Metzger, K. Dholakia, Univ. of St. Andrews (United Kingdom) [6644-40]

1:50 pm: **Effect of coherence on transverse optical binding studied using line optical tweezers**, S. K. Mohanty, Univ. of California/Irvine [6644-42]

2:10 pm: **Layer-by-layer optical assembly of colloidal particles**, G. Wang, Indiana Univ.-Purdue Univ. Fort Wayne [6644-43]

SESSION 10

Conv. Ctr. 23A/B Tues. 2:30 to 4:40 pm

Plasmonics/Nano

Chair: Carlos L. César, Univ. Estadual de Campinas (Brazil)

2:30 pm: **Gold nanoparticles: enhanced optical trapping yet significant heating**, T. T. Perkins, Y. Seol, A. E. Carpenter, Univ. of Colorado/Boulder [6644-46]

2:50 pm: **Thermal tweezers for nanomanipulation and nanofabrication on surfaces**, D. K. Gramotnev, D. R. Mason, G. Gramotnev, Queensland Univ. of Technology (Australia) [6644-47]

Coffee Break 3:10 to 3:30 pm

3:30 pm: **Blue-detuned trap for resonant confinement of metal nanoparticles**, M. Dienerowitz, P. J. Reece, N. K. Metzger, T. F. Krauss, K. Dholakia, Univ. of St. Andrews (United Kingdom) [6644-48]

3:50 pm: **Optical trapping of nanoshells**, K. Helmersson, A. Crawford, B. Cranswick, R. B. Kishore, National Institute of Standards and Technology; N. J. Halas, C. Levin, Rice Univ. [6644-49]

4:10 pm: **Plasmon-enhanced optical trapping of individual metal nanoparticles (Invited Paper)**, M. A. Pelton, Argonne National Lab.; M. Liu, The Univ. of Chicago; K. C. Toussaint, Jr., Univ. of Chicago; H. Y. Kim, G. Smith, J. Pesic, P. Guyot-Sionnest, The Univ. of Chicago; N. F. Scherer, Argonne National Lab. and The Univ. of Chicago [6644-51]

Wednesday 29 August

SESSION 11

Conv. Ctr. 23A/B Wed. 8:10 to 10:10 am

Colloid Science with Optical Traps

Chair: H. Daniel Ou-Yang, Lehigh Univ.

8:10 am: **Measuring many-body forces with many optical tweezers**, S. Sainis, E. R. Dufresne, Yale Univ. [6644-52]

8:30 am: **Multi-particle hydrodynamic interactions using a streaming high-speed video camera**, J. Leach, Univ. of Glasgow (United Kingdom); R. Di Leonardo, G. Ruocco, Univ. degli Studi di Roma (Italy); C. Saunter, G. Love, Durham Univ. (United Kingdom); S. Keen, M. Padgett, Univ. of Glasgow (United Kingdom) [6644-53]

8:50 am: **Direct observation of capillary forces between colloidal particles confined in a liquid film**, F. Saglimbeni, R. Di Leonardo, G. Ruocco, Univ. degli Studi di Roma (Italy) [6644-54]

9:10 am: **Studies of droplet manipulation in optical traps (Invited Paper)**, D. McGloin, D. R. Burnham, M. D. Summers, Univ. of St. Andrews (United Kingdom); N. Dewar, High School of Dundee (United Kingdom); J. Buchanan, D. Rudd, Univ. of St. Andrews (United Kingdom) [6644-55]

9:40 am: **Parametric resonance of optically trapped aerosols (Invited Paper)**, R. Di Leonardo, G. Ruocco, Univ. degli Studi di Roma (Italy); J. Leach, M. J. Padgett, Univ. of Glasgow (United Kingdom); A. J. Wright, J. M. Girkin, Univ. of Strathclyde (United Kingdom); D. R. Burnham, D. McGloin, Univ. of St. Andrews (United Kingdom) [6644-56]

Coffee Break 10:10 to 10:30 am

Conference 6644 • Conv. Ctr. 23A/B

SESSION 12

Conv. Ctr. 23A/B Wed. 10:30 am to 12:10 pm

Optical Traps for Novel Sensors

Chair: Eric R. Dufresne, Yale Univ.

10:30 am: **Circular motion control of an optically trapped microprobe for nano-position sensing**, Y. Nagasaka, Y. Takaya, T. Hayashi, T. Miyoshi, Osaka Univ. (Japan) [6644-57]

10:50 am: **Specific interaction study between protein molecules using optical tweezers and atomic force microscope combined**, H. Sehgal, T. De, M. V. Salapaka, Iowa State Univ. [6644-58]

11:10 am: **Cavitation induced by continuous wave laser**, J. C. Ramirez-San-Juan, E. Rodriguez-Aboytes, N. A. Korneev, R. Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6644-59]

11:30 am: **Optical trapping on biological samples and its combination with other fields in optics**, D. A. Cojoc, E. Ferrari, Lab. Nazionale TASC/INFN (Italy); V. Garbin, Univ. Twente (Netherlands); S. Cabrini, Lawrence Berkeley National Lab.; E. M. Di Fabrizio, Univ. degli studi Magna Græcia di Catanzaro (Italy) [6644-60]

11:50 am: **Azimuthal trapping and optical binding observed in single fiber optical tweezers**, S. K. Mohanty, K. S. Mohanty, Univ. of California/Irvine [6644-61]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 13

Conv. Ctr. 23A/B Wed. 1:30 to 3:10 pm

Optics of Optical Trap Systems

Chair: Rubén Ramos-García, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)

1:30 pm: **Axial optical trapping for an arbitrary beam through a refractive index mismatch interface**, A. A. R. Neves, Istituto Nazionale per la Fisica della Materia (Italy); A. Fontes, Federal Univ. of Pernambuco (Brazil); L. C. Barbosa, Univ. Estadual de Campinas (Brazil); A. Camposeo, R. Cingolani, D. Pisignano, Istituto Nazionale per la Fisica della Materia (Italy); C. L. César, Univ. Estadual de Campinas (Brazil) [6644-62]

1:50 pm: **Multiple counterpropagating-beam traps using MEMS-based spatial light modulation**, P. J. L. Rodrigo, I. R. Perch-Nielsen, C. A. C. Alonzo, J. S. Dam, J. Glückstad, Risø National Lab. (Denmark) [6644-63]

2:10 pm: **Assembly of novel nano and micro-structures**, D. M. Carberry, L. Ikin, Univ. of Bristol (United Kingdom); G. M. Gibson, M. J. Padgett, Univ. of Glasgow (United Kingdom); M. J. Miles, Univ. of Bristol (United Kingdom) [6644-64]

2:30 pm: **Operation of high resolution optically addressed spatial light modulators**, D. Preece, E. Yao, G. M. Gibson, M. Padgett, Univ. of Glasgow (United Kingdom) [6644-65]

2:50 pm: **Study on femtosecond optical tweezers induced kerr effect on rotation of microscopic objects**, S. K. Mohanty, Univ. of California/Irvine; K. D. Rao, P. K. Gupta, Raja Ramanna Ctr. for Advanced Technology (India) [6644-66]

Coffee Break 3:10 to 3:30 pm

SESSION 14

Conv. Ctr. 23A/B Wed. 3:30 to 5:10 pm

Optical Control for Biological Studies

Chair: David W. M. Marr, Colorado School of Mines

3:30 pm: **Preparative separations using optical chromatography**, A. V. Terray, J. Arnold, T. A. Leski, S. D. Sundbeck, S. J. Hart, Naval Research Lab. [6644-67]

3:50 pm: **Interrogating the impact of optical trapping on the bioluminescence of individual cells using the marine bacterium *Vibrio harveyi***, B. Koss, Naval Research Lab. [6644-68]

4:10 pm: **Elastic force measurement for *Klebsiella pneumoniae* type III pili by using optical tweezers**, F. Chen, L. Hsu, National Chiao Tung Univ. (Taiwan) [6644-69]

4:30 pm: **Stable manipulating of microscopic rods by line optical tweezers with haptic feedback**, S. Lee, Y. Lee, Kwangju Institute of Science and Technology (South Korea) [6644-70]

4:50 pm: **Real-time control of optical tweezers**, A. E. Wallin, R. Tuma, Univ. of Helsinki (Finland) [6644-72]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

SC655 Introduction to Optical Tweezers and Optical Micromanipulation (Dholakia, Spalding) Thursday 30, 8:30 am - 12:30 pm

Conference 6645 • Conv. Ctr. 24A

Monday-Thursday 27-30 August 2007 • Proceedings of SPIE Vol. 6645

Nanoengineering: Fabrication, Properties, Optics, and Devices IV

Conference Chairs: **Elizabeth A. Dobisz**, Hitachi Global Storage Technologies; **Louay A. Eldada**, DuPont Photonics Technologies

Program Committee: **Luisa D. Bozano**, IBM Almaden Research Ctr.; **Gregory J. Exarhos**, Pacific Northwest National Lab.; **Cynthia Hanson**, Space and Naval Warfare Systems Command; **Daniel J. C. Herr**, Semiconductor Research Corp.; **Ghassan E. Jabbour**, Arizona State Univ.; **Miguel Levy**, Michigan Technological Univ.; **Robert Magnusson**, Univ. of Connecticut; **Juan R. Maldonado**, Stanford Univ.; **Jun Tanida**, Osaka Univ. (Japan); **Chee Wei Wong**, Columbia Univ.

Monday 27 August

NanoScience and Engineering Plenary Session Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

Lunch Break 12:00 to 1:30 pm

SESSION 1

Conv. Ctr. 24A Mon. 1:30 to 3:00 pm

Photonic Crystals

Chair: **Louay A. Eldada**, DuPont Photonics Technologies

1:30 pm: **Controlling light with photonic crystal nanostructures: dispersion, nonlinearities and quantum (Invited Paper)**, C. W. Wong, Columbia Univ. [6645-01]

2:00 pm: **SiN photonic crystal cavities: promising tools for the manipulation of light in the visible**, M. Barth, Humboldt-Univ. zu Berlin (Germany); J. Kouba, BESSY GmbH (Germany); O. Benson, Humboldt-Univ. zu Berlin (Germany) [6645-02]

2:20 pm: **Fabrication of large scale nanofocusing device based on negative refraction index photonic crystals**, S. Cabrini, D. L. Olynick, Lawrence Berkeley National Lab.; V. Mocella, Istituto per la Microelettronica e Microsistemi (Italy) [6645-03]

2:40 pm: **Fabrication and optical characterisation of Si₃N₄ 2D-photonic crystals for applications in visible range**, J. Kouba, BESSY GmbH (Germany); M. Barth, Humboldt-Univ. zu Berlin (Germany); W. Eberhardt, B. Loechel, BESSY GmbH (Germany) [6645-04]

Coffee Break 3:00 to 3:20 pm

SESSION 2

Conv. Ctr. 24A Mon. 3:20 to 5:30 pm

Nano-Biotechnology

Chair: **Cynthia Hanson**, Space and Naval Warfare Systems Command

3:20 pm: **Parallel optical tweezers with combining a diffractive optical element and a spatial light modulator for photonic DNA memory (Invited Paper)**, M. Zheng, T. Naoya, O. Yusuke, T. Jun, Osaka Univ. (Japan) [6645-05]

3:50 pm: **Nanopatterned hydrogels and their application as high-density nanoarrays**, I. Saaem, Duke Univ.; M. R. Libera, Stevens Institute of Technology; J. Tian, Duke Univ. [6645-06]

4:10 pm: **Multi-layered organic light-emitting diode (OLED) based biosensors**, S. Prasad, S. Devabhaktuni, S. K. Padigi, Portland State Univ. [6645-07]

4:30 pm: **Nano-scale patterning of phospholipid thin films by interferometric UV lithography**, A. S. Kassu, J. M. Taguenang, A. Sharma, Alabama A&M Univ. [6645-08]

4:50 pm: **Biological fabrication of nanostructured silicon-germanium photonic crystals possessing unique photoluminescent and electroluminescent properties**, G. L. Rorrer, C. Chang, C. Jeffryes, T. Qin, D. Lee, Oregon State Univ.; T. Gutu, J. Jiao, R. Solanki, Portland State Univ. [6645-09]

5:10 pm: **Development of ultra-low magnetic field sensor with magnetic tunneling junctions**, W. T. Pong, W. F. Egelhoff, Jr., National Institute of Standards and Technology [6645-10]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Fabrication process optimization for magnetic tunnel junctions with magnetoelectronic applications**, W. T. Pong, W. F. Egelhoff, Jr., National Institute of Standards and Technology [6645-69]
- ✓ **Flexible Bragg reflection waveguide devices fabricated on a plastic substrate**, K. Kim, J. Yi, M. Oh, Pusan National Univ. (South Korea); Y. Noh, H. Lee, ChemOptics Inc. (South Korea) [6645-72]
- ✓ **Characterization of AlF₃ thin film in the ultraviolet by magnetron sputtering of aluminum target**, B. H. Liao, M. Liu, C. Lee, National Central Univ. (Taiwan) [6645-73]
- ✓ **The research of oblique deposition of lanthanum fluoride thin films at 193nm**, M. C. Liu, C. C. Lee, W. H. Cho, B. H. Liao, National Central Univ. (Taiwan) [6645-74]

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- ✓ **Dynamic force microscopy and x-ray photoemission spectroscopy studies of conducting polymer thin film on nanoscale structured Al surface**, H. Kato, S. Takemura, A. Ishii, Y. Takarai, Y. Watanabe, T. Sugiyama, T. Hiramatsu, N. Nanba, Kanto Gakuin Univ. (Japan); O. Nishikawa, M. Taniguchi, Kanazawa Institute of Technology (Japan) [6645-75]
- ✓ **Photopolymerization of hybrid organic/inorganic materials based on nanostructured molecular units for photonic applications**, I. Fortunati, R. Signorini, R. Bozio, G. Brusatin, M. Guglielmi, Univ. degli Studi di Padova (Italy); S. Dirè, V. Tagliazucca, Univ. degli Studi di Trento (Italy); S. Licoccia, M. L. Di Vona, M. Trombetta, Univ. degli Studi di Roma/Tor Vergata (Italy); P. Innocenzi, Univ. degli Studi di Sassari (Italy); C. Andraud, Ecole normale supérieure de Lyon (France) [6645-77]
- ✓ **Theory and numerical design of CROW sections with bends**, S. V. Pishko, S. V. Boriskina, Kharkiv National Univ. (Ukraine) [6645-78]
- ✓ **Compact MEMS switch and variable optical attenuator on high contrast silicon waveguides**, X. Wang, M. S. Nawrocka, A. Lavrenov, R. R. Panipucci, Florida International Univ. [6645-79]
- ✓ **Silicon nanoparticle conjugation to high molecular weight DNA**, J. Choi, National Institute of Standards and Technology; N. S. Wang, Univ. of Maryland/College Park; V. Reipa, National Institute of Standards and Technology [6645-80]
- ✓ **Elasticity of bradied DNA measured with AFM force spectroscopy**, J. W. Strzelecki, Nicholas Copernicus Univ. Chapter (Poland) [6645-81]
- ✓ **Micro-opto-electro-mechanical system (MOEMS) for microstructure manipulation and optical characterization**, J. A. Martinez, T. Liu, M. S. Nawrocka, R. R. Panepucci, Florida International Univ. [6645-82]
- ✓ **Comparison of the nonlinear optical response calculations for bulk semiconductors using length and transversal gauges**, M. A. Escobar Acevedo, J. L. Cabellos Quiroz, N. Arzate, B. S. Mendoza, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6645-83]
- ✓ **Structural modifications of carbon nanotubes by CO₂ gasification**, A. Collins, S. N. Sambandam, W. Lu, Fisk Univ. [6645-84]
- ✓ **The role of electro-osmosis and dielectrophoresis in collection of micro/nano size particles in low frequency AC electric field**, C. Wei, C. Hsu, Tatung Univ. (Taiwan) [6645-85]
- ✓ **A sub-wavelength polarizer with high contrast and high tolerance of incident ray's angle in the range of visible wavelength**, Y. Lo, K. Cheng, T. Teng, C. Sun, National Central Univ. (Taiwan) [6645-86]
- ✓ **Dielectric constant trends in silicate spin on glasses**, N. Iwamoto, Honeywell Electronic Materials; T. Li, Honeywell International, Inc.; J. Sepa, A. Krishnamoorthy, Honeywell Electronic Materials [6645-87]
- ✓ **New solution for nitrides optoelectronics: nanocrystalline GaN and GaN:Eu³⁺ powder and their optical and structural properties**, A. P. Podhorodecki, M. Nyk, R. Kudrawiec, J. Misiewicz, Politechnika Wroclawska (Poland); W. Strek, Polska Akademia Nauk (Poland) [6645-88]

Tuesday 28 August

SESSION 3

Conv. Ctr. 24A Tues. 8:10 to 10:00 am

Optical Interconnects

Chair: El-Hang Lee, Inha Univ. (South Korea)

- 8:10 am: **Nanoengineered polymeric materials for ultra-short to ultra-long optical links (Invited Paper)**, L. A. Eldada, DuPont Photonics Technologies [6645-11]
- 8:40 am: **Flexible optical wire-bonding for planar lightwave circuits packaging**, R. R. Panepucci, A. J. Zakariya, T. Liu, Florida International Univ. [6645-12]
- 9:00 am: **Nanotaper coupler for the horizontal slot-waveguide**, A. M. P. Fievre, R. R. Panepucci, T. Liu, Florida International Univ. [6645-13]
- 9:20 am: **Enhancement of light extraction efficiency in light-emitting diodes using prism type textured top surface**, M. Chang, SAMSUNG Electro-Mechanics Co., Ltd. (South Korea) [6645-14]
- 9:40 am: **Enhancement of light extraction efficiency of light-emitting diode with hexagonal photonic crystal layer**, H. L. Dang, H. Do, J. Park, I. Hoang, J. Lee, S. Ryu, Chonnam National Univ. (South Korea) [6645-15]
- Coffee Break 10:00 to 10:40 am

SESSION 4

Conv. Ctr. 24A Tues. 10:40 am to 12:00 pm

Nanofabricated Optical Devices

Chair: Chee Wei Wong, Columbia Univ.

- 10:40 am: **Polymer waveguide resonator with distributed Bragg reflectors**, T. Liu, M. S. Nawrocka, R. R. Panepucci, Florida International Univ. . [6645-17]
- 11:00 am: **Wavelength reconfigurable photonic switching using thermally tuned micro-ring resonators fabricated on silicon substrate**, M. R. Wang, H. Ng, Univ. of Miami; D. Li, New Span Opto-Technology, Inc.; X. Wang, J. Martinez, R. R. Panepucci, Florida International Univ. [6645-18]
- 11:20 am: **Nanophotonic devices based on optical Kerr effect in ovonic chalcogenides**, R. O. Miller, D. V. Tsu, D. A. Strand, Energy Conversion Devices, Inc. [6645-19]
- 11:40 am: **Variable diffraction gratings using nanoporous electrodes and electrophoresis of dye ions**, M. A. Martinuk, P. C. P. Hrudyc, M. A. Mossman, The Univ. of British Columbia (Canada); A. C. van Popta, M. J. Brett, Univ. of Alberta (Canada); J. S. Huizinga, 3M Co.; L. A. Whitehead, The Univ. of British Columbia (Canada) [6645-20]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 5

Conv. Ctr. 24A Tues. 1:30 to 3:00 pm

Quantum Dots and Wires

Chair: Elizabeth A. Dobisz, Hitachi Global Storage Technologies

- 1:30 pm: **Design and fabrication of functional nano-photonic devices for VLSI photonic circuit application (Invited Paper)**, E. Lee, Inha Univ. (South Korea) [6645-21]
- 2:00 pm: **Optical anisotropy, birefringence and light scattering by semiconductor nanowires**, J. Gomez Rivas, S. Diedenhofen, O. L. Muskens, E. Bakkers, M. Borgstrom, FOM Institute for Atomic and Molecular Physics (Netherlands) [6645-22]
- 2:20 pm: **Comparison of optical gain and a-factor in laser diodes having different quantum dot structures (in the vertical direction)**, K. C. Kim, Korea Univ. (South Korea) and Korea Institute of Science and Technology (South Korea); Y. C. Yoo, J. H. Jung, I. K. Han, J. I. Lee, Korea Institute of Science and Technology (South Korea); D. H. Kim, T. G. Kim, Korea Univ. (South Korea) [6645-23]
- 2:40 pm: **Design, fabrication and testing of enhanced EO quantum dots for mmW detection**, B. Redding, N. N. Faleev, T. Creazzo, D. W. Prather, Univ. of Delaware [6645-25]
- Coffee Break 3:00 to 3:20 pm

SESSION 6

Conv. Ctr. 24A Tues. 3:20 to 5:10 pm

Nanostructure Engineering

Chair: Jun Tanida, Osaka Univ. (Japan)

- 3:20 pm: **Ultrafast pulsed laser ablation as a method for synthesis of nanocrystals (Invited Paper)**, B. Liu, Z. Hu, IMRA America, Inc.; K. Sun, Y. Chen, X. Pan, Univ. of Michigan; Y. Che, IMRA America, Inc. [6645-26]
- 3:50 pm: **Fabrication of spintronic devices: etching endpoint detection by resistance measurement for magnetic tunnel junctions**, W. T. Pong, M. Schmueeli, W. F. Egelhoff, Jr., National Institute of Standards and Technology [6645-27]
- 4:10 pm: **Preliminary design and noise consideration of an ultrasensitive magnetic field**, W. T. Pong, R. D. McMichael, W. F. Egelhoff, Jr., National Institute of Standards and Technology [6645-29]
- 4:30 pm: **Nanocoating stationary phase of MEMS-based preconcentrators and gas chromatography columns fabricated by layer-by-layer assembly of gold nanoparticles for high-speed chemical detection analysis**, V. Jain, Virginia Polytechnic Institute and State Univ.; H. M. Yochum, Sweet Briar College; R. Montazami, J. R. Hefflin, B. Alfeeli, S. A. Ali, M. Agah, L. T. Taylor, M. Ashraf-Khorassani, Virginia Polytechnic Institute and State Univ. ... [6645-30]
- 4:50 pm: **In situ Raman scattering in nanomaterial flame synthesis**, X. Liu, Rutgers Univ. [6645-31]

Wednesday 29 August

SESSION 7

Conv. Ctr. 24A Wed. 8:10 to 10:10 am

Thin Film Nanostructure Optics

Chair: Gregory J. Exarhos, Pacific Northwest National Lab.

8:10 am: **Optics of thin-film silicon solar cells with efficient periodic light trapping texture**, C. S. Haase, H. Stiebig, Forschungszentrum Jülich GmbH (Germany) [6645-32]

8:30 am: **Tailored circular Bragg phenomena in TiO₂ sculptured thin films through post-deposition processing**, S. M. Pursel, M. W. Horn, A. Lakhtakia, The Pennsylvania State Univ. [6645-33]

8:50 am: **Optoelectronic properties of ZnO/ZnMgO quantum well lasers with coupled self-consistent models**, R. V. N. Melnik, Wilfrid Laurier Univ. (Canada); M. Willatzen, Syddansk Univ. (Denmark); D. R. Mahapatra, Indian Institute of Science (India); L. C. Lew Yan Voon, Wright State Univ. . [6645-34]

9:10 am: **Fabrication and characterization of silicon/silicon dioxide super lattices for silicon-based light-emitting devices**, T. Creazzo, E. Marchena, B. Redding, T. R. Hodson, D. W. Prather, Univ. of Delaware [6645-35]

9:30 am: **Function of bubble pit during readout process in PtOx type super-RENS disk**, Q. Liu, The National Ctr. for Nanoscience and Technology of China (China); T. Fukaya, National Institute of Advanced Industrial Science and Technology (Japan) [6645-36]

9:50 am: **Narrowband, linear-polarization rejection filter based on columnar thin film superlattice**, F. Chiadini, Univ. degli Studi di Salerno (Italy); V. Fiumara, Univ. degli Studi della Basilicata (Italy); A. Scaglione, Univ. degli Studi di Salerno (Italy); A. Lakhtakia, The Pennsylvania State Univ. [6645-37]

Coffee Break 10:10 to 10:30 am

SESSION 8

Conv. Ctr. 24A Wed. 10:30 am to 12:00 pm

Organic Nanostructures

Chair: Louay A. Eldada, DuPont Photonics Technologies

10:30 am: **Rational design of molecular self-assemblies for controlled surface patterning and molecular diffusion (Invited Paper)**, D. Bléger, D. Kréher, F. Mathevet, A. Attias, Univ. Pierre et Marie Curie (France); G. Schull, L. Douillard, C. Fiorini-Debuisschert, F. Charra, Commissariat à l'Energie Atomique (France) [6645-38]

11:00 am: **Fabrication of sub-diffraction-limit molecular structures by scanning near-field photolithography**, G. J. Leggett, The Univ. of Sheffield (United Kingdom) [6645-39]

11:20 am: **Elasticity of two-photon-fabricated nano-wires**, S. Nakanishi, Osaka Univ. (Japan); H. Sun, Jinlin Univ. (China) and Osaka University (Japan); S. Kawata, Osaka Univ. (Japan) [6645-40]

11:40 am: **Current modulation of polymer/nanoparticle memory devices through nanoparticle engineering**, J. Ouyang, National Univ. of Singapore (Singapore) [6645-41]

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

SESSION 9

Conv. Ctr. 24A Wed. 1:10 to 3:10 pm

Nanotubes

Chair: Elizabeth A. Dobisz, Hitachi Global Storage Technologies

1:10 pm: **Optical polarizer made of mechanically aligned carbon nanotubes**, S. Shoji, H. Suzuki, S. Kawata, Osaka Univ. (Japan) ... [6645-42]

1:30 pm: **Optoelectronic transport studies of photosensitive ruthenium complexes with single walled carbon nanotubes**, H. Chaturvedi, J. C. Poler, The Univ. of North Carolina at Charlotte [6645-43]

1:50 pm: **Ambient formation of highly aligned carbon nanotube networks**, M. D. Lay, P. Vichchulada, The Univ. of Georgia [6645-44]

2:10 pm: **Analytical modeling of the current transport in carbon nanotube field effect transistors (CNT-FETs)**, J. M. Marulanda, Florida International Univ.; A. Srivastava, Louisiana State Univ. [6645-45]

2:30 pm: **Nano materials for efficiently lowering the freezing point of anti-freeze coolants**, H. Hong, South Dakota School of Mines and Technology [6645-46]

2:50 pm: **Light source with carbon nanotubes field emission cathode and rare-earth doped nanocrystalline phosphors**, P. Psuja, W. Strek, Polska Akademia Nauk (Poland) [6645-47]

Coffee Break 3:10 to 3:30 pm

SESSION 10

Conv. Ctr. 24A Wed. 3:30 to 4:10 pm

Nanowires, Nanofibers, and Nanorods

Chair: David Bléger, Univ. Pierre et Marie Curie (France)

3:30 pm: **Ultrahigh sensitivity nanowire photodetectors**, C. Soci, A. Zhang, B. Xiang, S. A. Dayeh, D. P. R. Aplin, X. Bao, Y. Lo, D. Wang, Univ. of California/San Diego [6645-48]

3:50 pm: **Self-sensing of CNF and Ni nanowire/PVDF and cellulose composites using electro-micromechanical test**, J. Park, Gyeongsang National Univ. (South Korea) and The Univ. of Utah; P. Kim, J. Jang, Gyeongsang National Univ. (South Korea); D. Yoon, Korea Research Institute of Standards and Science (South Korea); G. Hansen, Metal Matrix Composites Co.; L. K. DeVries, The Univ. of Utah [6645-50]

Conference 6645 • Conv. Ctr. 24A

Thursday 30 August

SESSION 11

Conv. Ctr. 24A Thurs. 8:30 to 11:50 am

Optofluidics

Chairs: **Demetri Psaltis**, École Polytechnique Fédérale de Lausanne (Switzerland); **Yeshaiahu Fainman**, Univ. of California/San Diego

8:30 am: **Diffusive and convective dye replenishment in optofluidic light sources**, A. Kristensen, M. Gersborg-Hansen, N. A. Mortensen, Danmarks Tekniske Univ. (Denmark) [6645-51]

8:50 am: **Fabrication of bicolour pixels from a single active molecule by surface-tension-driven technique**, I. Viola, F. Della Sala, M. Piacenza, Univ. degli Studi di Lecce (Italy); L. Favaretto, M. Gazzano, Istituto per la Sintesi Organica e la Fotoreattività (Italy); M. Anni, Univ. degli Studi di Lecce (Italy); G. Barbarella, Istituto per la Sintesi Organica e la Fotoreattività (Italy); R. Cingolani, Istituto Nazionale per la Fisica della Materia (Italy); G. Gigli, Univ. degli Studi di Lecce (Italy) [6645-52]

9:10 am: **Holographic fabrication of photonic nanostructures for optofluidic integration**, S. Yang, S. Lee, S. G. Park, J. H. Moon, Korea Advanced Institute of Science and Technology (South Korea) [6645-53]

9:30 am: **Photonic crystal biosensor microplates with integrated fluid networks for high throughput applications in drug discovery**, C. J. Choi, L. L. Chan, M. F. Pineda, J. T. Heeres, P. J. Hergenrother, B. T. Cunningham, Univ. of Illinois at Urbana-Champaign [6645-54]

9:50 am: **Capillary driven tunable optofluidic DFB dye lasers**, M. Gersborg-Hansen, A. Kristensen, Danmarks Tekniske Univ. (Denmark) [6645-55]

Coffee Break 10:10 to 10:30 am

10:30 am: **Nanoscale optofluidic sensor arrays for Dengue virus detection**, S. Mandal, S. Nugen, R. Akhmechet, A. Baeumner, D. Erickson, Cornell Univ. [6645-56]

10:50 am: **Microfluidic channel with built-in photonic crystal nanolaser**, S. Kim, S. Lee, Y. Lee, S. Yang, Korea Advanced Institute of Science and Technology (South Korea) [6645-57]

11:10 am: **Liquid-infiltrated photonic crystals for lab-on-a-chip applications**, N. A. Mortensen, S. Xiao, Danmarks Tekniske Univ. (Denmark) [6645-58]

11:30 am: **Electroactive nanowells for spectrographic fluidic memory**, B. Cordovez, Cornell Univ.; D. Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland); D. Erickson, Cornell Univ. [6645-59]

Lunch Break 11:50 am to 1:30 pm

SESSION 12

Conv. Ctr. 24A Thurs. 1:30 to 4:30 pm

Nanoprocessing Technologies and Nanosystems for Medical Applications

Chair: **Frederic Zenhausern**, Arizona State Univ.

1:30 pm: **Enhancing the sensitivity of DNA-microarrays using shear-driven micro and nanoflows**, K. Pappaert, F. Detobel, P. Van Hummelen, G. Desmet, Vrije Univ. Brussel (Belgium) [6645-61]

1:50 pm: **Organic electronics and nanodevices in monitoring and control of cardiovascular diseases and neurological disorders**, V. K. Varadan, Univ. of Arkansas [6645-62]

2:10 pm: **Electron microscopy characterization of iron oxide nanopowders (prepared by laser pyrolysis) for magnetic fluid applications**, V. Ciupina, G. Prodan, Univ. Ovidius Constanta (Romania); I. G. Morjan, F. V. Dumitrache, R. Alexandrescu, Institutul National pentru Fizica Laserilor, Plasmei si Radiatiei (Romania); E. Vasile, METAV-CERCETARE DEZVOLTARE (Romania); L. Vekas, D. Bica, Politehnica Univ. of Timisoara (Romania) [6645-63]

2:30 pm: **Cytotoxicity of silicon nanocrystals**, J. Choi, National Institute of Standards and Technology; N. S. Wang, Univ. of Maryland/College Park; V. Reipa, National Institute of Standards and Technology [6645-64]

2:50 pm: **Shear-driven flows through nano-channels uniformly packed with a micro-structured pillar region**, D. Clicq, J. Vangeloooven, W. De malsche, Vrije Univ. Brussel (Belgium); H. Gardeniers, Univ. Twente; G. Desmet, Vrije Univ. Brussel [6645-65]

Coffee Break 3:10 to 3:30 pm

3:30 pm: **Verigene(r) system: a nanoparticle-based molecular diagnostic platform for enzyme-free direct detection of nucleic acids**, S. S. Marla, Y. P. Bao, J. J. Storhoff, M. Huber, T. Patno, W. H. Cork, Nanosphere, Inc. [6645-66]

3:50 pm: **Seeing multifunctional nano and microparticles suitable for therapy and imaging by freeze-fracture electron microscopy**, B. P. Sternberg, NanoAnalytical Lab. [6645-67]

4:10 pm: **Near-infrared laser photothermal therapy and photodynamic inactivation of cells by using gold nanoparticles and dyes**, G. G. Akchurin, G. G. Akchurin, V. A. Bogatyrev, I. L. Maksimova, Saratov State Univ. (Russia); G. A. Seliverstov, Saratov State Medical Univ. (Russia); B. N. Khlebtsov, N. G. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russia); G. S. Terentyuk, First Banian Hospital of Saratov (Russia); V. V. Tuchin, Saratov State Univ. (Russia) [6645-68]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

Nanobiotronics

Conference Chairs: **Emily M. Heckman**, Air Force Research Lab.; **Thokchom B. Singh**, Johannes Kepler Univ. Linz (Austria); **Thokchom B. Singh**, Johannes Kepler Univ. Linz (Austria)

Program Committee: **Liming Dai**, Univ. of Dayton; **Ananth Dodabalapur**, The Univ. of Texas/Austin; **James G. Grote**, Air Force Research Lab.; **Kuniharu Ijro**, Hokkaido Univ. (Japan); **Jung-II Jin**, Korea Academy of Science and Technology (South Korea); **Francois Kajzar**, Univ. d'Angers (France); **Norihisa Kobayashi**, Chiba Univ. (Japan); **Oksana Krupka**, Univ. d'Angers (France); **Charles Y. C. Lee**, Air Force Office of Scientific Research; **Misoon Mah**, Asian Office of Aerospace Research and Development (Japan); **Naoya Ogata**, Chitose Institute of Science and Technology (Japan); **Ileana Rău**, Univ. d'Angers (France); **Bruce H. Robinson**, Univ. of Washington; **Anna Samoc**, The Australian National Univ. (Australia); **Marek J. Samoc**, The Australian National Univ. (Australia); **Niyazi S. Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Andrew J. Steckl**, Univ. of Cincinnati; **Morley O. Stone**, Air Force Research Lab.; **Perry P. Yaney**, Univ. of Dayton

Sunday 26 August

SESSION 1

Conv. Ctr. 21 Sun. 8:40 to 9:50 am

Bio-Polymer Photonics

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

8:40 am: **An overview of Air Force biomimetic electronics and photonics (Keynote)**, M. O. Stone, Air Force Research Lab. [6646-01]

9:20 am: **DNA-hybrid materials for photonic applications (Invited Paper)**, N. Ogata, Y. Kagami, M. Wada, J. Yoshida, Chitose Institute of Science and Technology (Japan) [6646-02]

Coffee Break 9:50 to 10:20 am

SESSION 2

Conv. Ctr. 21 Sun. 10:20 am to 12:00 pm

Investigation and Characterization Techniques of DNA Films

Chair: **Marek J. Samoc**, The Australian National Univ. (Australia)

10:20 am: **Plasmid DNA structures for photonic devices**, J. Akin, Air Force Research Lab. [6646-03]

10:40 am: **Resistivity and electric-field poling behaviors of DNA-based polymers compared to selected non-DNA polymers**, P. P. Yaney, Univ. of Dayton [6646-04]

11:00 am: **Structure and optoelectrical properties of photopolymerized PAN/DNA complex (Invited Paper)**, N. Kobayashi, Chiba Univ. (Japan) . [6646-05]

11:30 am: **Prism coupler and microscopic investigations of DNA films (Invited Paper)**, A. Samoc, The Australian National Univ. (Australia); Z. Galewski, Univ. of Wroclaw (Poland); M. J. Samoc, The Australian National Univ. (Australia); J. G. Grote, Air Force Research Lab. [6646-06]

Lunch Break 12:00 to 1:30 pm

SESSION 3

Conv. Ctr. 21 Sun. 1:30 to 3:10 pm

NLO Processes in Biomaterials

Chair: **Anna Samoc**, The Australian National Univ. (Australia)

1:30 pm: **Thin film dye-lasers based on DNA-lipid complex materials (Invited Paper)**, J. Yoshida, Chitose Institute of Science and Technology (Japan) [6646-07]

2:00 pm: **Optical amplification and laser action in cyanine dyes doped in DNA complex**, M. Honda, N. Nakai, M. Fukuda, Y. Kawabe, Chitose Institute of Science and Technology (Japan) [6646-08]

2:20 pm: **Cubic nonlinear optical effects in deoxyribonucleic acid (DNA) based materials containing chromophores**, M. J. Samoc, A. Samoc, The Australian National Univ. (Australia); A. Miniewicz, Politechnika Wroclawska (Poland); J. G. Grote, US Air Force Research Lab. [6646-09]

2:40 pm: **DNA-metal Schottky barriers and measurements (Invited Paper)**, D. Zang, IPITEK, Inc. [6646-10]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Conv. Ctr. 21 Sun. 3:30 to 4:40 pm

Application and Characterization of Bio/Nanomaterials

Chair: **Junichi Yoshida**, Chitose Institute of Science and Technology (Japan)

3:30 pm: **DNA-metal hybrid nanomaterials (Invited Paper)**, K. Ijro, M. Sato, K. Niikura, Y. Matsuo, Hokkaido Univ. (Japan) [6646-11]

4:00 pm: **Design of an all-optical spatial light modulator and logic gates with phototropin**, S. Roy, K. Kulshrestha, Dayalbagh Educational Institute (India) [6646-12]

4:20 pm: **Brilliant organic nanodots as an alternative to semiconductor quantum dots for in vivo imaging**, M. H. Blanchard-Desce, CNRS (France); O. Mongin, Univ. de Rennes I (France); M. Werts, A. Caminade, J. Majoral, CNRS (France) [6646-13]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

Lunch Break 12:00 to 1:30 pm

Conference 6646 • Conv. Ctr. 21

SESSION 5

Conv. Ctr. 21 Mon. 1:30 to 2:50 pm

Biological Systems and Applications

Chair: Perry P. Yaney, Univ. of Dayton

1:30 pm: **An integrated bionanosensing array for airborne toxin detection**, M. Griep, C. R. Friedrich, D. Lueking, E. Winder, Michigan Technological Univ. [6646-15]

1:50 pm: **DNA base pair-controlled assembly of azobenzene at the air-water interface**, O. Haruta, Y. Matsuo, K. Ijio, Hokkaido Univ. (Japan)[6646-16]

2:10 pm: **The development of a nano-IMU using buoyancy-driven convection coupled with chemistry**, M. E. Tanner, J. Protz, Duke Univ. [6646-18]

2:30 pm: **Experimental and Monte Carlo studies of diffraction grating inscription in DNA-based materials**, A. C. Mitus, G. Pawlik, A. Kochalska, J. Mysliwiec, A. Miniewicz, Politechnika Wroclawska (Poland); F. Kajzar, Univ. d'Angers (France) [6646-19]

Coffee Break 2:50 to 3:30 pm

SESSION 6

Conv. Ctr. 21 Mon. 3:30 to 5:00 pm

Bio-Materials for Semiconductor and Sensor Applications

Chair: Joe Akin, Air Force Research Lab.

3:30 pm: **Bio-organic field effect transistors (Invited Paper)**, J. G. Grote, Air Force Research Lab. [6646-20]

4:00 pm: **Biopolymer-based semiconductor materials**, C. M. Bartsch, AT&T Government Solutions, Inc.; G. Subramanyam, Univ. of Dayton; J. G. Grote, K. M. Singh, R. R. Naik, Air Force Research Lab.; T. B. Singh, N. S. Sariciftci, Johannes Kepler Univ. Linz (Austria) [6646-21]

4:20 pm: **Scaling of nanoFET biosensors**, Q. Wei, F. Zhou, Kent State Univ. [6646-22]

4:40 pm: **High sensitivity SERS detection in hollow core microstructured optical fibre for biosensing applications**, F. M. Cox, M. C. J. Large, A. Argyros, The Univ. of Sydney (Australia); S. Kalluri, Ilumed, LLC [6646-23]

Courses of Related Interest

See *SPIE Cashier* for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday
26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

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Conference 6647 • Conv. Ctr. 24B

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6647

Nanocoatings

Conference Chairs: **Geoffrey B. Smith**, Univ. of Technology/Sydney (Australia); **Michael B. Cortie**, Univ. of Technology/Sydney (Australia)

Program Committee: **Richard J. Blaikie**, Univ. of Canterbury (New Zealand); **Michael J. Brett**, Univ. of Alberta (Canada); **Dentcho A. Genov**, Univ. of California/Berkeley; **Andreas Gombert**, Fraunhofer-Institut für Solare Energiesysteme (Germany); **Cläs-Göran Granqvist, Sr.**, Uppsala Univ. (Sweden); **Ruediger Iden**, BASF AG (Germany); **Cheng-Chung Lee**, National Central Univ. (Taiwan); **Andrey K. Sarychev**, Ethertronics Inc.; **Mark I. Stockman**, Georgia State Univ.; **Motofumi Suzuki**, Kyoto Univ. (Japan)

Sunday 26 August

SESSION 1

Conv. Ctr. 24B Sun. 8:30 to 10:10 am

Plasmonics in Nanocoatings

Chair: **Geoffrey B. Smith**, Univ. of Technology/Sydney (Australia)

8:30 am: **The use of metallo-dielectric coatings for super-resolution near-field imaging (Invited Paper)**, R. J. Blaikie, Univ. of Canterbury (New Zealand) and The MacDiarmid Institute for Advanced Materials and Nanotechnology (New Zealand) [6647-01]

9:00 am: **The exciting world of surface plasmons: order vs. chaos (Invited Paper)**, D. A. Genov, Univ. of California/Berkeley [6647-02]

9:30 am: **Active control of the optical properties of nanoscale coatings of gold and silver nanorods**, M. B. Cortie, X. Xu, M. J. Ford, Univ. of Technology/Sydney (Australia) [6647-03]

9:50 am: **Co-existence of localized and delocalized surface plasmon modes**, K. Seal, Oak Ridge National Lab. [6647-04]

Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 24B Sun. 10:30 am to 12:20 pm

Devices and Optical Switching

Chair: **Richard J. Blaikie**, Univ. of Canterbury (New Zealand)

10:30 am: **Photonic structures for high efficiency solar cells (Invited Paper)**, K. R. Catchpole, S. Pillai, M. A. Green, Univ. of New South Wales (Australia) [6647-05]

11:00 am: **Plasmonic nanocoatings tailored for surface-enhanced Raman imaging in near-infrared region**, M. Suzuki, Y. Wada, S. Li, K. Nakajima, K. Kimura, Kyoto Univ. (Japan); T. Fukuoka, Japan Science and Technology Agency (Japan); Y. Mori, Doshisha Univ. (Japan) [6647-06]

11:20 am: **Millisecond switching speed and high contrast of electrochromic self-assembled films for fast displays**, V. Jain, R. Montazami, Virginia Polytechnic Institute and State Univ.; H. M. Yochem, Sweet Briar College; J. R. Heflin, Virginia Polytechnic Institute and State Univ. [6647-07]

11:40 am: **Optical and electrical switching in nanostructured coatings of VO₂**, A. R. Gentle, A. I. Maarroof, M. B. Cortie, G. B. Smith, Univ. of Technology/Sydney (Australia) [6647-08]

12:00 pm: **Application of transparent nanostructured electrodes for modulation of total internal reflection**, P. C. P. Hruday, M. A. Martinuk, M. A. Mossman, The Univ. of British Columbia (Canada); A. C. van Popta, M. J. Brett, Univ. of Alberta (Canada); J. S. Huizinga, 3M Co.; L. A. Whitehead, The Univ. of British Columbia (Canada) [6647-09]

Lunch Break 12:20 to 2:00 pm

SESSION 3

Conv. Ctr. 24B Sun. 2:00 to 3:10 pm

Advanced Nano-materials I

Chair: **Motofumi Suzuki**, Kyoto Univ. (Japan)

2:00 pm: **Present status of research and development on visible-light photocatalysts (Invited Paper)**, Y. Taga, Chubu Univ. (Japan) [6647-10]

2:30 pm: **Thermal annealing of birefringent TiO₂ thin films formed by oblique-angle deposition**, A. C. van Popta, J. Cheng, J. C. Sit, M. J. Brett, Univ. of Alberta (Canada) [6647-13]

2:50 pm: **Nanoporous plasmonic coatings**, A. I. Maarroof, A. R. Gentle, M. B. Cortie, G. B. Smith, Univ. of Technology/Sydney (Australia) [6647-14]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Conv. Ctr. 24B Sun. 3:30 to 5:20 pm

Advanced Nano-materials II

Chair: **Michael B. Cortie**, Univ. of Technology/Sydney (Australia)

3:30 pm: **The business case for (and against) nanocoatings (Invited Paper)**, M. Bunge, Lux Research, Inc. [6647-15]

4:00 pm: **Synthesis of polymer nanocomposites by UV-curing of silver nano particles-acrylic resins**, L. Balan, École Nationale Supérieure de Chimie de Mulhouse (France); R. Schneider, Lab. de Chimie Physique et Microbiologie pour l'Environnement (France); O. Soppera, D. Lougnot, École Nationale Supérieure de Chimie de Mulhouse (France) [6647-16]

4:20 pm: **Study on the layer-by-layer electrostatic self-assembly method for biomolecule immobilization onto biosensor surface**, X. Wang, Univ. of Massachusetts/Lowell; K. L. Cooper, A. Wang, Virginia Polytechnic Institute and State Univ. [6647-17]

4:40 pm: **Ellipsometric porosimetry: fast and non-destructive method of porosity characterization of porous thin films**, A. Bondaz, L. Kitzinger, SOPRA, Inc. [6647-18]

5:00 pm: **Optical near-field patterning of photopolymer**, O. Soppera, S. Jradi, C. Ecoffet, D. Lougnot, École Nationale Supérieure de Chimie de Mulhouse (France) [6647-19]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6647 • Conv. Ctr. 24B

Monday 27 August

NanoScience and Engineering Plenary Session

Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

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9:30 am: **Brave New Nanoworld, Without Apologies to Aldous Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

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11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **An approach to self-cleaning SERS sensors by arraying Au nanorods on TiO₂ layer**, S. Li, M. Suzuki, K. Nakajima, K. Kimura, Kyoto Univ. (Japan); T. Fukuoka, Japan Science and Technology Agency (Japan); Y. Mori, Doshisha Univ. (Japan) [6647-20]
- ✓ **Thin films of zinc phthalocyanine (ZnPc) for optoelectronic devices**, M. Puri, Guru Nanak Dev Univ. (India) [6647-21]
- ✓ **On the excess specific heat of single-wall carbon nanotube ropes due to the adsorption of helium atoms in the temperature range 2-20K**, S. Tewari, A. Saxena, S. Rana, Univ. of Delhi (India) [6647-22]
- ✓ **Characterization of radio-frequency sputtered AlN films by spectroscopic ellipsometry**, D. Huang, K. Uppireddi, V. Pantojas, W. Otano-Rivera, B. R. Weiner, G. Morell, Univ. of Puerto Rico [6647-23]

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

Instrumentation, Metrology, and Standards for Nanomanufacturing

Conference Chair: **Michael T. Postek**, National Institute of Standards and Technology

Cochair: **John A. Allgair**, SEMATECH, Inc. and Freescale Semiconductors, Inc.

Program Committee: **Haris Dumanidis**, National Science Foundation; **Daniel J. C. Herr**, Semiconductor Research Corp.; **Mark D. Hoover**, The National Institute for Occupational Safety and Health; **David C. Joy**, The Univ. of Tennessee and Oak Ridge National Lab.; **Kevin W. Lyons**, National Institute of Standards and Technology; **Ron L. Remke**, SEMATECH, Inc.; **Richard M. Silver**, National Institute of Standards and Technology; **Stephan J. Stranick**, National Institute of Standards and Technology

Monday 27 August

NanoScience and Engineering Plenary Session Conv. Ctr. Ballroom 20A Mon. 8:30 am to 12:00 pm

8:30 am: **Optically Driven Mechanical Micro/Nanosystems in Classical and Quantum Realms**, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia)

9:00 am: **Plastic Optoelectronics and Aligned Carbon Nanotube Nanodevices**, Liming Dai, Univ. of Dayton

9:30 am: **Brave New Nanoworld, Without Apologies to Auldus Huxley**, Akhlesh Lakhtakia, The Pennsylvania State Univ.

Coffee Break 10:00 to 10:30 am

10:30 am: **High Performance Organic Electronic Devices Based on Nano-Scale Engineering**, Yang Yang, Univ. of California/Los Angeles

11:00 am: **Nanotechnology: New Tool for Diagnostics and Treatment of Cancer**, Michael Heller, Univ. of California/San Diego

11:30 am: **Commercialization of Nanotechnology: A Business Perspective**, Sean Murdock, Nano Business Alliance

See pg. 14-16 for presentation overviews.

Wednesday 29 August

SESSION 1

Conv. Ctr. 24B Wed. 1:40 to 3:00 pm

Instrumentation Metrology and Standards I

Chairs: **John A. Allgair**, International SEMATECH Manufacturing Initiative; **David C. Joy**, The Univ. of Tennessee

1:40 pm: **Instrumentation, metrology, and standards: key elements for the future of nanomanufacturing**, M. T. Postek, K. W. Lyons, National Institute of Standards and Technology [6648-01]

2:00 pm: **Infrared reflectivity spectroscopy of optical phonons in short-period AlGaIn superlattices**, J. B. Herzog, A. M. Mintairov, K. Sun, J. L. Merz, D. Jena, C. Yu, Univ. of Notre Dame [6648-03]

2:20 pm: **Near-field birefringence response in thickness direction of liquid crystal thin film**, J. Qin, N. Umeda, Tokyo Univ. of Agriculture and Technology (Japan) [6648-04]

2:40 pm: **High-throughput maskless nanolithography**, C. Sun, W. Srituravanich, L. Pan, X. Zhang, D. Bogy, Univ. of California/Berkeley [6648-05]

Coffee Break 3:00 to 3:30 pm

SESSION 2

Conv. Ctr. 24B Wed. 3:30 to 5:50 pm

Instrumentation and Metrology II

Chairs: **Richard M. Silver**, National Institute of Standards and Technology; **John Small**, National Institute of Standards and Technology

3:30 pm: **Helium ion microscopy: a new tool for nanomanufacturing**, M. T. Postek, A. E. Vladár, J. Kramar, National Institute of Standards and Technology; L. A. Stern, J. Notte, S. McVey, ALIS Corp. [6648-06]

3:50 pm: **Length calibration standards for nanomanufacturing**, D. C. Joy, S. J. Deo, The Univ. of Tennessee [6648-07]

4:10 pm: **Microstructure of 100 nm damascene copper overburden and lines**, R. Geiss, D. T. Read, National Institute of Standards and Technology [6648-08]

4:30 pm: **Robust and novel nanomanufacturing via laser-induced self-organization of metal nanostructures**, C. Favazza, R. Sureshkumar, R. Kalyanaraman, Washington Univ. in St. Louis [6648-09]

4:50 pm: **Elevated temperature QCM for nanotube quality control**, S. A. Hooker, National Institute of Standards and Technology; R. Schilt, Univ. of Colorado/Boulder; A. Kar, R. Geiss, National Institute of Standards and Technology [6648-10]

5:10 pm: **On-line monitoring of nanoparticles and agglomerates on a substrate**, M. Francoeur, M. M. Aslan, P. M. Mengüç, Univ. of Kentucky [6648-11]

5:30 pm: **Nanomonitors: electrical immunoassays for clinical diagnostics applications**, S. Prasad, R. K. Reddy, Portland State Univ.; T. Barrett, Oregon Health & Science Univ.; J. Carruthers, Portland State Univ. [6648-12]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

✓ **Development of acoustic and vibration criteria for research instrumentation and microelectronics process tools**, T. A. Busch, Consultant (Canada) [6648-19]

✓ **A novel low-cost high-throughput probe card analyzer for characterization of magnetic tunnel junctions**, W. T. Pong, M. Schmuouli, W. F. Egelhoff, Jr., National Institute of Standards and Technology [6648-25]

✓ **High temperature acoustic wave gas sensors using nanostructured ZnO**, H. Cheng, L. Qin, Q. Wang, Univ. of Pittsburgh [6648-26]

✓ **Silicon test object of the linewidth of the nanometer range for SEM and AFM**, Y. Novikov, V. Gavrilenko, General Physics Institute (Russia); Y. Ozerin, JSC Mikron (Russia); A. Rakov, General Physics Institute (Russia); P. Todua, Ctr. for Surface and Vacuum Research (Russia) [6648-27]

Conference 6648 • Conv. Ctr. 24B

- ✓ **Measurements of linear sizes of relief elements in the nanometer range using an atomic force microscope**, P. Todua, Ctr. for Surface and Vacuum Research (Russia); M. Filippov, N.S. Kurnakov Institute of General and Inorganic Chemistry (Russia); V. Gavrilenko, Ctr. for Surface and Vacuum Research (Russia); Y. Novikov, A. Rakov, General Physics Institute (Russia) [6648-28]
- ✓ **Measurements of linear sizes of relief elements in the nanometer range using a scanning electron microscope**, V. Gavrilenko, Ctr. for Surface and Vacuum Research (Russia); M. Filippov, N.S. Kurnakov Institute of General and Inorganic Chemistry (Russia); Y. Novikov, A. Rakov, General Physics Institute (Russia); P. Todua, Ctr. for Surface and Vacuum Research (Russia) [6648-29]
- ✓ **Effect of ambient temperature on nano-scale measurement precision**, J. Cui, S. Gao, H. Du, National Institute of Metrology (China); M. Lu, Tsinghua Univ. (China); Y. Shi, China Jiliang Univ. (China) [6648-30]
- ✓ **Nano-electrokinetic focusing as a tool for nanomanufacturing**, D. Garcia, Univ. of California/Los Angeles; A. Silva, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico); C. Ho, Univ. of California/Los Angeles [6648-31]
- ✓ **Heterogeneous surface patterning by diffusion limited patterning and capillary force lithography**, M. Y. Dogan, C. Duan, Univ. of California/Berkeley; I. Wong, C. Ho, Univ. of California/Los Angeles; A. Majumdar, Univ. of California/Berkeley and Lawrence Berkeley National Lab. [6648-32]

Thursday 30 August

SESSION 3

Conv. Ctr. 24B Thurs. 8:10 to 10:10 am

Integration, Interoperability, and Information Management I

Chairs: **Kevin W. Lyons**, National Institute of Standards and Technology; **Haris Dumanidis**, Consultant

- 8:10 am: **Integration, interoperability and information management for nanomanufacturing**, K. W. Lyons, National Institute of Standards and Technology [6648-13]
- 8:30 am: **The National Nanomanufacturing Network: a vehicle for cooperative R&D and information dissemination in nanomanufacturing**, M. T. Tuominen, Univ. of Massachusetts/Amherst [6648-33]
- 8:50 am: **Modelling of angle-resolved x-ray photoelectron spectroscopy (ARXPS) intensity ratios for nanocharacterization of closely packed core-shell nanofibres and nanoparticles**, J. Wang, P. J. Cumpson, National Physical Lab. (United Kingdom) [6648-15]
- 9:10 am: **Optimal architecture of a neural network for a high precision in ellipsometric scatterometry**, I. Gereige, S. Robert, D. Jamon, Univ. Jean Monnet (France) [6648-16]
- 9:30 am: **Nano-precision dynamic motion control**, T. Tsao, Univ. of California/Los Angeles [6648-17]
- 9:50 am: **Combining nanometrology and coordinate measurement for large-range nanoscale metrology**, M. Gruhlke, H. Rothe, Helmut-Schmidt Univ. (Germany) [6648-18]
- Coffee Break 10:10 to 10:30 am

SESSION 4

Conv. Ctr. 24B Thurs. 10:30 am to 12:10 pm

Integration, Interoperability, and Information Management II

Chairs: **Daniel J. C. Herr**, Semiconductor Research Corp.; **Kevin W. Lyons**, National Institute of Standards and Technology

- 10:30 am: **Control of relatively long wavelength acoustic "noise" within technology facilities**, T. A. Busch, Consultant (Canada) [6648-20]
- 10:50 am: **Computational modeling of laser-induced self-organization in nanoscopic metal films for predictive nanomanufacturing**, J. Trice, C. Favazza, R. Kalyanaraman, R. Sureshkumar, Washington Univ. in St. Louis [6648-14]

- 11:10 am: **Efficient design of complex optical nanocomposites: a broadband solar absorbing glass**, J. Trice, Washington Univ. in St. Louis; H. Garcia, Southern Illinois Univ.; R. Sureshkumar, R. Kalyanaraman, Washington Univ. in St. Louis [6648-21]
- 11:30 am: **VEDA: a virtual environment for dynamic atomic force microscopy**, J. Melcher, S. Hu, A. Raman, Purdue Univ. [6648-22]
- 11:50 am: **A CAD integration framework for designing devices with atomic scale resolution**, Y. Chang, Stanford Univ.; K. Ramaswami, Indian Institute of Science (India); M. Pinilla, F. Prinz, Stanford Univ. [6648-23]
- Lunch Break 12:10 to 1:30 pm

Conv. Ctr. 24B Thurs. 1:30 to 2:30 pm

Environmental, Health and Safety Monitoring and Metrology

Chairs: **Mark D. Hoover**, The National Institute for Occupational Safety and Health; **Ron L. Remke**, SEMATECH, Inc.

ESH Overview - Exposure Assessment and Control for Nanoparticles in the Workplace: Insights from the NIOSH Nanotechnology Research Program: 1:30 to 2:30 pm

Mark D. Hoover, National Institute for Occupational Safety and Health

The National Institute for Occupational Safety and Health (NIOSH) is the US federal agency that conducts research and makes recommendations for preventing work-related injuries, illnesses, and deaths. This presentation provides an update on the coordinated program of laboratory, field, and information dissemination activities being conducted by the NIOSH Nanotechnology Research Center (NTRC). Activities of the NIOSH NTRC support the development of environment, safety, and health tools, practices, and recommendations, including the web-based "Approaches to Safe Nanotechnology" document, and the Nanotechnology Information Library. NIOSH has performed a number of field studies in nanoparticle research, development and production facilities to evaluate potential worker exposures; collect information on work practices; evaluate the presence and effectiveness of controls; and identify areas for improvement. A framework is developing for conducting a qualitative risk management approach to managing nanomaterials along the product life cycle, and for applying the associated logic to control exposures in the presence of uncertainty. The framework takes into account the potential routes of exposure and factors that may influence biological activity and potential toxicity of nanomaterials; incorporates primary approaches based on the traditional industrial hygiene hierarchy of controls involving elimination or substitution, engineering controls, administrative controls, and use of personal protective equipment; and includes valuable secondary approaches involving health surveillance and medical monitoring.

Panel Discussion 2:30 to 3:10 pm

Environment, Health, and Safety Issues for Nanotechnology

Panel Moderator: **Mark D. Hoover**, National Institute for Occupational Safety and Health

Panel Members: **Ron L. Remke**, SEMATECH, Inc.; **Michael T. Postek**, National Institute of Standards and Technology; **Mark Tuominen**, Univ. of Massachusetts

This panel discussion will provide participants with the opportunity to pose questions about potential worker exposures; work practices; engineering and administrative controls; and areas for information sharing and improvement.

Courses of Related Interest

See SPIE Cashier for information.

SC496 Fabrication and Processing of Nanostructures (Cao) Sunday 26, 8:30 am - 5:30 pm

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

Solar Energy + Applications

Part of **SPIE** Optics+Photonics

Symposium Chair:



Ravi Durvasula,
Lightfleet Corp.

Technical Organizing Committee

- Martha Symko-Davies,** National Renewable Energy Lab.
- Jinghua Guo,** Lawrence Berkeley National Lab.
- Bolko von Roedern,** National Renewable Energy Lab.
- Alan E. Delahoy,** Energy Photovoltaics, Inc.
- Daryl R. Myers,** National Renewable Energy Lab.

SOLAR

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
6649 High and Low Concentration for Solar Electric Applications II (<i>Symko-Davies</i>), p. 74	6650 Solar Hydrogen and Nanotechnology II (<i>Guo</i>), p. 76				
	6651 PV Cell and Module Technologies (<i>von Roedern/Delahoy</i>), p. 79				
6652 Optical Modeling and Measurements for Solar Energy Systems (<i>Myers</i>), p. 80					
EXHIBITION, p. 40-41					
		10:00 am to 5:00 pm	10:00 am to 5:00 pm	10:00 am to 2:00 pm	



**Don't miss the Special Events,
Plenaries, Receptions, Technical
Workshops, Courses, Poster
Sessions – and more!**

See pages 9-41.



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Conference 6649 • Conv. Ctr. 33C

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6649

High and Low Concentration for Solar Electric Applications II

Conference Chair: **Martha Symko-Davies**, National Renewable Energy Lab.

Program Committee: **Allen M. Barnett**, Univ. of Delaware; **Timothy J. Coutts**, National Renewable Energy Lab.; **Ravi Durvasula**, Lightfleet Corp.; **Vahan Garboushian**, Amonix Inc.; **Sarah R. Kurtz**, National Renewable Energy Lab.; **Oliver Mayer**, GE Global Research (Germany); **Raed A. Sherif**, Spectrolab, Inc.

Sunday 26 August

SESSION 1

Conv. Ctr. 33C Sun. 3:30 to 4:50 pm

CPV Characterization

Chair: **Fannie Posey-Eddy**, National Renewable Energy Lab.

3:30 pm: **XR: a high-performance photovoltaic concentrator**, M. Hernández, Light Prescriptions Innovators Europe, S. L. (Spain); P. Benítez, Univ. of California/Merced and Univ. Politécnica de Madrid (Spain); J. C. Miñano, Univ. Politécnica de Madrid (Spain) and Light Prescriptions Innovators Europe, S. L. (Spain); A. Cvetkovic, Univ. of California/Merced; O. Dross, R. Mohedano-Arroyo, Light Prescriptions Innovators Europe, S. L. (Spain); R. Jones, The Boeing Co.; G. S. Kinsey, Spectrolab, Inc.; R. Alvarez, Light Prescriptions Innovators Europe, S. L. (Spain) [6649-01]

3:50 pm: **Ray-trace modeling of reflectors for quantum dot solar concentrators**, M. R. Kennedy, S. McCormack, J. P. Doran, B. Norton, Dublin Institute of Technology (Ireland) [6649-03]

4:10 pm: **Daily fill factor variation as a diagnostic probe of concentrator systems during outdoor operation**, W. E. McMahon, K. E. Emery, D. J. Friedman, L. Ottoson, M. S. Young, J. S. Ward, C. M. Kramer, A. Duda, S. R. Kurtz, National Renewable Energy Lab. [6649-04]

4:30 pm: **High-flux characterization of ultra-efficient commercial 1 mm² multi-junction solar cells**, O. Korech, B. Hirsch, E. A. Katz, J. M. Gordon, Ben-Gurion Univ. of the Negev (Israel) [6649-05]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 2

Conv. Ctr. 33C Mon. 8:00 to 10:00 am

CPV Systems

Chair: **Timothy J. Coutts**, National Renewable Energy Lab.

8:00 am: **A 30% efficient (>250 Watt) module using multijunction solar cells and their one-year on-sun field performance (Keynote)**, V. Garboushian, A. M. Slade, R. Gordon, Amonix Inc. [6649-06]

8:30 am: **A high concentration rooftop photovoltaic system (Keynote)**, P. L. Gleckman, Energy Innovations [6649-07]

9:00 am: **The SunTrap PV receiver**, E. G. Aylaian, Radiant Power, LLC[6649-08]

9:20 am: **Photocurrent enhancement in In^{0.53}Ga^{0.47}As solar cells grown on InP/SiO₂/Si transferred epitaxial templates**, J. M. Zahler, AONEX Technologies; K. Tanabe, California Institute of Technology; C. Ladous, T. Pinnington, AONEX Technologies; F. D. Newman, EMCORE Corp.; H. A. Atwater, California Institute of Technology [6649-09]

9:40 am: **Quantum dot solar concentrators: an investigation of various geometries**, B. C. Rowan, Dublin Institute of Technology (Ireland) .. [6649-10]

Coffee Break 10:00 to 10:30 am

SESSION 3

Conv. Ctr. 33C Mon. 10:30 to 11:40 am

CPV and Economics

Chair: **William E. McMahon**, National Renewable Energy Lab.

10:30 am: **Concentrator optical design to minimize LCOE (Invited Paper)**, G. D. Conley, S. Horne, SolFocus, Inc. [6649-11]

11:00 am: **Design and development of a concentrator PV module utilizing Si cells**, S. V. Vasylyev, V. Vasylyev, SVVTI, Inc. [6649-13]

11:20 am: **InGaP/GaAs/Ge/Si multijunction solar cells fabricated on transferred epitaxial templates**, M. J. Archer, California Institute of Technology; D. C. Law, R. R. King, Spectrolab, Inc.; A. C. Ackerman, C. Ladous, AONEX Technologies; H. A. Atwater, California Institute of Technology[6649-14]

Lunch Break 11:40 am to 1:30 pm

Solar Energy Plenary Session

Conv. Ctr. Ballroom 20A Mon. 1:30 to 5:30 pm

1:30 pm: **The Solar-hydrogen Economy: An Analysis (Invited Paper)**, W. Reynolds, Eco-Engineers, Inc. [6650-101]

2:00 pm: **Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell (Invited Paper)**, H. Arakawa, C. Shiraishi, M. Tatemoto, H. Kishida, D. Usui, A. Suma, A. Takamisawa, T. Yamaguchi, Tokyo Univ. of Science (Japan) [6650-102]

2:30 pm: **New Opportunities in Concentrator Photovoltaics with Low-cost 40% Efficient Multijunction III-V Solar Cells (Invited Paper, Presentation Only)**, R. R. King, R. A. Sherif, G. S. Kinsey, D. C. Law, K. M. Edmondson, H. Yoon, H. L. Cotal, C. M. Fetzer, J. H. Ermer, P. Hebert, P. Pien, N. H. Karam, Spectrolab, Inc.

3:00 pm: **Module Design and Development: Progress and Opportunities (Invited Paper, Presentation Only)**, D. Rose, Sunpower Corp.

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Delivering Service at Scale: Old Requirements for the New Energy Industry (Invited Paper, Presentation Only)**, M. Culpepper, VP/Strategic Marketing, SunEdison

4:30 pm: **PV Solar Electricity Market and Technology Development (Invited Paper, Presentation Only)**, W. Hoffmann, Applied Materials, Inc.

5:00 pm: **The Solar Industry-DOE and NREL Programs to Accelerate Growth (Invited Paper, Presentation Only)**, S. J. Eglash, Consultant to the National Renewable Energy Lab.

See pg. 17-19 for presentation overviews.

Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Tuesday. Poster presenters who have not set up by 5:00 pm on Tuesday 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.

- ✓ **MOVPE growth of quantum well GaAs/In_{0.11}GaAs for space solar cell applications**, P. Wu, Y. Su, National Cheng Kung Univ. (Taiwan); Y. C. Tzeng, Institute of Nuclear Energy Research (Taiwan) [6649-15]
- ✓ **High concentration nonimaging Fresnel lens design with flat upper surface**, A. Akisawa, T. Sato, T. Miyazaki, T. Kashiwagi, Tokyo Univ. of Agriculture and Technology (Japan); M. Hiramatsu, Daido Steel Co., Ltd. (Japan) [6649-16]
- ✓ **Design of lens system to power up the \$100 computer using solar cells**, R. Manayil John, B. Thailampillai, National Institute of Technology/Tiruchirappalli (India) [6649-17]
- ✓ **RF control system of a parabolic solar concentrator**, M. Tecpoyotl-Torres, Univ. Autónoma del Estado de Morelos (Mexico); J. Campos-Alvarez, F. Tellez-Alanis, Univ. Nacional Autónoma de México (Mexico); J. Sanchez-Mondragon, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6649-18]
- ✓ **Spectral-shifting compound parabolic concentrator to improve the performance of amorphous and multi-crystalline silicon solar cells**, R. K. Kostuk, J. E. Castillo, J. Manuel-Russo, The Univ. of Arizona [6649-19]



Courses of Related Interest

See SPIE Cashier for information.

SC388 Non-Imaging Optics (Winston) Monday 27, 8:30 am - 12:30 pm

SC552 Aspheric Optics: Design, Fabrication, and Test (Fischer) Wednesday 29, 1:30 - 5:30 pm

SC659 Understanding Reflective Optical Design (Contreras) Monday 27, 8:30 am - 5:30 pm

SC797 The Science and Technology of Organic Solar Cells (Peumans) Tuesday 28, 1:30 - 5:30 pm

Conference 6650 • Conv. Ctr. 33B

Monday-Thursday 27-30 August 2007 • Proceedings of SPIE Vol. 6650

Solar Hydrogen and Nanotechnology II

Conference Chair: **Jinghua Guo**, Lawrence Berkeley National Lab.

Program Committee: **Hironori Arakawa**, Tokyo Univ. of Science (Japan); **Jan Augustynski**, Univ. de Genève (Switzerland); **Joe da Costa**, The Univ. of Queensland (Australia); **Maria L. Ghirardi**, National Renewable Energy Lab.; **Michael Graetzel**, École Polytechnique Fédérale de Lausanne (Switzerland); **Ting Guo**, Univ. of California/Davis; **Claude Levy-Clement**, Ctr. National de la Recherche Scientifique (France); **Yoshihiro Nakato**, Osaka Univ. (Japan); **Janusz Nowotny**, Univ. of New South Wales (Australia); **Ian C. Plumb**, Commonwealth Scientific and Industrial Research Organisation (Australia); **Pathiyamattom J. Sebastian**, Univ. Nacional Autónoma de México (Mexico); **John A. Turner**, National Renewable Energy Lab.; **Lionel Vayssieres**, National Institute for Materials Science (Japan); **T. Nejat Veziroglu**, The International Ctr. for Hydrogen Energy Technologies (Turkey); **Gunnar Westin**, Uppsala Univ. (Sweden); **Upul Wijayantha**, Loughborough Univ. (United Kingdom); **Jin Z. Zhang**, Univ. of California/Santa Cruz

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Monday 27 August

Solar Energy Plenary Session

Conv. Ctr. Ballroom 20A Mon. 1:30 to 5:30 pm

1:30 pm: **The Solar-hydrogen Economy: An Analysis (Invited Paper)**, W. Reynolds, Eco-Engineers, Inc. [6650-101]

2:00 pm: **Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell (Invited Paper)**, H. Arakawa, C. Shiraishi, M. Tatemoto, H. Kishida, D. Usui, A. Suma, A. Takamisawa, T. Yamaguchi, Tokyo Univ. of Science (Japan) [6650-102]

2:30 pm: **New Opportunities in Concentrator Photovoltaics with Low-cost 40% Efficient Multijunction III-V Solar Cells (Invited Paper, Presentation Only)**, R. R. King, R. A. Sherif, G. S. Kinsey, D. C. Law, K. M. Edmondson, H. Yoon, H. L. Cotal, C. M. Fetzer, J. H. Ermer, P. Hebert, P. Pien, N. H. Karam, Spectrolab, Inc.

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Coffee Break 3:30 to 4:00 pm

4:00 pm: **Delivering Service at Scale: Old Requirements for the New Energy Industry (Invited Paper, Presentation Only)**, M. Culpepper, VP/Strategic Marketing, SunEdison

4:30 pm: **PV Solar Electricity Market and Technology Development (Invited Paper, Presentation Only)**, W. Hoffmann, Applied Materials, Inc.

5:00 pm: **The Solar Industry-DOE and NREL Programs to Accelerate Growth (Invited Paper, Presentation Only)**, S. J. Eglash, Consultant to the National Renewable Energy Lab.

See pg. 17-19 for presentation overviews.

Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

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- ✓ **Photocatalytic hydrogen production over CdS/titania-nanotube composite films**, S. Moon, J. Baeg, Korea Research Institute of Chemical Technology (South Korea) [6650-31]
- ✓ **A solar photobioreactor for the production of biohydrogen from microalgae**, R. Patiño, L. Panti, P. Chávez, D. Robledo, Ctr. de Investigación y de Estudios Avanzados (Mexico) [6650-32]
- ✓ **Visible light activated nanocrystalline photocatalysts for solar hydrogen production**, C. Huang, B. Illiassou, N. Muradov, A. T-Raissi, Univ. of Central Florida [6650-33]
- ✓ **Interaction of [FeFe] hydrogenases with single-walled carbon nanotubes**, D. Svedruzic, National Renewable Energy Lab.; T. J. McDonald, National Renewable Energy Lab. and Columbia Univ.; J. L. Blackburn, Y. Kim, M. J. Heben, P. W. King, National Renewable Energy Lab. [6650-34]
- ✓ **Visible light photocatalysis based on homogeneous and heterogenized tin(IV)-porphyrins**, J. Park, W. Kim, W. Choi, Pohang Univ. of Science and Technology (South Korea); H. Kim, Kumoh National Institute of Technology (South Korea) [6650-35]
- ✓ **Visible-light-induced photocatalytic reaction of fullerol/TiO₂**, Y. Park, W. Choi, Pohang Univ. of Science and Technology (South Korea) [6650-36]

Wednesday 29 August

SESSION 1

Conv. Ctr. 33B Wed. 8:30 to 10:10 am

Synthesis of Advanced Nanostructures and Semiconductor I

Chair: **Jinghua Guo**, Lawrence Berkeley National Lab.

8:30 am: **Novel visible light-active metal oxide semiconductor nanostructures for solar hydrogen generation (Invited Paper)**, L. Vayssieres, National Institute for Materials Science (Japan) [6650-01]

9:00 am: **Vertically-aligned highly-ordered TiFeOx nanotube arrays with enhanced visible spectrum photo-electrochemical properties (Invited Paper)**, C. A. Grimes, The Pennsylvania State Univ. [6650-02]

9:30 am: **Copper gallium diselenide photocathodes for solar photoelectrolysis**, B. Marsen, B. Cole, S. Dorn, R. E. Rocheleau, E. L. Miller, Univ. of Hawaii at Manoa [6650-03]

9:50 am: **Effect of 100 MeV Ni¹⁰⁺ swift heavy ion (SHI) irradiation on electrodeposited Cu₂O films for hydrogen generation by photoelectrochemical splitting of water**, C. Tripathi, Dayalbagh Educational Institute (India); D. K. Avasthi, S. A. Khan, A. Tripathi, Inter Univ. Accelerator Ctr. (India); J. Shrivastav, M. Gupta, A. P. Singh, S. Kumari, V. R. Satsangi, R. Shrivastav, S. D. Kaura, Dayalbagh Educational Institute (India) [6650-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 33B Wed. 10:40 am to 12:10 pm

Synthesis of Advanced Nanostructures and Semiconductor II

Chair: **Lionel Vayssieres**, National Institute for Materials Science (Japan)

10:40 am: **Effects of doping on the photocatalytic activity for water splitting of metal oxides and nitride (Invited Paper)**, Y. Inoue, Nagaoka Univ. of Technology (Japan) [6650-05]

11:10 am: **Photoelectrochemical properties of nanostructured zinc oxide electrodes (Invited Paper)**, T. Oekermann, Univ. Hannover (Germany) [6650-06]

11:40 am: **Electrodeposition of ZnO nanowire arrays with tailored dimensions: building blocks for photoelectrochemical devices (Invited Paper)**, R. Tena-Zaera, J. Elias, C. Lévy-Clément, Ctr. National de la Recherche Scientifique (France) [6650-07]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Conv. Ctr. 33B Wed. 1:30 to 3:00 pm

Solar Hydrogen and Water Splitting

Chair: **Jin Z. Zhang**, Univ. of California/Santa Cruz

1:30 pm: **Water-splitting (Invited Paper)**, D. G. Nocera, Massachusetts Institute of Technology [6650-09]

2:00 pm: **Nanowires for solar energy and hydrogen production (Invited Paper)**, T. Guo, Univ. of California/Davis [6650-10]

2:30 pm: **Metal oxide semiconductors in PEC splitting of water (Invited Paper)**, V. R. Satsangi, Dayalbagh Educational Institute (India) [6650-11]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 33B Wed. 3:30 to 5:10 pm

Bandgap Engineering of Solar Hydrogen Materials

Chair: **Gunnar Westin**, Uppsala Univ. (Sweden)

3:30 pm: **Hydrogen production using metal nanoparticle modified silicon thin film photoelectrode (Invited Paper)**, S. Yae, Univ. of Hyogo (Japan) and CREST-JST (Japan); M. Abe, N. Fukumuro, Univ. of Hyogo (Japan); S. Ogawa, Gifu Univ. (Japan); N. Yoshida, S. Nonomura, Gifu Univ. (Japan) and CREST (Japan); Y. Nakato, Kwansai Gakuin Univ. (Japan) and CREST (Japan); H. Matsuda, Univ. of Hyogo (Japan) [6650-12]

4:00 pm: **Electronic structure characterization and bandgap engineering of solar hydrogen materials (Invited Paper)**, J. Guo, Lawrence Berkeley National Lab. [6650-13]

4:30 pm: **Rapid synthesis of nanostructured metal-oxide films for solar energy applications by a flame aerosol reactor (FLAR)**, E. J. Thimsen, H. Song, C. Kirmaier, D. Holten, P. Biswas, Washington Univ. in St. Louis [6650-14]

4:50 pm: **Bandgap reduction of ZnO for photoelectrochemical splitting of water**, Y. Yan, K. Ahn, National Renewable Energy Lab.; T. Deutsch, Univ. of Colorado/Boulder; M. Huda, S. Wei, J. A. Turner, M. Al-Jassim, National Renewable Energy Lab. [6650-15]

Thursday 30 August

SESSION 5

Conv. Ctr. 33B Thurs. 8:00 to 10:10 am

Solar Hydrogen at Biohybrid and Organic Catalysts

Chair: **Ting Guo**, Univ. of California/Davis

8:00 am: **Ultrafast structural dynamics of photoactive metal complexes in solar hydrogen generation (Invited Paper)**, L. X. Q. Chen, Argonne National Lab. [6650-28]

8:30 am: **Merging (FeFe) hydrogenases with materials and nanomaterials as biohybrid catalysts for solar hydrogen production (Invited Paper)**, P. W. King, D. Svedruzic, National Renewable Energy Lab.; M. Hamburger, M. Gervaldo, Arizona State Univ.; T. J. McDonald, J. L. Blackburn, M. J. Heben, National Renewable Energy Lab.; D. Gust, A. L. Moore, T. A. Moore, Arizona State Univ.; M. L. Ghirardi, National Renewable Energy Lab. [6650-16]

9:00 am: **Sonoelectrochemical synthesis of low-band-gap titania nanotubes for photoelectrochemical generation of hydrogen (Invited Paper)**, M. Misra, Y. S. Sohn, K. S. Raja, V. R. Subramanian, Univ. of Nevada/Reno [6650-17]

9:30 am: **Photocatalytic hydrogen production using surface-modified titania nanoparticles**, W. Choi, Pohang Univ. of Science and Technology (South Korea) [6650-18]

9:50 am: **Porphyrin-based nanostructures for solar hydrogen production**, Z. Wang, L. Evans, C. J. Medforth, J. E. Miller, Sandia National Labs.; J. A. Shelnutt, Sandia National Labs. and Univ. of Georgia [6650-19]

Coffee Break 10:10 to 10:40 am

SESSION 6

Conv. Ctr. 33B Thurs. 10:40 am to 12:10 pm

Hydrogen Generation and Storage Materials

Chair: **Gunnar Westin**, Uppsala Univ. (Sweden)

10:40 am: **Generation and storage of hydrogen using tandem PV-PEC devices based on nanomaterials (Invited Paper)**, J. Z. Zhang, L. Seballos, T. Lopez-Luke, A. Wolcott, Univ. of California/Santa Cruz; Y. Zhao, W. Smith, Y. He, The Univ. of Georgia [6650-20]

11:10 am: **Hydrogen storage in microporous metal-organic frameworks with exposed metal sites (Invited Paper, Presentation Only)**, J. R. Long, M. Dinca, S. S. Kaye, W. S. Han, Univ. of California/Berkeley [6650-21]

11:40 am: **Nanostructured catalysts for fuel cell reactions (Invited Paper)**, C. Zhong, Binghamton Univ. [6650-22]

Lunch/Exhibition Break 12:10 to 1:40 pm

Conference 6650 • Conv. Ctr. 33B

SESSION 7

Conv. Ctr. 33B Thurs. 1:40 to 3:20 pm

Solar Hydrogen Devices and Applications

Chair: Lionel Vayssieres, National Institute for Materials Science (Japan)

1:40 pm: **Nitride-based photoelectrochemical cells** (*Invited Paper*), W. Walukiewicz, Lawrence Berkeley National Lab.; R. E. Jones, K. Alberi, Univ. of California/Berkeley and Lawrence Berkeley National Lab. [6650-23]

2:10 pm: **Soft x-ray and electron spectroscopy studies of oxide semiconductors for photoelectrochemical hydrogen production** (*Invited Paper*), C. Heske, Univ. of Nevada/Las Vegas [6650-24]

2:40 pm: **Progress toward 10% solar-to-hydrogen efficiency in a hybrid, thin-film silicon photoelectrochemical (PEC) cell**, A. P. Stavrides II, A. Kunrath, J. Hu, R. Treglio, A. Feldman, MVSystems, Inc.; B. Marsen, B. Cole, E. L. Miller, Univ. of Hawaii at Manoa; A. Madan, MVSystems, Inc. [6650-25]

3:00 pm: **Photoelectrochemical and photocatalytic properties of nanocrystalline TiO₂ electrodes**, H. G. Oliveira, D. C. Nery, M. P. Paschoalino, W. F. Jardim, C. Longo, Univ. Estadual de Campinas (Brazil) [6650-26]

Coffee Break 3:20 to 3:50 pm

SESSION 8

Conv. Ctr. 33B Thurs. 3:50 to 5:30 pm

Photo-Catalysis at Titanium Oxides

Chair: Jinghua Guo, Lawrence Berkeley National Lab.

3:50 pm: **Solution processing of complex large band-gap semi-conductors for photo-catalysis** (*Invited Paper*), G. Westin, M. Leideborg, Uppsala Univ. (Sweden) [6650-27]

4:20 pm: **Ultrafast dynamics of transition metal charge-transfer chromophores: implications for their use in dye-sensitized TiO₂-based solar cells** (*Invited Paper*), A. L. Smeigh, A. M. Brown, J. K. McCusker, Michigan State Univ. [6650-37]

4:50 pm: **Slow photons in TiO₂ inverse opals: optical amplification and effect of disorder on the photocatalytic efficiency**, J. I. L. Chen, Univ. of Toronto (Canada); G. von Freymann, Forschungszentrum Karlsruhe (Germany); S. Y. Choi, Univ. of Toronto (Canada); V. Kitaev, Wilfrid Laurier Univ. (Canada); G. A. Ozin, Univ. of Toronto (Canada) [6650-29]

5:10 pm: **Synthesis and characterization of phase-pure anatase, brookite, and rutile nanoparticles**, G. Oskam, D. Reyes-Coronado, G. Rodriguez-Gattorno, Ctr. de Investigación y de Estudios Avanzados (Mexico) .. [6650-30]

Courses of Related Interest

See SPIE Cashier for information.

SC797 The Science and Technology of Organic Solar Cells (Peumans) Tuesday 28, 1:30 - 5:30 pm

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Conference 6651 • Conv. Ctr. 33B

Monday-Tuesday 27-28 August 2007 • Proceedings of SPIE Vol. 6651

Photovoltaic Cell and Module Technologies

Conference Chairs: **Bolko von Roedern**, National Renewable Energy Lab.; **Alan E. Delahoy**, Energy Photovoltaics, Inc.

Program Committee: **Robert W. Collins, Jr.**, Univ. of Toledo; **Ravi Durvasula**, Lightfleet Corp.; **Alan L. Fahrenbruch**, Stanford Univ.; **Sheyu Guo**, Energy Photovoltaics, Inc.; **Steven G. Hegedus**, Univ. of Delaware; **Martha C. Lux-Steiner**, Hahn-Meitner-Institut Berlin (Germany); **James R. Sites**, Colorado State Univ.

Monday 27 August

Solar Energy Plenary Session

Conv. Ctr. Ballroom 20A Mon. 1:30 to 5:30 pm

1:30 pm: **The Solar-hydrogen Economy: An Analysis (Invited Paper)**, W. Reynolds, Eco-Engineers, Inc. [6650-101]

2:00 pm: **Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell (Invited Paper)**, H. Arakawa, C. Shiraishi, M. Tatemoto, H. Kishida, D. Usui, A. Suma, A. Takamisawa, T. Yamaguchi, Tokyo Univ. of Science (Japan) [6650-102]

2:30 pm: **New Opportunities in Concentrator Photovoltaics with Low-cost 40% Efficient Multijunction III-V Solar Cells (Invited Paper, Presentation Only)**, R. R. King, R. A. Sherif, G. S. Kinsey, D. C. Law, K. M. Edmondson, H. Yoon, H. L. Cotal, C. M. Fetzer, J. H. Ermer, P. Hebert, P. Pien, N. H. Karam, Spectrolab, Inc.

3:00 pm: **Module Design and Development: Progress and Opportunities (Invited Paper, Presentation Only)**, D. Rose, Sunpower Corp.

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Delivering Service at Scale: Old Requirements for the New Energy Industry (Invited Paper, Presentation Only)**, M. Culpepper, VP/Strategic Marketing, SunEdison

4:30 pm: **PV Solar Electricity Market and Technology Development (Invited Paper, Presentation Only)**, W. Hoffmann, Applied Materials, Inc.

5:00 pm: **The Solar Industry-DOE and NREL Programs to Accelerate Growth (Invited Paper, Presentation Only)**, S. J. Eglash, Consultant to the National Renewable Energy Lab.

See pg. 17-19 for presentation overviews.

SESSION 2

Conv. Ctr. 33B Tues. 10:50 am to 12:00 pm

Solar Cell (Material/Process) Characterization

Chair: **Bolko von Roedern**, National Renewable Energy Lab.

10:50 am: **Analysis and optimization of thin film photovoltaic materials and device fabrication by real time spectroscopic ellipsometry (Invited Paper)**, R. W. Collins, Jr., J. Li, N. J. Podraza, J. A. Stoke, D. Sainju, Univ. of Toledo [6651-06]

11:20 am: **A reliable optical method for in-situ process control for deposition of Cu(In,Ga)Se₂ thin layers for photovoltaics**, R. Hesse, A. Caballero-Mesa, D. Abou-Ras, T. Unold, C. A. Kaufmann, H. W. Schock, Hahn-Meitner-Institut Berlin GmbH (Germany) [6651-07]

11:40 am: **Structural, microelectrical and microluminescent characterization of crystallized Si films**, M. Al-Jassim, M. J. Romero, F. Liu, National Renewable Energy Lab. [6651-08]

Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 3

Conv. Ctr. 33B Tues. 1:20 to 3:30 pm

Solar Cell Material/Cell Processing

Chair: **Robert W. Collins, Jr.**, Univ. of Toledo

1:20 pm: **Design consideration for nanocrystalline silicon solar cells (Invited Paper)**, X. Deng, Univ. of Toledo [6651-09]

1:50 pm: **Textured, doped, ZnO thin films produced by a new process for a-Si and CIGS solar cell application**, S. Guo, A. Patel, J. Cambridge, L. Sahoo, A. E. Delahoy, Energy Photovoltaics, Inc. [6651-10]

2:10 pm: **Deposition of a-Si:H and μ c-Si:H using a novel linear RF source**, B. Van Aken, C. Devilee, M. Dörenkämper, M. Geusebroek, M. Heijna, J. Löffler, W. J. Soppe, ECN Solar Energy (Netherlands) [6651-11]

2:30 pm: **Correlation between the photoconductivity and the nanostructure of hot-wire deposited silicon-germanium alloys analyzed by anomalous small-angle x-ray scattering**, G. J. Goerigk, Deutsches Elektronen-Synchrotron (Germany); D. Williamson, Colorado School of Mines [6651-12]

2:50 pm: **Optimum base carrier density for spherical silicon solar cell with reflector cup**, T. Minemoto, S. Nishimura, H. Takakura, Ritsumeikan Univ. (Japan) [6651-13]

3:10 pm: **Modeling of Si-based solar cells with v-grooved surface texture by crosslight APSYS**, Y. Xiao, Crosslight Software Inc. (Canada); M. Lestrade, Ecole Polytechnique de Montréal (Canada); Z. L. Li, Z. M. S. Li, Crosslight Software Inc. (Canada) [6651-14]

Coffee Break 3:30 to 4:00 pm

Tuesday 28 August

SESSION 1

Conv. Ctr. 33B Tues. 8:30 to 10:20 am

Solar Cell Operation

Chair: **Alan E. Delahoy**, Energy Photovoltaics, Inc.

8:30 am: **Detailed balance: lifetimes and efficiencies (Invited Paper)**, H. J. Queisser, Max-Planck-Institut für Festkörperforschung (Germany) .. [6651-01]

9:00 am: **Efficiency enhancement in concentrator solar cells by dielectric micro-concentrators**, O. Korech, J. M. Gordon, E. A. Katz, D. Feuermann, Ben-Gurion Univ. of the Negev (Israel); N. P. Eisenberg, Jerusalem College of Technology (Israel) [6651-02]

9:20 am: **Performance analysis of CIGS₂ thin film solar cells based on semiconductor properties**, N. G. Dhere, Univ. of Central Florida .. [6651-03]

9:40 am: **Temperature dependence of Si-based thin film solar cells near phase boundary**, K. Sriprapha, I. A. Yunaz, S. Y. Myong, A. Yamada, M. Konagai, Tokyo Institute of Technology (Japan) [6651-04]

10:00 am: **Diffraction and energy selective photonic crystal for thin-film tandem solar cells**, A. Bielawny, Martin-Luther Univ. Halle-Wittenberg (Germany); A. von Rhein, Univ. Paderborn (Germany); R. B. Wehrspohn, Fraunhofer Institut für Werkstoffmechanik Halle (Germany); C. Rockstuhl, Univ. de Neuchâtel (Switzerland); M. Lisca, F. L. Lederer, Friedrich-Schiller-Univ. Jena (Germany); B. Lange, R. Zentel, Johannes Gutenberg Univ. Mainz (Germany); R. Carius, Forschungszentrum Jülich GmbH (Germany) [6651-05]

Coffee Break 10:20 to 10:50 am

SOLAR

Conference 6651 • Conv. Ctr. 33B

SESSION 4

Conv. Ctr. 33B Tues. 4:00 to 5:00 pm

PV Module/Manufacturing Issues

Chair: **Neelkanth G. Dhere**, Univ. of Central Florida

4:00 pm: **Electrical and photovoltaic properties through a large multicrystalline silicon ingot**, S. Martinuzzi, I. Perichaud, O. Palais, D. Barakel, Univ. Paul Cézanne (France); M. Gaultier, PHOTOWATT International S.A.S (France) [6651-15]

4:20 pm: **Influence of the laser parameters on the patterning quality of thin-film silicon modules**, S. Haas, A. Gordijn, H. Stiebig, Forschungszentrum Jülich GmbH (Germany) [6651-16]

4:40 pm: **Enhancing efficiency in PV systems: a new solar cooling module**, M. Buchanan, G. M. Aas, Norsk Solkraft AS (Norway); B. Moshfegh, Högskolan i Gävle (Sweden) [6651-17]

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Tuesday. Poster presenters who have not set up by 5:00 pm on Tuesday 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.

- ✓ **High-rate preparation of poly-si film by atmospheric-pressure plasma enhanced chemical transport with high feedstock utilization efficiency**, H. Ohmi, K. Kishimoto, D. Kamada, H. Kakiuchi, K. Yasutake, Osaka Univ. (Japan) [6651-18]
- ✓ **Si film preparation by atmospheric pressure plasma enhanced chemical transport in H₂/He or H₂/Ar mixture**, D. Kamada, H. Ohmi, K. Kishimoto, H. Kakiuchi, K. Yasutake, Osaka Univ. (Japan) [6651-19]
- ✓ **Fabrication of Cu(In,Al)Se₂ solar cells by three stage evaporation process**, T. Hayashi, T. Minemoto, T. Araki, H. Takakura, Ritsumeikan Univ. (Japan) [6651-20]
- ✓ **Heterojunctions on the basis of A₂B₂C₆ films, deposited from solution**, E. F. Nasirov, S. Mamedova, A. S. Abidinov, M. A. Jafarov, Baku State Univ. (Azerbaijan) [6651-21]
- ✓ **Summary of a-Si PVT system in Thailand**, T. Nualboonrueng, P. Sichanugrist, National Science and Technology Development Agency (Thailand) [6651-23]
- ✓ **Solar radiation splitting technology for enhancing solar energy conversion efficiency**, J. Avaliani, I. I. Kordzakhia, Institute OPTICA (Georgia) [6651-24]
- ✓ **III-V on Ge multijunction solar cells as an energy source for wireless sensor networks**, N. V. Yastrebova, K. Hinzer, Univ. of Ottawa (Canada); D. Mason, CYRIUM Technologies Inc. (Canada); S. Desgreniers, H. Schriemer, Univ. of Ottawa (Canada); B. Riel, S. Fafard, CYRIUM Technologies Inc. (Canada); T. Hall, Univ. of Ottawa (Canada) [6651-25]

Courses of Related Interest

See SPIE Cashier for information.

SC797 The Science and Technology of Organic Solar Cells
(Peumans) Tuesday 28, 1:30 - 5:30 pm

Conference 6652 • Conv. Ctr. 33C

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6652

Optical Modeling and Measurements for Solar Energy Systems

Conference Chair: **Daryl R. Myers**, National Renewable Energy Lab.

Program Committee: **Ravi Durvasula**, Light Fleet Corp.; **Christian A. Gueymard**, Solar Consulting Services; **Hanno Ohvril**, Tartu Ülikool (Estonia); **Benjamin K. Tsai**, National Institute of Standards and Technology; **Frank Vignola**, Univ. of Oregon

Sunday 26 August

SESSION 1

Conv. Ctr. 33C Sun. 8:30 to 10:30 am

Solar Energy Systems and Components

Chair: **Benjamin K. Tsai**, National Institute of Standards and Technology

8:30 am: **Fast in-line surface topography and stress metrology for solar cell manufacturing for throughput requirements in excess of 2000 WPH**, W. J. Walecki, F. Szondy, Sunrise Optical LLC; M. Hilali, Advent Solar, Inc. [6652-01]

8:50 am: **Antenna-coupled MIM diodes for efficient energy conversion**, R. M. Osgood III, B. R. Kimball, J. B. Carlson, K. Gregorczyk, U.S. Army Soldier Systems Ctr. [6652-02]

9:10 am: **Design and analysis of optical mechanism for concentration photovoltaic module**, C. Chen, H. Kuo, H. Hong, H. Shin, Institute of Nuclear Energy Research (Taiwan) [6652-03]

9:30 am: **Inverse illumination method for characterization of CPC concentrators**, A. P. Parretta, ENEA (Italy) and Univ. degli Studi di Ferrara (Italy); A. Antonini, CPower S.r.l. (Italy) and Univ. degli Studi di Ferrara (Italy); M. Stefanich, CPower S.r.l. (Italy); G. Martinelli, Univ. degli Studi di Ferrara (Italy); M. Armani, EURAC research (Italy) [6652-04]

9:50 am: **PV optics: a software package for solar cell and module design**, B. L. Sopori, National Renewable Energy Lab. [6652-05]

10:10 am: **Characterization of CPC solar concentrators by a laser method**, A. P. Parretta, ENEA (Italy) and Univ. degli Studi di Ferrara (Italy); A. Antonini, M. Stefanich, CPower S.r.l. (Italy) and Univ. degli Studi di Ferrara (Italy); V. Franceschini, G. Martinelli, Univ. degli Studi di Ferrara (Italy); M. Armani, EURAC research (Italy) [6652-06]

Coffee Break 10:30 to 11:00 am

SESSION 2

Conv. Ctr. 33C Sun. 11:00 am to 12:20 pm

Solar Radiation Measurements and Modeling I

Chair: **Daryl R. Myers**, National Renewable Energy Lab.

11:00 am: **General cloud cover modifier for clear sky solar radiation models**, D. R. Myers, National Renewable Energy Lab. [6652-07]

11:20 am: **Passive separation of global irradiance into direct normal and diffuse components**, M. J. Brooks, Univ. of KwaZulu-Natal (South Africa); D. R. Myers, National Renewable Energy Lab. [6652-08]

11:40 am: **Evaluation of methods to correct for IR loss in Eppley PSP diffuse measurements**, F. Vignola, Univ. of Oregon; C. N. Long, Pacific Northwest National Lab.; I. Reda, National Renewable Energy Lab. [6652-09]

12:00 pm: **The assessment of four different correction models applied to the diffuse radiation measured with a shadow ring using global and normal beam radiation measurements for Beer Sheva, Israel**, A. I. Kudish, E. G. Evseev, Ben-Gurion Univ. of the Negev (Israel) [6652-10]

Lunch Break 12:20 to 1:20 pm

SESSION 3

Conv. Ctr. 33C Sun. 1:20 to 2:00 pm

Solar Radiation Measurements and Modeling II

Chair: **Daryl R. Myers**, National Renewable Energy Lab.

1:20 pm: **Spectral effects on latitude-tilt and vertical PV modules as affected by latitude, air mass and climate**, C. A. Gueymard, Solar Consulting Services [6652-12]

1:40 pm: **Optimizing concentrating solar collection systems considering integrated performance over time band and location**, T. L. R. Davenport, Optical Research Associates [6652-15]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

Solar Energy Plenary Session

Conv. Ctr. Ballroom 20A Mon. 1:30 to 5:30 pm

1:30 pm: **The Solar-hydrogen Economy: An Analysis (Invited Paper)**, W. Reynolds, Eco-Engineers, Inc. [6650-101]

2:00 pm: **Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell (Invited Paper)**, H. Arakawa, C. Shiraishi, M. Tatemoto, H. Kishida, D. Usui, A. Suma, A. Takamisawa, T. Yamaguchi, Tokyo Univ. of Science (Japan) [6650-102]

2:30 pm: **New Opportunities in Concentrator Photovoltaics with Low-cost 40% Efficient Multijunction III-V Solar Cells (Invited Paper, Presentation Only)**, R. R. King, R. A. Sherif, G. S. Kinsey, D. C. Law, K. M. Edmondson, H. Yoon, H. L. Cotal, C. M. Fetzer, J. H. Ermer, P. Hebert, P. Pien, N. H. Karam, Spectrolab, Inc.

3:00 pm: **Module Design and Development: Progress and Opportunities (Invited Paper, Presentation Only)**, D. Rose, Sunpower Corp.

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Delivering Service at Scale: Old Requirements for the New Energy Industry (Invited Paper, Presentation Only)**, M. Culpepper, VP/Strategic Marketing, SunEdison

4:30 pm: **PV Solar Electricity Market and Technology Development (Invited Paper, Presentation Only)**, W. Hoffmann, Applied Materials, Inc.

5:00 pm: **The Solar Industry-DOE and NREL Programs to Accelerate Growth (Invited Paper, Presentation Only)**, S. J. Eglash, Consultant to the National Renewable Energy Lab.

See pg. 17-19 for presentation overviews.

Conference 6652 • Conv. Ctr. 33C

Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

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- ✓ **Design of a sun concentrator with hexagonal facets**, J. Herrera-Vazquez, S. Vazquez y Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6652-16]

Courses of Related Interest
See SPIE Cashier for information.

SC797 The Science and Technology of Organic Solar Cells
(Peumans) Tuesday 28, 1:30 - 5:30 pm



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Symposium Chair:



Zakya H. Kafafi,
Naval Research Lab.

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Sylvia S. Shen, The Aerospace Corp.
David L. Shealy, The Univ. of Alabama/Birmingham
Ruth Shinar, Iowa State Univ.
Franky So, Univ. of Florida
Ashok K. Sood, Magnolia Optical Technologies, Inc.
William J. Thomes, Jr., Sandia National Labs.

Photonic Devices + Applications

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Organic Photonics and Electronics					
		6653 Linear and Nonlinear Optics of Organic Materials VII (<i>Nunzi</i>), p. 85			
6654 Liquid Crystals XI (<i>Khoo</i>), p. 88					
6655 Organic Light-Emitting Materials and Devices XI (<i>Kafafi</i>), p. 90					
		6656 Organic Photovoltaics VIII (<i>Kafafi</i>), p. 94			
		6657 Organic 3D Photonics Materials and Devices (<i>Orlic</i>), p. 97			
6658 Organic Field-Effect Transistors VI (<i>Bao/Gundlach</i>), p. 99					
		6659 Organic-Based Chemical and Biological Sensors (<i>Shinar</i>), p. 102			
Detectors and Imaging Devices					
6660B Infrared and Photoelectronic Imagers and Detectors III (<i>Longshore/Sood</i>), p. 105		6660A Infrared Detectors and Focal Plane Arrays IX (<i>Dereniak/Hartke</i>), p. 103			
		6661 Imaging Spectrometry XII (<i>Shen/Lewis</i>), p. 106			
		6662 Optical Technologies for Arming, Safing, Fuzing, and Firing III (<i>Thomes/Dickey</i>), p. 107			
		6663 Laser Beam Shaping VIII (<i>Dickey/Shealy</i>), p. 108			
Applications					

EXHIBITION, p. 40-41
 10:00 am to 5:00 pm 10:00 am to 5:00 pm 10:00 am to 2:00 pm



Don't miss the Special Events, Plenaries, Receptions, Technical Workshops, Courses, Poster Sessions – and more!

See pages 9-41.



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Conference 6653 • Conv. Ctr. 31B

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6653

Linear and Nonlinear Optics of Organic Materials VII

Conference Chair: **Jean-Michel Nunzi**, Queens Univ. (Canada)

Cochairs: **Rachel Jakubiak**, Air Force Research Lab.; **Theodore G. Goodson III**, Univ. of Michigan; **Manfred Eich**, Technische Univ. Hamburg-Harburg (Germany)

Program Committee: **Kevin D. Belfield**, Univ. of Central Florida; **Antao Chen**, Univ. of Washington; **Koen J. Clays**, Katholieke Univ. Leuven (Belgium); **Alain F. Fort**, Institut de Physique et Chimie des Matériaux de Strasbourg (France); **Francois Kajzar**, Univ. d'Angers (France); **Satoshi Kawata**, Osaka Univ. (Japan); **Mark G. Kuzyk**, Washington State Univ.; **Charles Y. C. Lee**, Air Force Office of Scientific Research; **Kwang-Sup Lee**, Hannam Univ. (South Korea); **Geoffrey A. Lindsay**, Naval Air Warfare Ctr.; **Aristides A. Marcano**, Delaware State Univ.; **Robert A. Norwood**, College of Optical Sciences/The Univ. of Arizona; **André P. Persoons**, College of Optical Sciences/The Univ. of Arizona; **Jayan Thomas**, College of Optical Sciences/The Univ. of Arizona; **Tatsuo Wada**, The Institute of Physical and Chemical Research (Japan); **A. Todd Yeates**, Air Force Research Lab.

Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Tuesday. Poster presenters who have not set up by 5:00 pm on Tuesday 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.

- ✓ **Unidirectional bulk growth of pure and doped KDP crystals**, B. Subramaniyan, R. Perumalsamy, SSN College of Engineering (India) [6653-36]
- ✓ **Detection of alterations in human sperm using magnetic orientation techniques**, L. Sakhnini, M. Dairi, Univ. of Bahrain (Bahrain); H. Manaa, Kuwait Univ. (Kuwait) [6653-37]
- ✓ **Possibility of using Rhodamine B dye in diagnosis of some men's diseases**, G. Khodjaev, Z. F. Ismailov, E. N. Kurtaliev, F. U. Khaydarova, Samarkand State Univ. (Uzbekistan); Z. M. Hamidov, Special Medical Ctr. (Uzbekistan); D. P. Khakimova, Samarkand No. 3 Polyclinic (Uzbekistan); N. N. Nizomov, Samarkand State Univ. (Uzbekistan) [6653-38]
- ✓ **Structure of salient vibration $\nu(\text{H-Hal})$ absorption band of B...H-Hal complex in gaseous and condensed systems**, M. Gulamxon, Samarkand State Univ. (Uzbekistan); K. G. Tokhadze, Saint-Petersburg State Univ. (Russia) [6653-41]
- ✓ **Completely passive nonlinear transmission system using nonlinear absorbing medium and azobenzene films**, C. S. Yelleswarapu, D. V. G. L. N. Rao, Univ. of Massachusetts/Boston; B. R. Kimball, U.S. Army Soldier Systems Ctr. [6653-42]
- ✓ **Enhanced photoinduced birefringence in hydrogen-bonded guest-host polymers**, A. Priimagi, Helsinki Univ. of Technology (Finland); F. J. Rodriguez, M. Kauranen, Tampere Univ. of Technology (Finland); M. Kaivola, Helsinki Univ. of Technology (Finland) [6653-43]

- ✓ **New sol-gel hybrid materials for high energy applications in nonlinear optics**, I. Fortunati, R. Signorini, R. Bozio, G. Brusatin, M. Guglielmi, Univ. degli Studi di Padova (Italy); S. Dirè, Univ. degli Studi di Trento (Italy) [6653-44]
- ✓ **Control of refractive index distribution for realization of high-functional optical polymer**, M. Asai, Y. Koike, Keio Univ. (Japan) [6653-45]
- ✓ **Growth, optical and microhardness studies of trimethoprim malate: an organic NLO crystal**, F. Savarimuthu, B. K. Periyasamy, B. Thailampillai, National Institute of Technology/Tiruchirappalli (India) [6653-46]
- ✓ **Ultrafast excitation dynamics in organic multicromophoric systems after two-photon excitation**, O. P. Varnavski, T. G. Goodson III, Univ. of Michigan [6653-48]
- ✓ **Quantitative description two-photon absorption in dipolar molecules with two-level model**, N. S. Makarov, A. Rebane, M. A. Drobizhev, Z. Suo, Montana State Univ./Bozeman; C. W. Spangler, Rasiris, Inc.; B. D. Spangler, Sensopath Technologies, Inc.; F. Meng, MPA Technologies, Inc.; H. L. Anderson, C. J. Wilson, Univ. of Oxford (United Kingdom) [6653-49]
- ✓ **Observation of new strong high-frequency feature in two-photon absorption spectrum of GFP and its description within three-level model with resonance enhancement**, M. A. Drobizhev, N. S. Makarov, A. Rebane, T. E. Hughes, Montana State Univ./Bozeman [6653-50]
- ✓ **One step inscription of surface relief multigratings**, S. Ahmadi-Kadjani, Univ. d'Angers (France); S. H. Kucharski, Politechnika Wroclawska (Poland); R. Barille, Univ. d'Angers (France); J. Nunzi, Queens Univ. (Canada) [6653-51]
- ✓ **Concentration and solvent effects on the two-photon absorption of diphenylaminofluorene chromophore adducts of [60] fullerene**, R. Jakubiak, Air Force Research Lab.; R. Anandakathir, Univ. of Massachusetts/Lowell; H. I. Elim, W. Ji, National Univ. of Singapore (Singapore); L. Tan, Air Force Research Lab.; L. Y. Chiang, Univ. of Massachusetts/Lowell [6653-52]
- ✓ **Synthesis and chiroptical properties of methacrylic copolymers containing in side-chain optically active carbazole and azochromophores**, L. Angiolini, T. Benelli, L. Giorgini, F. Mauriello, E. Salatelli, Univ. degli Studi di Bologna (Italy) [6653-54]

Conference 6653 • Conv. Ctr. 31B

Wednesday 29 August

SESSION 1

Conv. Ctr. 31B Wed. 8:30 to 10:10 am

Organic Lasers

Chair: **Manfred Eich**, Technische Univ. Hamburg-Harburg (Germany)

Keynote

8:30 am: **Photonic superlattices for photonic crystal laser (Keynote)**, K. J. Clays, Katholieke Univ. Leuven (Belgium) and Washington State Univ.; K. Baert, M. Van der Auweraer, R. Vallée, Katholieke Univ. Leuven (Belgium) . [6653-01]

9:00 am: **An all-plastic polymer laser**, K. D. Singer, Y. Wu, T. Boatwright, H. Song, A. Hiltner, J. Lott, C. Weder, E. Baer, Case Western Reserve Univ. [6653-02]

9:20 am: **First order distributed feedback dye laser effect in reflection pumping geometry for nonlinear optical measurements**, F. Chen, Univ. d'Angers (France); D. Gindre, Institut de Physique et Chimie des Matériaux de Strasbourg (France); J. Nunzi, Queens Univ. (Canada) [6653-03]

9:40 am: **Photoresponsive polymers containing side-chain chiral azocarbazole chromophores as multifunctional materials (Invited Paper)**, L. Angiolini, Univ. degli Studi di Bologna (Italy); R. Bozio, T. Dainese, Univ. degli Studi di Padova (Italy); L. Giorgini, Univ. degli Studi di Bologna (Italy); A. Golemme, Univ. degli Studi della Calabria (Italy); F. Mauriello, Univ. degli Studi di Bologna (Italy); D. Pedron, Univ. degli Studi di Padova (Italy); R. Termine, Univ. degli Studi della Calabria (Italy) [6653-55]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 31B Wed. 10:40 to 11:40 am

Multiphoton Effects

Chair: **Jean-Michel Nunzi**, Queens Univ. (Canada)

10:40 am: **Two-photon and excited-state absorption in asymmetric phthalocyanines, push-pull phthalocyanines, and phthalocyanine: electron-acceptor diads**, M. A. Drobizhev, N. S. Makarov, A. Rebane, Montana State Univ./Bozeman; G. de la Torre, T. Torres, Univ. Autónoma de Madrid (Spain); H. Wolleb, H. Spahn, Ciba Specialty Chemicals Inc. (Switzerland) [6653-05]

11:00 am: **Broad bandwidth near-IR two-photon absorption in conjugated porphyrins core dendrimers**, A. Rebane, M. A. Drobizhev, N. S. Makarov, Montana State Univ./Bozeman; C. W. Spangler, Rasiris, Inc.; A. Gong, MPA Technologies, Inc.; F. Meng, Montana State Univ./Bozeman [6653-06]

11:20 am: **High sensitivity photo-thermal lens method for measurement of two-photon absorption**, A. Marcano, K. D. Williams, N. Melikechi, Delaware State Univ. [6653-07]

Lunch/Exhibition Break 11:40 am to 1:20 pm

SESSION 3

Conv. Ctr. 31B Wed. 1:20 to 3:00 pm

Microstructures

Chair: **Aristides A. Marcano**, Delaware State Univ.

1:20 pm: **Polymer microphotonic structures (Invited Paper)**, M. Eich, Technische Univ. Hamburg-Harburg (Germany) [6653-09]

1:50 pm: **Optical storage through second harmonic signals in organic films**, A. F. Fort, A. Barsella, A. J. Boeglin, L. Mager, Institut de Physique et Chimie des Matériaux de Strasbourg (France); D. Gindre, Propriétés Optiques des Matériaux et Applications (France); K. D. Dorkenoo, Institut de Physique et Chimie des Matériaux de Strasbourg (France) [6653-10]

2:10 pm: **Infiltration characterization of 2D and 3D photonic crystals using laser scatterometry**, L. Wang, R. A. Norwood, A. Kropachev, N. N. Peyghambarian, College of Optical Sciences/The Univ. of Arizona . . [6653-11]

2:30 pm: **Molecular orientation by two-and multi-photon photoselection and nanofabrication in azo-polymers (Invited Paper)**, Z. Sekkat, Osaka Univ. (Japan) [6653-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 31B Wed. 3:30 to 5:30 pm

Optical Components

Chair: **Alain F. Fort**, Institut de Physique et Chimie des Matériaux de Strasbourg (France)

3:30 pm: **Effect of silicon dioxide nanoparticles on the characteristics of PQ/PMMA holographic filters**, J. M. Russo, R. K. Kostuk, The Univ. of Arizona [6653-13]

3:50 pm: **Design of low-loss and thermally stable GI POF prepared by novel polymer**, K. Koike, Keio Univ. (Japan); Y. Okamoto, Polytechnic Univ.; Y. Koike, Keio Univ. (Japan) and ERATO-SORST/JST (Japan); H. Teng, Polytechnic Univ. [6653-14]

4:10 pm: **Zero zero-birefringence polymers for photonics devices**, A. Tagaya, Japan Science and Technology Agency (Japan) and Keio Univ. (Japan); Y. Koike, Keio Univ. (Japan) and Japan Science and Technology Agency (Japan) [6653-15]

4:30 pm: **Fiber optic transmission of analog signals**, R. Furukawa, Y. Koike, Keio Univ. (Japan) [6653-16]

4:50 pm: **Modal analysis of organic-inorganic hybrid planar waveguides for integrated optics**, L. P. Pellegrino, Siemens Networks GmbH & Co. KG (Portugal) and Univ. de Aveiro (Portugal); P. M. P. Monteiro, Siemens Networks GmbH & Co. KG (Portugal) and Instituto de Telecomunicações (Portugal) and Univ. de Aveiro (Portugal); R. S. Ferreira, C. Vicente, P. André, L. D. Carlos, Univ. de Aveiro (Portugal) [6653-17]

5:10 pm: **Design of zero-birefringence optical polymer and analysis of birefringence of molecule dopant and polymer**, H. Takahashi, A. Tagaya, Keio Univ. (Japan); H. Teng, Y. Okamoto, Polytechnic Univ.; Y. Koike, Keio Univ. (Japan) and ERATO-SORST, Japan Science and Technology Agency (Japan) [6653-18]

Thursday 30 August

SESSION 5

Conv. Ctr. 31B Thurs. 8:30 to 10:10 am

Photo-Induced Effects

Chair: **Rachel Jakubiak**, Air Force Research Lab.

8:30 am: **A new mechanism of relaxation in poled guest-host systems: Monte Carlo analysis of aggregation scenario (Invited Paper)**, A. C. Mitus, G. Pawlik, Politechnika Wroclawska (Poland); I. Rau, Commissariat à l'Énergie Atomique (France); F. Kajzar, Univ. d'Angers (France); C. Andraud, Ecole normale supérieure de Lyon (France) [6653-19]

9:00 am: **Photoinduced twisting behavior of chiral cyclic compounds (Invited Paper)**, M. Kawamoto, T. Aoki, T. Wada, The Institute of Physical and Chemical Research (RIKEN) (Japan) [6653-20]

9:20 am: **Stability of all-optical poling in hydrogen-bonded guest-host polymers**, F. J. Rodriguez, I. Kettunen, Tampere Univ. of Technology (Finland); A. Priimagi, Helsinki Univ. of Technology (Finland); M. Kauranen, Tampere Univ. of Technology (Finland) [6653-21]

9:40 am: **Nonlinear optical effects induced in polymer optical fibres (Invited Paper)**, A. Samoc, M. J. Samoc, B. Luther-Davies, The Australian National Univ. (Australia); R. Barille, Univ. d'Angers (France); J. Nunzi, Queens Univ. (Canada) [6653-22]

Coffee Break 10:10 to 10:40 am

SESSION 6

Conv. Ctr. 31B Thurs. 10:40 am to 12:10 pm

Nonlinear Devices

Chair: **Theodore G. Goodson III**, Univ. of Michigan

- 10:40 am: **Multifunctional polyimides for tailored high-performance polymer electro-optical devices (Invited Paper)**, A. J. Guenther, M. E. Wright, S. Fallis, G. A. Lindsay, J. Cash, Naval Air Warfare Ctr.; D. Zang, C. Gaeta, M. C. Zounes, IPITEK, Inc. [6653-23]
- 11:10 am: **Oven aging of optical modulators made from CLD and FTC in guest-host polycarbonate and side-chain polyimides**, G. A. Lindsay, A. J. Guenther, M. E. Wright, Naval Air Warfare Ctr.; M. Sanghadasa, The AEgis Technologies Group, Inc.; P. R. Ashley, U.S. Army Aviation and Missile Command [6653-24]
- 11:30 am: **Optical bistability of terchlophenyl/polymethylmethacrylate composite film**, S. Ochiai, Aichi Institute of Technology (Japan); S. Mototani, Aichi Institute of Technology (Japan); K. Kojima, T. Mizutani, Aichi Institute of Technology (Japan) [6653-25]
- 11:50 am: **Very low half-wave voltage and high electro-optic effect in Mach-Zehnder modulators using nonlinear optical polymers**, D. Jin, D. Huang, B. Chen, L. Zhang, H. Chen, D. Tolstedt, S. Condon, A. M. Barklund, G. Yu, E. Miller, Y. Fang, B. Li, R. Dinu, Lumera Corp. [6653-26]
- Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 7

Conv. Ctr. 31B Thurs. 1:40 to 3:10 pm

Second Order Effects

Chair: **Robert A. Norwood**, College of Optical Sciences/The Univ. of Arizona

- 1:40 pm: **Structure-property relationship in organometallic compounds regarding SHG (Invited Paper)**, J. Heck, M. H. Prosen, Univ. Hamburg (Germany); T. Meyer-Friedrichsen, H.C. Starck GmbH & Co. KG (Germany); H. Kuball, G. Archetti, Univ. Kaiserslautern (Germany); Y. Luo, Kungliga Tekniska Högskolan (Sweden) [6653-27]
- 2:10 pm: **Second-harmonic generation investigation of the interfacial charge-transfer-induced polarity of C₆₀ thin film**, S. W. Chan, Univ. d'Angers (France); J. Nunzi, Queens Univ. (Canada); M. A. Rutkis, I. Muzikante, Latvijas Univ. (Latvia) [6653-28]
- 2:30 pm: **Plasmon enhanced second order nonlinear optical response of ionic self-assembled multilayer films**, C. Durak, K. Chen, H. Robinson, A. Garg, R. M. Davis, J. R. Heflin, Virginia Polytechnic Institute and State Univ. [6653-29]
- 2:50 pm: **Optical absorption and SHG in PMMA: DR1 thin films as function of poling time**, J. A. Garcia-Macedo, A. Franco, G. Valverde-Aguilar, C. Aguilar-Gutiérrez, Univ. Nacional Autónoma de México (Mexico) [6653-30]
- Coffee Break 3:10 to 3:40 pm

SESSION 8

Conv. Ctr. 31B Thurs. 3:40 to 4:50 pm

Molecular Engineering

Chair: **Tatsuo Wada**, The Institute of Physical and Chemical Research (Japan)

- 3:40 pm: **Quantum two-photon absorption of an organic material by entangled photon pairs in spontaneous parametric down-conversion (Invited Paper)**, D. Lee, T. G. Goodson III, Univ. of Michigan [6653-31]
- 4:10 pm: **Modulated conjugation for record high intrinsic hyperpolarizabilities**, K. J. Clays, Katholieke Univ. Leuven (Belgium) and Washington State Univ.; J. Pérez-Moreno, Katholieke Univ. Leuven (Belgium); M. G. Kuzyk, Washington State Univ.; Y. Zhao, Technical Institute of Physics and Chemistry (China) [6653-32]
- 4:30 pm: **NLO properties of dithienothiophene-based chromophores: a comparison study between the donor/donor and donor/acceptor substitution patterns**, M. C. Ruiz Delgado, J. Casado, V. Hernández, J. T. López Navarrete, Univ. de Málaga (Spain); O. Kim, H. Y. Woo, Naval Research Lab.; J. Orduna, J. Garín, B. Villacampa, Univ. de Zaragoza (Spain) . [6653-33]

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Conference 6654 • Conv. Ctr. 31C

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6654

Liquid Crystals XI

Conference Chair: **Iam Choon Khoo**, The Pennsylvania State Univ.

Program Committee: **Timothy J. Bunning**, Air Force Research Lab.; **Shaw H. Chen**, Univ. of Rochester; **Neil Collings**, Univ. of Cambridge (United Kingdom); **Jean-Pierre Huignard**, Thales Research & Technology (France); **Tomiki Ikeda**, Tokyo Institute of Technology (Japan); **Francesco F. Simoni**, Univ. Politecnica delle Marche (Italy); **David M. Walba**, Univ. of Colorado/Boulder

Sunday 26 August

SESSION 1

Conv. Ctr. 31C Sun. 8:30 to 10:10 am

Electro-Optics LC and Polarized LED

Chair: **Iam Choon Khoo**, The Pennsylvania State Univ.

8:30 am: **Polarized organic light-emitting diodes as energy-efficient backlight for liquid-crystal displays (Invited Paper)**, A. C. Chen, S. H. Chen, Univ. of Rochester; C. W. Tang, Eastman Kodak Co. [6654-01]

9:00 am: **Polarization dependent photoactuation in azobenzene LC polymers**, T. J. White, General Dynamics Information Technology; V. P. Tondiglia, L. V. Natarajan, Science Applications International Corp.; N. V. Tabirian, S. V. Serak, V. A. Grozhik, BEAM Engineering for Advanced Measurements Co.; T. J. Bunning, R. A. Vaia, Air Force Research Lab. [6654-02]

9:20 am: **Three-dimensional alignment of liquid crystals in nanostructured porous thin films (Invited Paper)**, N. Wakefield, J. C. Sit, Univ. of Alberta (Canada) [6654-03]

9:50 am: **Polarization-independent, tunable optical filters based on liquid-crystal polarization gratings**, E. Nicolescu, M. J. Escuti, North Carolina State Univ. [6654-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 31C Sun. 10:40 am to 12:20 pm

Electro- and Nonlinear-Optical LC and Devices

Chair: **Neil Collings**, Univ. of Cambridge (United Kingdom)

10:40 am: **Nonlinear effects in a liquid-crystal optical oscillator (Invited Paper)**, S. Residori, U. Bortolozzo, Institut Non Linéaire de Nice Sophia Antipolis (France); J. Huignard, Thales Research & Technology (France); A. Montina, T. F. Arecchi, Univ. degli Studi di Firenze (Italy) [6654-05]

11:10 am: **Toward low-threshold and high efficiency tunable chiral nematic and blue phase liquid crystal lasers (Invited Paper)**, H. J. Coles, Univ. of Cambridge (United Kingdom) [6654-06]

11:40 am: **Polysilane 1xN optical splitters fabricated by UV laser direct drawing**, S. Kobayashi, T. Suda, Y. Masuko, Chitose Institute of Science and Technology (Japan); K. Ogura, H. Tsushima, Nippon Paint Co., Ltd. (Japan) [6654-07]

12:00 pm: **Photo-alignment of glassy-nematic liquid crystals**, A. Trajkovska, C. K. Kim, J. U. Wallace, S. H. Chen, Univ. of Rochester [6654-08]

Lunch Break 12:20 to 1:20 pm

SESSION 3

Conv. Ctr. 31C Sun. 1:20 to 3:10 pm

Electro- and Nonlinear-Optical LC and Processes

Chair: **Timothy J. Bunning**, Air Force Research Lab.

1:20 pm: **Optical and thermal tuning of cholesteric liquid-crystal selective reflection wavelengths (Invited Paper)**, L. V. Natarajan, R. L. Sutherland, V. P. Tondiglia, Science Applications International Corp.; J. M. Wofford, Air Force Research Lab.; S. A. Siwecki, Science Applications International Corp.; H. Koerner, R. A. Vaia, T. J. Bunning, Air Force Research Lab. [6654-09]

1:50 pm: **Enhanced photosensitivity and functionality of hybrid liquid-crystal structures (Invited Paper)**, M. Kaczmarek, O. Buchnev, Univ. of Southampton (United Kingdom) [6654-10]

2:20 pm: **Implementation of colorless shutter-based free-space optical interconnections using ferroelectric liquid-crystal spatial light modulators**, H. Chou, N. Collings, T. D. Wilkinson, Univ. of Cambridge (United Kingdom); F. Zhang, Univ. of Southampton (United Kingdom); W. A. Crossland, Univ. of Cambridge (United Kingdom) [6654-11]

2:40 pm: **Nano-dispersed liquid-crystalline zero or negative-index frequency selective structures for filters and switch applications (Invited Paper)**, I. C. Khoo, A. Diaz, S. Kubo, T. Mallouk, D. Kwon, J. H. Park, D. H. Werner, The Pennsylvania State Univ. [6654-22]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Conv. Ctr. 31C Sun. 3:40 to 5:00 pm

Liquid-Crystal Optics

Chair: **Andres Diaz**, The Pennsylvania State Univ.

3:40 pm: **Super-structured smectics and their application (Invited Paper)**, I. Nishiyama, Dainippon Ink and Chemicals, Inc. (Japan); T. Yamamoto, National Institute of Advanced Industrial Science and Technology (Japan); J. Yamamoto, Kyoto Univ. (Japan); H. Yokoyama, National Institute of Advanced Industrial Science and Technology (Japan) [6654-13]

4:10 pm: **Using time-dependent density functional theory (TD-DFT) in the design and development of near-IR dopants for liquid-crystal device applications**, K. L. Marshall, R. Wang, M. Coan, K. Leskow, R. Pauszek, A. Moore, Univ. of Rochester [6654-14]

4:30 pm: **Optical aspects of inhomogeneous molecular order in confined NLC systems: Monte Carlo studies (Invited Paper)**, A. C. Mitus, G. Pawlik, Politechnika Wroclawska (Poland); F. Kajzar, Univ. d'Angers (France) [6654-15]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 5

Conv. Ctr. 31C Mon. 8:30 to 10:30 am

LC Lasers and Optoelectronics

Chair: **Shaw H. Chen**, Univ. of Rochester

8:30 am: **Electrically tunable laser based on dye-doped cholesteric liquid-crystal with negative dielectric anisotropy (Invited Paper)**, A. Y. Fuh, T. Lin, H. Jau, National Cheng Kung Univ. (Taiwan); C. Chen, National Chia-Yi Univ. (Taiwan); T. Wei, National Chung Cheng Univ. (Taiwan) [6654-16]

9:00 am: **Mesophase semiconductors and the field effect transistors (Invited Paper)**, Y. Shimizu, National Institute of Advanced Industrial Science and Technology (Japan) [6654-17]

9:30 am: **Electro-optical effect coupled with macroscopic deformation of swollen nematic elastomers (Invited Paper)**, K. Urayama, A. Fukunaga, S. Honda, T. Takigawa, Kyoto Univ. (Japan); I. Kobayashi, Nissan Chemical Industries, Ltd. (Japan) [6654-18]

10:00 am: **Photochemical control of structural color of composite materials consisting of inverse opal structure and azo-polymer liquid crystals (Invited Paper)**, S. Kurihara, M. Moritsugu, S. Kim, T. Ogata, T. Nonaka, Kumamoto Univ. (Japan) [6654-19]

Coffee Break 10:30 to 11:00 am

SESSION 6

Conv. Ctr. 31C Mon. 11:00 am to 12:20 pm

Novel Index and Electro-Optical Liquid-Crystalline Materials

Chair: **Jeremy C. Sit**, Univ. of Alberta (Canada)

11:00 am: **Studies of the fundamental limits of electro-optical modulation (Invited Paper)**, U. Efron, R. Israeli, Ben-Gurion Univ. of the Negev (Israel); B. Apter, B. Lembrikov, Holon Institute of Technology (Israel) [6654-20]

11:30 am: **Optical properties of organic-based periodic structures (Invited Paper)**, D. E. Lucchetta, F. Vita, R. Castagna, O. Francescangeli, F. F. Simoni, Univ. Politecnica delle Marche (Italy) and Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia (CNISM) (Italy) [6654-21]

12:00 pm: **Computer simulation of liquid-crystal spatial light modulator based on surface plasmon resonance**, P. Kogan, Ben Gurion University of the Negev (Israel); B. Apter, Holon Institute of Technology (Israel); U. Efron, Ben-Gurion Univ. of the Negev (Israel) and Holon Institute of Technology (Israel); I. Baal-Zedaka, Holon Institute of Technology (Israel) [6654-12]

Lunch Break 12:20 to 1:30 pm

SESSION 7

Conv. Ctr. 31C Mon. 1:30 to 3:30 pm

Novel Liquid Crystals and Optoelectronics

Chair: **Iam Choon Khoo**, The Pennsylvania State Univ.

1:30 pm: **Unique optical and physical properties with stimuli-sensitivity in soft transparent nanocomposite gels (Invited Paper)**, K. Haraguchi, Kawamura Institute of Chemical Research (Japan) [6654-23]

2:00 pm: **Development of deVries SmA* materials for liquid-crystal waveguide applications (Invited Paper)**, E. D. Korblova, D. M. Walba, Univ. of Colorado at Boulder; S. R. Davis, S. D. Rommel, Vescent Photonics Inc.; R. Shao, Univ. of Colorado at Boulder; M. Talarico, Univ. degli Studi della Calabria (Italy); M. Nakata, N. A. Clark, Univ. of Colorado at Boulder [6654-24]

2:30 pm: **Multidomain liquid-crystal alignment properties on anchoring controllable polymer surface (Invited Paper)**, R. Yamaguchi, S. Sato, Akita Univ. (Japan) [6654-25]

3:00 pm: **Switching properties of VAN LCoS devices with ultra-microscale electrodes (Invited Paper)**, R. Ghannam, Univ. of Cambridge (United Kingdom); R. W. James, Univ. College London (United Kingdom); N. Collings, W. A. Crossland, Univ. of Cambridge (United Kingdom); A. Fernandez, S. E. Day, Univ. College London (United Kingdom) [6654-26]

Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

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Poster Setup

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✓ **Dynamic polarization switching and stimulated orientational scattering by sub-microsecond lasers in nematic liquid crystals**, I. C. Khoo, A. Diaz, M. V. Stinger, J. D. Liou, The Pennsylvania State Univ. [6654-28]

✓ **Nonlinear liquid cored fiber array and liquid crystals for fast and broadband CW and long-pulse laser power control and switching**, I. C. Khoo, J. D. Liou, J. H. Park, M. V. Stinger, A. Diaz, J. Huang, The Pennsylvania State Univ. [6654-29]

✓ **A tunable feedback resonator based on a nematic liquid crystal as a variable capacitance**, C. Marcos, J. C. Torres Zafrá, J. M. Sanchez, I. A. Perez, C. Vázquez García, Univ. Carlos III de Madrid (Spain) [6654-31]

✓ **Tunable refractive index materials with gold nano-spheres dispersed in liquid crystals**, S. Kubo, The Pennsylvania State Univ. and Tokyo Institute of Technology; A. Diaz, Y. Tang, T. S. Mayer, I. C. Khoo, T. Mallouk, The Pennsylvania State Univ. [6654-32]

Conference 6655 • Conv. Ctr. 32A/B

Sunday-Wednesday 26-29 August 2007 • Proceedings of SPIE Vol. 6655

Organic Light Emitting Materials and Devices XI

Conference Chair: **Zakya H. Kafafi**, Naval Research Lab.

Cochair: **Franky So**, Univ. of Florida

Program Committee: **Chihaya Adachi**, Kyushu Univ. (Japan); **Alasdair J. Campbell**, Imperial College London (United Kingdom); **Brian W. D'Andrade**, Universal Display Corp.; **Anil R. Duggal**, GE Global Research; **Tukaram K. Hatwar**, Eastman Kodak Co.; **Andrew B. Holmes**, The Univ. of Melbourne (Australia); **Ghassan E. Jabbour**, Arizona State Univ.; **Junji Kido**, Yamagata Univ. (Japan); **Changhee Lee**, Seoul National Univ. (South Korea); **Chun S. Lee**, City Univ. of Hong Kong (Hong Kong China); **Michele Muccini**, Istituto per lo Studio dei Materiali Nanostrutturati (Italy); **Ifor D. W. Samuel**, Univ. of St. Andrews (United Kingdom); **Joseph Shinar**, Iowa State Univ.

Sunday 26 August

Opening Remarks

Conv. Ctr. 32A/B Sun. 10:30 to 10:45 am

Conference Chair: **Zakya H. Kafafi**, Naval Research Lab., Conference
Cochair: **Franky So**, Univ. of Florida

SESSION 1

Conv. Ctr. 32A/B Sun. 10:45 am to 12:25 pm

OLED Materials I

Chair: **Zakya H. Kafafi**, Naval Research Lab.

10:45 am: **Recent progress in deep-blue phosphorescent OLEDs (Invited Paper)**, C. D. Schildknecht, C. Lennartz, K. Kahle, O. Molt, E. Fuchs, J. Rudolph, P. Amrhein, J. Proelss, I. Muenster, BASF AG (Germany) . . . [6655-05]

11:10 am: **Liquid crystalline semiconducting materials and nanostructures (Invited Paper)**, K. D. Singer, V. Duzhko, Case Western Reserve Univ. [6655-02]

11:35 am: **Origin of the different emission wavelengths in Alq₃ analyzed by solid-state NMR (Invited Paper)**, H. Kaji, Kyoto Univ. (Japan) [6655-03]

12:00 pm: **Tuning the properties of polythienothiophene conductive polymers for hole injection layer application (Invited Paper)**, X. Jiang, E. Klingenberg, K. Campbell, F. Amy, B. Han, Air Products and Chemicals, Inc.; F. So, K. Roy-Choudhury, A. Gupta, Univ. of Florida [6655-75]

Lunch Break 12:25 to 1:30 pm

SESSION 2

Conv. Ctr. 32A/B Sun. 1:30 to 3:25 pm

OLED Materials II

Chair: **Franky So**, Univ. of Florida

1:30 pm: **Designing molecules using heteroaromatic building blocks (Invited Paper)**, L. S. Sapochak, A. B. Padmaperuma, P. Vecchi, H. Qiao, P. E. Burrows, Pacific Northwest National Lab. [6655-06]

1:55 pm: **Synthesis and electroluminescent properties of poly(p-phenylenevinylene)s with 3',3'-diheptyl-3,4-propylenedioxythiophene pendant group for light-emitting diode applications (Invited Paper)**, S. Jin, Pusan National Univ. (South Korea) [6655-01]

2:20 pm: **New charge-transporting and emitting amorphous molecular materials for organic electroluminescent devices (Invited Paper)**, Y. Shirota, Fukui Univ. of Technology (Japan); K. Okumoto, K. Hashimoto, M. Maeda, T. Yamate, M. Tanaka, H. Kageyama, Osaka Univ. (Japan) [6655-08]

2:45 pm: **Organic materials for blue emission organic electroluminescent devices (Invited Paper)**, J. Shi, Army Research Lab. [6655-09]

3:10 pm: **Efficient blue organic light-emitting diodes with 4H-cyclopenta[def]phenanthrene**, H. Suh, Y. Jin, S. Song, C. Yoo, J. Kim, Pusan National Univ. (South Korea) [6655-10]

Coffee Break 3:25 to 3:55 pm

SESSION 3

Conv. Ctr. 32A/B Sun. 3:55 to 5:35 pm

Stability Issues in OLEDs

Chair: **Ifor D. W. Samuel**, Univ. of St. Andrews (United Kingdom)

3:55 pm: **On the oxidation of fluorenes and the synthesis of low defect polyfluorenes (Invited Paper)**, A. B. Holmes, S. Y. Cho, A. C. Grimdale, S. E. Watkins, The Univ. of Melbourne (Australia) [6655-04]

4:20 pm: **Emission and degradation mechanism of PLED (Invited Paper)**, M. Koden, Sharp Corp. (Japan) [6655-38]

4:45 pm: **Synchrotron radiation micro-XPS study of OLEDs degradation in different environment and of ITO anode surface after etching treatments (Invited Paper)**, P. Melpignano, Ctr. Ricerche Plast-Optica (Italy); L. Gregoratti, S. Gardonio, D. Scaini, C. Castellarin-Cudia, P. Dudin, Sincrotrone Trieste S.C.p.A. (Italy); V. Biondo, Ctr. Ricerche Plast-Optica (Italy); R. Zamboni, S. Caria, Istituto per lo Studio dei Materiali Nanostrutturati (Italy); M. Kiskinova, Sincrotrone Trieste S.C.p.A. (Italy) [6655-71]

5:10 pm: **Intrinsic degradation mechanism of organic light-emitting devices fabricated under ultra-high vacuum condition (Invited Paper)**, H. Murata, Japan Advanced Institute of Science and Technology (Japan) [6655-41]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6655 • Conv. Ctr. 32A/B

Monday 27 August

SESSION 4

Conv. Ctr. 32A/B Mon. 8:15 to 10:00 am

Triplet Emitters

Chair: **Linda S. Sapochak**, Pacific Northwest National Lab.

8:15 am: **Spin-orbit coupling routes and OLED performance: studies of blue-light emitting Ir(III) and Pt(II) complexes (Invited Paper)**, H. Yersin, A. F. Rausch, Univ. Regensburg (Germany); P. I. Djurovich, M. E. Thompson, Univ. of Southern California [6655-11]

8:40 am: **Blue phosphorescent emitter microcavity OLED devices (Invited Paper)**, P. B. Mackenzie, B. W. D'Andrade, V. I. Adamovich, M. S. Weaver, Universal Display Corp. [6655-14]

9:05 am: **High efficiency phosphorescent organic light emitting diodes at high current density (Invited Paper)**, J. Kim, J. Kang, W. Jung, Seoul National Univ. (South Korea) [6655-12]

9:30 am: **Harvest of triplet excitons in fluorescence emission layer based on a wide band gap host of TcTa for efficient white organic light emitting diodes**, J. Lee, H. Y. Chu, Y. S. Yang, L. M. Do, S. M. Chung, S. K. Park, C. Hwang, Electronics and Telecommunications Research Institute (South Korea) [6655-13]

9:45 am: **Harvesting triplet excitons from fluorescent blue emitters for high-efficiency white organic light emitting diodes**, G. Schwartz, M. P. Pfeiffer, K. Walzer, K. Leo, Technische Univ. Dresden (Germany) [6655-70]

Coffee Break 10:00 to 10:30 am

SESSION 5

Conv. Ctr. 32A/B Mon. 10:30 to 11:50 am

OLEDs and Fabrication Processes

Chair: **Chihaya Adachi**, Kyushu Univ. (Japan)

10:30 am: **Spectrally narrowed edge emission from organic light-emitting diodes (Invited Paper)**, Y. Tian, Z. Gan, Z. Zhou, Iowa State Univ.; J. Kang, Q. Park, Korea Univ. (South Korea); D. W. Lynch, J. Shinar, Iowa State Univ. [6655-15]

10:55 am: **Highly efficient fully transparent inverted OLED**, J. Meyer, T. Winkler, S. Hamwi, M. Kröger, P. Görrn, H. Johannes, T. J. Riedl, W. Kowalsky, Technische Univ. Braunschweig (Germany); T. D. Dobbertin, D. Becker, E. Lang, OSRAM Opto Semiconductors GmbH (Germany) [6655-16]

11:10 am: **Fabrication of multi-layered polymer light emitting diodes by resonant infrared pulsed laser deposition**, S. L. Johnson, Vanderbilt Univ.; H. K. Park, Appliflex LLC; R. F. Haglund, Jr., Vanderbilt Univ. [6655-17]

11:25 am: **Technical issues of stainless steel foil substrates for OLED display applications (Invited Paper)**, Y. Hong, Seoul National Univ. (South Korea) [6655-18]

Lunch Break 11:50 am to 1:30 pm

SESSION 6

Conv. Ctr. 32A/B Mon. 1:30 to 3:00 pm

Novel Light Emitting Structures and Devices

Chair: **Michele Muccini**, Istituto per lo Studio dei Materiali Nanostrutturati (Italy)

1:30 pm: **OLEDs from ionic transition metal complexes (Invited Paper)**, G. G. Malliaras, Cornell Univ. [6655-19]

1:55 pm: **Novel non-planar and ITO-free organic light-emitting device architectures (Invited Paper)**, M. Shtein, Univ. of Michigan [6655-22]

2:20 pm: **Electrospun light-emitting nanofibers**, J. D. Slinker, J. Moran-Mirabal, J. A. DeFranco, H. D. Abruna, H. G. Craighead, G. G. Malliaras, Cornell Univ. [6655-20]

2:35 pm: **Exciton-photon coupling in optical microcavities and applications in organic optoelectronic devices (Invited Paper)**, R. J. Holmes, Univ. of Minnesota [6655-40]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Conv. Ctr. 32A/B Mon. 3:30 to 5:05 pm

Organic Lasers

Chair: **Brian K. Crone**, Los Alamos National Lab.

3:30 pm: **Photonic feedback structures for organic lasers: modeling and experiment (Invited Paper)**, R. F. Mahrt, T. Stoeflerle, N. Moll, R. Harbers, IBM Zürich Research Lab. (Switzerland) [6655-24]

3:55 pm: **Loss processes in organic double-heterostructure laser diodes**, C. Gaertner, C. Karnutsch, U. Lemmer, Univ. Karlsruhe (Germany) ... [6655-26]

4:10 pm: **Towards an electrically driven organic laser**, B. Wallikewitz, D. Hertel, K. Meerholz, Univ. zu Köln (Germany) [6655-27]

4:25 pm: **Polymer lasers: recent advances (Invited Paper)**, T. J. Riedl, T. Rabe, P. Görrn, Technische Univ. Braunschweig (Germany); T. Weinmann, J. Wang, P. Hinze, Physikalisch-Technische Bundesanstalt (Germany); F. Galbrecht, U. Scherf, Bergische Univ. Wuppertal (Germany); W. Kowalsky, Technische Univ. Braunschweig (Germany) [6655-29]

4:50 pm: **Diode-pumped polymer lasers**, G. A. Turnbull, A. E. Vasdekis, G. Tsiminis, I. D. W. Samuel, Univ. of St. Andrews (United Kingdom) ... [6655-30]

Tuesday 28 August

Solid State Lighting and OLEDs Plenary Session

Conv. Ctr. 32 A/B 8:30 to 10:00 am

8:30 am: Solid State Lighting: Illumination and Communication (Invited Paper, Presentation Only), I. E. Ashdown, Senior Research Scientist for TIR Systems Ltd. (Canada) and Senior Software Engineer for Lighting Analysts Inc. and President of by.Heart Consultants Ltd. (Canada)

9:15 am: Organic LEDs for Lighting Applications (Invited Paper, Presentation Only), J. Kido, Professor, Yamagata Univ. (Japan) and General Director, Research Institute for Organic Electronics (Japan)

See pg. 19-20 for presentation overviews.

Coffee Break 10:00 to 10:30 am

SESSION 8

Conv. Ctr. 32A/B Tues. 10:30 am to 12:10 pm

OLEDs and Solid State Lighting

Joint Session with Conference 6669: Seventh International Conference on Solid State Lighting

Chair: **Hideyuki Murata**, Japan Advanced Institute of Science and Technology (Japan)

10:30 am: **Employing microcavity effects to enhance performances of white-emitting OLEDs (Invited Paper)**, C. Wu, Y. Lu, T. Cho, National Taiwan Univ. (Taiwan) [6655-31]

10:55 am: **InGaN based high efficiency light emitting diode (Invited Paper)**, E. Park, S. Jeon, C. Kim, D. Kim, J. Park, Epivalley Co., Ltd. (South Korea) [6669-15]

11:20 am: **Low-cost manufacturing processes for OLEDs (Invited Paper)**, J. Liu, C. Ye, L. N. Lewis, A. R. Duggal, GE Global Research [6655-32]

11:45 am: **Circadian photoreception and the use of physiologically adaptive LEDs (PALs) to treat dysfunctions of the circadian system (Invited Paper)**, G. Tosini, Morehouse School of Medicine; I. T. Ferguson, Georgia Institute of Technology [6669-21]

Lunch/Exhibition Break 12:10 to 1:15 pm

Conference 6655 • Conv. Ctr. 32A/B

SESSION 9

Conv. Ctr. 32A/B Tues. 1:15 to 3:00 pm

OLED Lighting

Chair: Jie Liu, GE Global Research

- 1:15 pm: **Super-flexible electroluminescent systems for both white light and near-infrared illumination (Invited Paper)**, E. A. Bruton, P. J. Kinlen, F. Doering, Crosslink [6655-33]
- 1:40 pm: **Improving the light extraction efficiency of polymer LEDs using microcavities and photonic crystals (Invited Paper)**, D. G. Lidzey, The Univ. of Sheffield (United Kingdom) [6655-34]
- 2:05 pm: **Concepts for high efficient white OLEDs for lighting applications (Invited Paper)**, A. Hunze, S. Seidel, R. Krause, O. Weiss, C. Chiu, G. Schmid, F. Kozlowski, Siemens AG (Germany); W. Kowalsky, H. Johannes, J. Meyer, M. Kröger, Technische Univ. Braunschweig (Germany); T. D. Dobbertin, OSRAM Opto Semiconductors GmbH (Germany) [6655-35]
- 2:30 pm: **White phosphorescent organic light emitting devices**, B. W. D'Andrade, Universal Display Corp. [6655-36]
- 2:45 pm: **Light extraction for a doubly resonant cavity organic LED: the RC2LED**, P. Vandersteegen, S. Mladenovski, Univ. Gent (Belgium); V. van Elsbergen, G. Gaertner, Philips Research Labs. (Germany); P. Bienstman, K. Neyts, R. G. Baets, Univ. Gent (Belgium) [6655-37]
- Coffee Break 3:00 to 3:30 pm

SESSION 10

Conv. Ctr. 32A/B Tues. 3:30 to 5:25 pm

Light-Emission in Organic Structures and Field-Effect Transistors

Chair: Chung-Chih Wu, National Taiwan Univ. (Taiwan)

- 3:30 pm: **Molecular organization in organic thin films employed as active layers in light-emitting transistors (Invited Paper)**, M. Muccini, Istituto per lo Studio dei Materiali Nanostrutturati (Italy) [6655-07]
- 3:55 pm: **Where is the dipole?: measuring and optimizing the emissive dipole distribution in polymeric OLEDs**, M. C. Gather, A. Köhnen, K. Meerholz, Univ. zu Köln (Germany) [6655-39]
- 4:10 pm: **Ambipolar organic field effect transistor aiming for efficient electroluminescence (Invited Paper)**, C. Adachi, M. Yahiro, T. Sakanoue, H. Nakanotani, Kyushu Univ. (Japan) [6655-23]
- 4:35 pm: **Organic light-emitting transistors containing laterally arranged heterojunction (Invited Paper)**, Y. Liu, Institute of Chemistry (China) [6655-21]
- 5:00 pm: **Unraveling organic optoelectronic device function on the single molecule level (Invited Paper)**, J. M. Lupton, The Univ. of Utah ... [6655-42]

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

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- ✓ **Optical gain in Coumarin 545T doped Tris (8-hydroxy-chinolinato)aluminium thin films**, T. Rabe, P. Görrn, T. J. Riedl, W. Kowalsky, Technische Univ. Braunschweig (Germany) [6655-28]
- ✓ **White light-emitting organic electroluminescent device base on a new orange organometallic iridium complexes**, T. Shieh, H. Huang, P. Liu, M. Tseng, J. Liu, Industrial Technology Research Institute (Taiwan) .. [6655-46]
- ✓ **Optical characteristics of the OLED with microlens array film attachment**, H. Lin, J. Lee, National Taiwan Univ. (Taiwan); M. Wei, National Dong Hwa Univ. (Taiwan); K. Chen, S. Hsu, Y. Ho, C. Lin, National Taiwan Univ. (Taiwan) [6655-49]
- ✓ **Oscillation method for uniform formation of solution-processed organic films and its application to organic light-emitting devices**, T. Kitano, S. Naka, M. Shibata, H. Okada, Univ. of Toyama (Japan) [6655-50]
- ✓ **Influence of cavity effects on light out-coupling efficiency in organic light emitting devices**, J. Lee, K. Roy-Choudhury, F. So, Univ. of Florida [6655-51]
- ✓ **Novel strategies for the fabrication of solution processed multilayer OLEDs: oxetane crosslinking without photoacid**, A. Köhnen, N. Riegel, D. C. Müller, K. Meerholz, Univ. zu Köln (Germany) [6655-52]
- ✓ **Lasing characteristics of optically-pumped edge-emitting organic semiconductor laser**, H. Yamaoka, S. N. Takahashi, M. Shibamoto, Keio Univ. (Japan) [6655-53]
- ✓ **New conjugated polymer (PININE) with stability for LEDs**, S. Song, Y. Jin, K. Kim, J. Kim, S. Kim, Pusan National Univ. (South Korea); J. Kim, Univ. of California/Santa Barbara and Pusan National Univ. (South Korea); S. Park, Pusan National Univ. (South Korea); K. Lee, Gwangju Institute of Science and Technology (South Korea); H. Suh, Pusan National Univ. (South Korea) [6655-54]
- ✓ **Exclusive inkjet printed poly(3,4-ethylenedioxythiophene): polystyrenesulfonate as anode in polymer light-emitting diodes**, W. Chou, S. Lin, M. Chang, J. Horng, H. Cheng, National Cheng Kung Univ. (Taiwan) [6655-55]
- ✓ **A gas barrier film composed of SiO₂/Al₂O₃ multilayers on flexible substrates**, J. Liao, P. Liu, Y. Yeh, M. Tseng, Industrial Technology Research Institute (Taiwan) [6655-56]
- ✓ **Studies of blue organic electroluminescent devices using the polymer/dopant systems as light-emitting layer**, F. Wu, H. Cheng, W. Chou, National Cheng Kung Univ. (Taiwan) [6655-57]
- ✓ **Carrier injection and bipolar transport in NPB for single-layer OLEDs**, S. Tse, K. Tsung, S. So, Hong Kong Baptist Univ. (Hong Kong China) [6655-58]
- ✓ **Live and let die of polymeric oxonium ions in multi-layer OLEDs**, P. Zacharias, M. C. Gather, K. Meerholz, Univ. zu Köln (Germany) .. [6655-59]
- ✓ **Numerical simulation of top-emitting organic light-emitting diodes with electron and hole blocking layers**, S. Chang, C. Yang, National Changhua Univ. of Education (Taiwan) [6655-60]

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- ✓ **Numerical simulation of bright white multilayer organic light-emitting diodes**, M. Chen, C. Yang, C. Wen, S. Chang, Y. Kuo, National Changhua Univ. of Education (Taiwan) [6655-61]
- ✓ **Light emission optimization of europium based complex in multilayer organic light emitting diodes**, G. Santos, F. J. Fonseca, A. M. Andrade, Univ. de São Paulo (Brazil); M. Peres, T. Monteiro, W. Santos, L. R. Pereira, Univ. de Aveiro (Portugal) [6655-62]
- ✓ **Electro-optical measurements, stability and physical carrier behavior of rare-earth based organic light emitting diodes**, G. Santos, F. J. Fonseca, A. M. Andrade, Univ. de São Paulo (Brazil); V. Deichmann, L. C. Ackelrud, Univ. Federal do Parana (Brazil); M. Peres, T. Monteiro, W. Santos, L. R. Pereira, Univ. de Aveiro (Portugal) [6655-63]
- ✓ **Improved lifetime and efficiency of green organic light-emitting diodes with a fluorescent dye (C545T)doped hole transport layer**, H. Bang, J. Yun, C. Lee, Seoul National Univ. (South Korea) [6655-64]
- ✓ **Tunable organic solid-state DFB laser utilizing molecular reorientation**, C. Wu, H. Cheng, H. Lin, K. Wong, C. Kuan, National Taiwan Univ. (Taiwan) [6655-65]
- ✓ **Surface properties of indium-tin-oxide anode by plasma treated for organic light emitting diodes**, C. Tseng, National Sun Yat-Sen Univ. (Taiwan) [6655-66]
- ✓ **Influence of thermal treatment on ITO surface and OLED performance**, C. Tseng, National Sun Yat-Sen Univ. (Taiwan) [6655-67]
- ✓ **Out-coupling enhancement of OLED using a nano-imprinted diffractive resistance layer**, J. Jang, K. Kim, J. Kim, T. Yoon, J. Kim, M. Oh, Pusan National Univ. (South Korea) [6655-68]
- ✓ **Transparent silver oxide anode by using oxygen plasma treatment for inverted top-emitting organic light-emitting diodes**, K. Hong, J. Lee, Pohang Univ. of Science and Technology (South Korea) [6655-69]

Wednesday 29 August

SESSION 11

Conv. Ctr. 32A/B Wed. 1:45 to 3:05 pm

Charge Injection and Transport in Organic Devices

Joint Session with Conference 6656: Organic Photovoltaics VIII

Chair: Kwanghee Lee, Gwangju Institute of Science and Technology (South Korea)

1:45 pm: **The role of isoelectronic dopants in organic light emitting diodes (Invited Paper)**, B. K. Crone, I. H. Campbell, D. L. Smith, Los Alamos National Lab. [6655-43]

2:10 pm: **Charge separation and transport in ZnO nanostructures/polymer:TiO₂ hybrid solar cell**, Y. Lin, T. Zeng, C. Chen, W. Su, National Taiwan Univ. (Taiwan) [6656-38]

2:25 pm: **Photopatternable liquid crystal materials for OLEDs and organic electronics (Invited Paper)**, A. J. Campbell, A. J. McGlashan, K. S. Whitehead, D. D. C. Bradley, Imperial College London (United Kingdom); D. M. Smilgies, G. G. Malliaras, Cornell Univ.; M. J. Heaney, W. Zhang, I. A. McCulloch, Merck Chemicals Ltd. (United Kingdom) [6655-73]

2:50 pm: **Charge transport and recombination in dendrimer-fullerene blends studied by time resolved microwave conductivity**, W. L. Rance, Colorado School of Mines; D. S. Ginley, N. Kopidakis, W. J. Mitchell, G. Rumbles, S. E. Shaheen, National Renewable Energy Lab. [6656-10]

Coffee Break 3:05 to 3:35 pm

SESSION 12

Conv. Ctr. 32A/B Wed. 3:35 to 5:20 pm

Interfaces in Organic Devices

Joint Session with Conference 6656: Organic Photovoltaics VIII

Chair: Mark A. Baldo, Massachusetts Institute of Technology

3:35 pm: **New insights on traditional concepts of interfaces in organic electronic devices (Invited Paper)**, C. S. Lee, City Univ. of Hong Kong (Hong Kong China) [6655-72]

4:00 pm: **Material and interface engineering for high efficiency light emitting devices (Invited Paper)**, A. K. - Jen, Univ. of Washington [6655-74]

4:25 pm: **Improved electron injection and enhanced performance in organic light emitting devices by successful doping with LiF**, K. Roy-Choudhury, J. Yoon, F. So, Univ. of Florida [6655-44]

4:40 pm: **Self-assembled monolayer modification of PEDOT: PSS interface to improve the device performance in polymer light-emitting diodes**, Y. Lee, T. Park, W. Jeon, J. Park, J. Kwon, J. Jang, Kyunghee Univ. (South Korea) [6655-45]

4:55 pm: **Role of intrinsic band-gap states for the energy level alignment at an organic-conductor interface (Invited Paper)**, N. Ueno, Chiba Univ. (Japan) [6656-17]

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Organic Photovoltaics VIII

Conference Chair: **Zakya H. Kafafi**, Naval Research Lab.

Cochair: **Christoph J. Brabec**, Konarka Austria (Austria)

Program Committee: **Homer Antoniadis**, InnovaLight, Inc.; **Rene A. J. Janssen**, Technische Univ. Eindhoven (Netherlands); **Bernard Kippelen**, Georgia Institute of Technology; **Paul A. Lane**, Naval Research Lab.; **Kwanghee Lee**, Gwangju Institute of Science and Technology (South Korea); **Peter Peumans**, Stanford Univ.; **Niyazi S. Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Sean E. Shaheen**, National Renewable Energy Lab.; **Yasuhiko Shirota**, Fukui Univ. of Technology (Japan); **Tetsuo Tsutsui**, Kyushu Univ. (Japan)

Co-sponsored by:



Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

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- ✓ **Carrier transport and photovoltaic properties of hybrid heterojunction polymer solar cells using GaN nanowire array**, C. Lin, C. Lin, J. Lee, K. Chen, L. Chen, National Taiwan Univ. (Taiwan) [6656-09]
- ✓ **Dye sensitized solar cells with a plastic counter electrode of poly(3,4-ethylene dioxythiophene)-poly(styrenesulfonate)**, A. Kanczurawska, E. Dobruchowska, A. Baranzahi, E. Carlegrim, A. Fahlman, M. Fahlman, Linköpings Univ. (Sweden); M. A. Girtu, Univ. Ovidius Constanta (Romania) [6656-13]
- ✓ **Solution processable small molecules with energy levels optimized for maximum open circuit voltage and absorption of the solar spectrum**, M. T. Lloyd, Cornell Univ.; J. E. Anthony, Univ. of Kentucky; G. G. Malliaras, Cornell Univ. [6656-27]
- ✓ **Dark and photovoltaic properties of p-CoPc/n-Si (Organic/Inorganic) heterojunction cells**, T. G. Abdel-Malik, Minia Univ. (Egypt); N. H. Abd El-Aziz, Alexandria Univ. (Egypt) [6656-29]
- ✓ **New bio-inorganic photo-electronic devices based on photosynthetic proteins**, N. Lebedev, Naval Research Lab.; A. Spano, Univ. of Virginia; S. A. Trammell, Naval Research Lab.; I. Griva, George Mason Univ.; S. Tsoi, J. Schnur, Naval Research Lab. [6656-31]
- ✓ **Light intensity dependent recombination at the anode in bulk-heterojunction solar cells**, A. J. Moulé, K. Meerholz, Univ. zu Köln (Germany) [6656-32]
- ✓ **Titania nanotube array based photovoltaic cells**, C. Yip, K. Cheung, A. B. Djuricic, W. Chan, The Univ. of Hong Kong (Hong Kong China) .. [6656-34]
- ✓ **The effect of hydrophobic absorbent for reducing charge recombination to improve dye-sensitized solar cell performance**, S. Chaiyuth, H. Ekkachart, S. Porponth, National Science and Technology Development Agency (Thailand) [6656-39]

- ✓ **Efficiency improvement of polymer solar cells by electron transport layers**, A. Colmann, J. Junge, D. Kohler, R. Webinger, C. Kayser, U. Lemmer, Univ. Karlsruhe (Germany) [6656-41]
- ✓ **Elucidating the aspect of phase separation in organic blends by means of thermal analysis**, A. Swinnen, Univ. Hasselt (Belgium); J. Zhao, G. Van Assche, Vrije Univ. Brussel (Belgium); D. J. M. Vanderzande, M. D'Olieslaeger, J. V. Manca, Univ. Hasselt (Belgium); B. Van Mele, Vrije Univ. Brussel (Belgium) [6656-42]
- ✓ **Cryscade(tm) n-peller based solar cells**, P. I. Lazarev, E. Morozov, B. Sanderson, Cryscade Solar Ltd. (Russia) [6656-43]
- ✓ **Efficient photovoltaic devices based on blends of fullerenes and radical salt-doped hole transporters**, S. Vaddiraju, M. K. Mathai, Univ. of Connecticut; E. Kymakis, Technological Education Institute-Crete (Greece); F. Papadimitrakopoulos, Univ. of Connecticut [6656-45]
- ✓ **Integrated spectroscopic approach to study low-absorbing spectral features in thin film, organic D/A blends for next generation solar cells**, L. J. Goris, Stanford Univ.; A. Poruba, A. Purkrt, M. Vanecek, Fyzikální Ústav (Czech Republic); K. Haenen, J. V. Manca, D. J. M. Vanderzande, Univ. Hasselt (Belgium) [6656-46]
- ✓ **Nanoscale control of donor/acceptor materials concentrations in polymeric photovoltaic devices**, M. Kaur, A. Gopal, R. M. Davis, Virginia Polytechnic Institute and State Univ.; M. Drees, B. Holloway, Luna Innovations, Inc.; J. R. Hefflin, Virginia Polytechnic Institute and State Univ. [6656-47]
- ✓ **Alternating current induced by interference pattern for investigation of photoelectric properties of bulk heterojunction polymer structure**, M. Espinosa, S. Mansurova, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); K. Meerholz, H. Lademann, Univ. zu Köln (Germany) [6656-48]
- ✓ **Hybrid ionic liquid and polymer electrolytes for nanocrystalline dye-sensitized TiO₂ solar cells**, A. F. Dalsin, M. De Paoli, A. F. Nogueira, Univ. Estadual de Campinas (Brazil); S. Passerini, W. Henderson, ENEA (Italy); C. Longo, Univ. Estadual de Campinas (Brazil) [6656-50]
- ✓ **Molecular morphological effects to optoelectronics**, S. Sun, Norfolk State Univ. [6656-51]
- ✓ **Oriented P3HT crystals in P3HT:PCBM solar cells**, A. C. Mayer, S. R. Scully, Stanford Univ.; M. F. Toney, Stanford Linear Accelerator Ctr.; M. D. McGehee, Stanford Univ. [6656-52]
- ✓ **DNA complex layer as a hole transport layer in P3HT/PCBM bulk heterojunction solar cells**, V. Kolachure, M. H. C. Jin, The Univ. of Texas at Arlington [6656-54]
- ✓ **Plasmon enhanced photovoltaic conversion efficiency in organic bulk heterojunction devices**, A. J. Morfa, Univ. of Colorado at Boulder; J. van de Lagemaat, National Renewable Energy Lab.; K. L. Rowlen, Univ. of Colorado at Boulder [6656-55]
- ✓ **Polymer optoelectronic devices with ion conductive layers**, J. Ouyang, National Univ. of Singapore (Singapore) [6656-56]
- ✓ **Enhanced optical absorption of organic materials via surface plasmon resonance in gold nanoparticles**, G. J. Su, C. Sue, National Taiwan Univ. (Taiwan) [6656-57]

Conference 6656 • Conv. Ctr. 32A/B

Wednesday 29 August

SESSION 1

Conv. Ctr. 32A/B Wed. 8:30 to 10:00 am

Optimized Structures for Organic Photovoltaics

Chair: **Zakya H. Kafafi**, Naval Research Lab.

8:30 am: **Air-stable, efficient polymer solar cells incorporating solution-processed titanium oxide layer (Invited Paper)**, K. Lee, Gwangju Institute of Science and Technology (South Korea); J. Kim, A. J. Heeger, Univ. of California/Santa Barbara [6656-01]

8:55 am: **Ordered structures for photovoltaic devices (Invited Paper)**, M. F. Durstock, T. Kang, Air Force Research Lab.; A. P. Smith, B. A. Minch, B. D. Pate, J. R. Deneault, B. E. Taylor, Universal Technology Corp. [6656-02]

9:20 am: **Organic tandem solar cells comprising polymer and small-molecule subcells**, A. Colmann, J. Silbereisen, J. Junge, C. Kayser, U. Lemmer, Univ. Karlsruhe (Germany) [6656-40]

9:35 am: **Optical considerations in bulk-heterojunction solar cells (Invited Paper)**, G. Dennler, K. Forberich, M. C. Scharber, C. J. Brabec, Konarka Austria (Austria); K. Hingerl, T. Fromherz, Johannes Kepler Univ. Linz (Austria) [6656-03]

Coffee Break 10:00 to 10:30 am

SESSION 2

Conv. Ctr. 32A/B Wed. 10:30 am to 12:05 pm

Solar Cells and Modules

Chair: **Michael F. Durstock**, Air Force Research Lab.

10:30 am: **Dye-sensitized solar cells with high efficiency (Invited Paper)**, S. Hayase, T. Kado, T. Kato, Kyushu Institute of Technology (Japan) ... [6656-04]

10:55 am: **Umbrella concepts for mesoporous photovoltaic (voltaic) solar**, M. T. Spittler, National Renewable Energy Lab. [6656-05]

11:10 am: **All screen printed dye solar cell modules (Invited Paper)**, T. B. Meyer, A. F. Meyer, A. Azam, Solaronix SA (Switzerland) [6656-06]

11:35 am: **Development of new efficient Ru dyes having β -diketonate and terpyridine ligands for solar cells**, H. Arakawa, N. Shibayama, M. Nakade, T. Yamaguchi, Y. Abe, Tokyo Univ. of Science (Japan) [6656-07]

11:50 am: **CMOS color image sensor with overlaid organic photoelectric conversion layers having narrow absorption band: depression of dark current**, M. Ihama, M. Hayashi, Y. Maehara, T. Mitsui, S. Takada, Fuji Photo Film Co., Ltd. (Japan) [6656-36]

Lunch/Exhibition Break 12:05 to 1:45 pm

SESSION 3

Conv. Ctr. 32A/B Wed. 1:45 to 3:05 pm

Charge Injection and Transport in Organic Devices

Joint Session with Conference 6655: Organic Light Emitting Materials and Devices XI

Chair: **Kwanghee Lee**, Gwangju Institute of Science and Technology (South Korea)

1:45 pm: **The role of isoelectronic dopants in organic light emitting diodes (Invited Paper)**, B. K. Crone, I. H. Campbell, D. L. Smith, Los Alamos National Lab. [6655-43]

2:10 pm: **Charge separation and transport in ZnO nanostructures/polymer:TiO₂ hybrid solar cell**, Y. Lin, T. Zeng, C. Chen, W. Su, National Taiwan Univ. (Taiwan) [6656-38]

2:25 pm: **Photopatternable liquid crystal materials for OLEDs and organic electronics (Invited Paper)**, A. J. Campbell, A. J. McGlashan, K. S. Whitehead, D. D. C. Bradley, Imperial College London (United Kingdom); D. M. Smilgies, G. G. Malliaras, Cornell Univ.; M. J. Heeney, W. Zhang, I. A. McCulloch, Merck Chemicals Ltd. (United Kingdom) [6655-73]

2:50 pm: **Charge transport and recombination in dendrimer-fullerene blends studied by time resolved microwave conductivity**, W. L. Rance, Colorado School of Mines; D. S. Ginley, N. Kopidakis, W. J. Mitchell, G. Rumbles, S. E. Shaheen, National Renewable Energy Lab. [6656-10]

Coffee Break 3:05 to 3:35 pm

SESSION 4

Conv. Ctr. 32A/B Wed. 3:35 to 5:20 pm

Interfaces in Organic Devices

Joint Session with Conference 6655: Organic Light Emitting Materials and Devices XI

Chair: **Mark A. Baldo**, Massachusetts Institute of Technology

3:35 pm: **New insights on traditional concepts of interfaces in organic electronic devices (Invited Paper)**, C. S. Lee, City Univ. of Hong Kong (Hong Kong China) [6655-72]

4:00 pm: **Material and interface engineering for high efficiency light emitting devices (Invited Paper)**, A. K. - Jen, Univ. of Washington [6655-74]

4:25 pm: **Improved electron injection and enhanced performance in organic light emitting devices by successful doping with LiF**, K. Roy-Choudhury, J. Yoon, F. So, Univ. of Florida [6655-44]

4:40 pm: **Self-assembled monolayer modification of PEDOT: PSS interface to improve the device performance in polymer light-emitting diodes**, Y. Lee, T. Park, W. Jeon, J. Park, J. Kwon, J. Jang, Kyunghee Univ. (South Korea) [6655-45]

4:55 pm: **Role of intrinsic band-gap states for the energy level alignment at an organic-conductor interface (Invited Paper)**, N. Ueno, Chiba Univ. (Japan) [6656-17]

Thursday 30 August

SESSION 5

Conv. Ctr. 32A/B Thurs. 8:40 to 10:00 am

Electronic Properties and Processes

Chair: **Christoph J. Brabec**, Konarka Austria (Austria)

8:40 am: **Toward singlet fission for excitonic solar cells (Invited Paper)**, J. Michl, Univ. of Colorado at Boulder; A. J. Nozik, National Renewable Energy Lab.; X. Chen, Univ. of Colorado at Boulder; J. C. Johnson, National Renewable Energy Lab.; G. Rana, A. Akdag, A. F. Schwerin, Univ. of Colorado at Boulder [6656-14]

9:05 am: **Time-resolved microwave conductivity studies of polymer: fullerene blends (Invited Paper)**, G. Rumbles, A. Ferguson, X. Ai, N. Kopidakis, S. E. Shaheen, National Renewable Energy Lab.; J. P. P. Piris, Technische Univ. Delft (Netherlands); M. C. Beard, R. J. Ellingson, T. J. McDonald, M. J. Heben, National Renewable Energy Lab. [6656-15]

9:30 am: **Efficient thin-film organic solar cells containing low band gap oligothiophenes: tailored heterojunctions with fullerene as studied by photoinduced absorption**, R. Schueppel, Technische Univ. Dresden (Germany); K. Schmidt, Georgia Institute of Technology; C. L. Uhrich, K. Schulze, D. Wynands, Technische Univ. Dresden (Germany); J. Brédas, Georgia Institute of Technology; B. Maennig, Technische Univ. Dresden (Germany); M. P. Pfeiffer, Heliatek GmbH (Germany); K. Leo, Technische Univ. Dresden (Germany); E. Brier, E. Reinold, P. Baeuerle, Univ. Ulm (Germany) ... [6656-19]

9:45 am: **Electrical and photoelectrical properties of nickel phthalocyanine photovoltaic cells**, T. G. Abdel-Malik, Minia Univ. (Egypt); A. H. Elsayed, Alexandria Univ. (Egypt) [6656-30]

Coffee Break 10:00 to 10:30 am

Conference 6656 • Conv. Ctr. 32A/B

SESSION 6

Conv. Ctr. 32A/B Thurs. 10:30 am to 12:05 pm

Energy Transfer and Exciton Diffusion

Chair: Paul A. Lane, Naval Research Lab.

10:30 am: **Surface plasmon polariton mediated energy transfer in organic photovoltaic devices (Invited Paper)**, M. Baldo, T. Heidel, J. Mapel, K. Celebi, M. Currie, Massachusetts Institute of Technology [6656-18]

10:55 am: **In situ investigation of exciton diffusion in organic semiconductors (Invited Paper)**, X. Hou, Fudan Univ. (China) [6656-58]

11:20 am: **Polythiophene:fullerene solar cells: strongly carrier dependent bimolecular recombination rate constants measured by combined transient absorption and transient photovoltage experiments on complete cells under bias illumination**, C. G. Shuttle, B. C. O'Regan, A. M. Ballantyne, J. C. de Mello, J. R. Durrant, Imperial College London (United Kingdom) [6656-20]

11:35 am: **Effects of geminate and bimolecular recombination on organic PV: limiting factors to the maximum efficiency**, S. R. Scully, A. C. Mayer, Stanford Univ.; B. C. Thompson, J. M. J. Frechet, Univ. of California/Berkeley; M. D. McGehee, Stanford Univ. [6656-21]

11:50 am: **Photovoltaic devices of polymer and alkanethiol modified ZnO**, T. C. Monson, D. C. Olson, N. C. Archuleta, J. W. P. Hsu, Sandia National Labs. [6656-33]

Lunch/Exhibition Break 12:05 to 1:15 pm

SESSION 7

Conv. Ctr. 32A/B Thurs. 1:15 to 3:05 pm

Bulk Heterojunction Solar Cells

Chair: Garry Rumbles, National Renewable Energy Lab.

1:15 pm: **Formation of new bulk-heterojunction structure in organic thin film solar cells (Invited Paper)**, M. Matsumura, Osaka Univ. (Japan) [6656-22]

1:40 pm: **Improvement of low light efficiency of bulk heterojunction devices with respect to first applications**, C. Waldauf, G. Dennler, C. J. Brabec, M. C. Scharber, M. F. Morana, M. Koppe, P. Denk, H. Egelhaaf, T. Ameri, K. Forberich, Konarka Austria (Austria) [6656-23]

1:55 pm: **Interface control in heterojunction photovoltaic cells by polymer phase separation processes**, J. Heier, EMPA (Switzerland); F. A. Castro, Univ. de São Paulo (Brazil); F. A. Nüesch, R. Hany, EMPA (Switzerland) ... [6656-24]

2:10 pm: **Optimization of conjugated polymer/nanostructured ZnO photovoltaic devices**, D. C. Olson, Y. Lee, E. D. Spoecke, Sandia National Labs.; M. S. White, S. E. Shaheen, D. S. Ginley, National Renewable Energy Lab.; J. A. Voigt, J. W. P. Hsu, Sandia National Labs. [6656-25]

2:25 pm: **Integrated organic photovoltaic modules**, W. J. Potscavage, S. Yoo, B. Dornier, J. Kim, J. Holt, B. Kippelen, Georgia Institute of Technology [6656-53]

2:40 pm: **In-depth investigation of P3HT:PCBM solar cells (Invited Paper)**, K. Meerholz, A. J. Moulé, J. Bonekamp, H. Lademann, Univ. zu Köln (Germany) [6656-11]

Coffee Break 3:05 to 3:30 pm

SESSION 8

Conv. Ctr. 32A/B Thurs. 3:30 to 5:20 pm

Processable and Low Band Gap Materials for OPVs

Chair: Yasuhiko Shirota, Fukui Univ. of Technology (Japan)

3:30 pm: **Photovoltaic devices from water-soluble conjugated polymers (Invited Paper)**, T. T. Nguyen, J. Yang, Univ. of California/Santa Barbara [6656-26]

3:55 pm: **Organic photovoltaics based on solution-processed benzoporphyrin**, Y. Sato, T. Niinomi, M. Hashiguchi, Y. Matsuo, E. Nakamura, The Univ. of Tokyo (Japan) [6656-44]

4:10 pm: **Synthesis and properties of novel thiophene-based low band gap materials for organic solar cells (Invited Paper)**, P. Baeuerle, Univ. Ulm (Germany) [6656-28]

4:35 pm: **Advances in Plexcore™ active layer technology systems for organic photovoltaics: a more efficient alternative to P3HT:PCBM**, D. Laird, S. Williams, T. D. Hammond, M. Mathai, Plextronics Inc. [6656-12]

4:50 pm: **Fabrication of low band-gap polymer solar cells using chemical vapor deposition polymerization**, C. Lee, M. H. C. Jin, The Univ. of Texas at Arlington [6656-49]

5:05 pm: **High open-circuit-voltage organic solar cell based on two solution-processable triphenylamine-containing compounds**, Y. Li, Institute of Chemistry (China) [6656-35]

Courses of Related Interest

See SPIE Cashier for information.

SC797 The Science and Technology of Organic Solar Cells
(Peumans) Tuesday 28, 1:30 - 5:30 pm

Conference 6657 • Conv. Ctr. 31C

Tuesday 28 August 2007 • Proceedings of SPIE Vol. 6657

Organic 3D Photonics Materials and Devices

Conference Chair: **Susanna Orlic**, Technische Univ. Berlin (Germany)

Cochair: **Klaus Meerholz**, Univ. zu Köln (Germany)

Program Committee: **Eunyoung Kim**, Yonsei Univ. (South Korea); **Robert R. McLeod**, Univ. of Colorado/Boulder; **David A. Waldman**, DCE Aprilis, Inc.; **William L. Wilson**, InPhase Technologies

Tuesday 28 August

SESSION 1

Conv. Ctr. 31C Tues. 8:30 to 10:00 am

Materials I

Chair: **Klaus Meerholz**, Univ. zu Köln (Germany)

8:30 am: **Holographic assembly of nanoparticles in polymers for 3D recording and patterning (Invited Paper)**, Y. Tomita, N. Suzuki, Y. Endoh, S. Kurozumi, M. Miki, Univ. of Electro-Communications (Japan); K. Chikama, Nissan Chemical Industries, Ltd. (Japan) [6657-01]

9:00 am: **Impact of inhibitor diffusion in holographic photopolymers**, R. R. McLeod, Univ. of Colorado at Boulder [6657-02]

9:20 am: **New composite blue sensitive materials for high resolution optical data storage**, L. Criante, F. Vita, R. Castagna, D. E. Lucchetta, Univ. Politecnica delle Marche (Italy) and CNISM (Italy); S. Frohmann, T. Feid, Technische Univ. Berlin (Germany); F. F. Simoni, Univ. Politecnica delle Marche (Italy); S. Orlic, Technische Univ. Berlin (Germany) [6657-03]

9:40 am: **Determination of the microstructure-defect concentration relationship by high sensitive optical spectroscopy**, L. J. Goris, L. H. Jimison, A. Salleo, Stanford Univ. [6657-04]

Coffee Break 10:00 to 10:40 am

SESSION 2

Conv. Ctr. 31C Tues. 10:40 to 11:50 am

Applications I

Chair: **Susanna Orlic**, Technische Univ. Berlin (Germany)

10:40 am: **Depth multiplexing of microgratings for multilayer optical disk (Invited Paper)**, E. Dietz, T. Feid, S. Frohmann, J. Gortner, J. Rass, S. Orlic, Technische Univ. Berlin (Germany) [6657-05]

11:10 am: **Non-volatile holographic data storage media based on dye-doped thermoplastic**, C. Erben, X. Shi, E. P. Boden, K. L. Longley, B. L. Lawrence, GE Global Research [6657-06]

11:30 am: **Advanced imaging using photorefractive polymers**, K. Meerholz, M. F. Salvador, S. Köber, J. Pauzner, Univ. zu Köln (Germany) [6657-08]

Lunch Break 11:50 am to 1:30 pm

SESSION 3

Conv. Ctr. 31C Tues. 1:30 to 3:00 pm

Materials II

Chair: **Robert R. McLeod**, Univ. of Colorado/Boulder

1:30 pm: **Rewritable FRET-based two-photon 3D optical data storage (Invited Paper)**, K. D. Belfield, Z. Huang, C. C. Corredor, Univ. of Central Florida [6657-09]

2:00 pm: **Chemical photostructuring in iodoform-doped carbazolic copolymers for holographic recording**, B. Mailhot, A. Rivaton, Univ. Blaise Pascal (France); E. Chilat, S. V. Robu, State Univ. of Chisinau (Moldova); L. Frezet, M. Bolte, Univ. Blaise Pascal (France) [6657-10]

2:20 pm: **Photopolymers containing photo functional dyes for holographic recording**, E. Kim, H. Oh, Yonsei Univ. (South Korea) [6657-11]

2:40 pm: **Characterization of photoelectric properties of photorefractive PF6-TPD based composite by non-steady-state photo-EMF technique**, M. Espinosa, S. Mansurova, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); S. Köber, K. Meerholz, Univ. zu Köln (Germany) [6657-12]

Coffee Break 3:00 to 3:40 pm

SESSION 4

Conv. Ctr. 31C Tues. 3:40 to 4:40 pm

Applications II

Chair: **Enrico Dietz**, Technische Univ. Berlin (Germany)

3:40 pm: **Improved outcoupling in OLEDs by direct holographic patterning**, M. de la Rosa, K. Meerholz, Univ. zu Köln (Germany) [6657-13]

4:00 pm: **3D nano and micro structuration of polymer nanocomposites for optical sensing and image processing**, S. Orlic, H. Markötter, C. Mueller, C. Rauch, A. Schloesser, Technische Univ. Berlin (Germany) [6657-14]

4:20 pm: **3D waveguides with fiber couplers and 90 degree bends in holographic photopolymer**, R. R. McLeod, Univ. of Colorado at Boulder [6657-16]

Conference 6657 • Conv. Ctr. 31C

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Tuesday. Poster presenters who have not set up by 5:00 pm on Tuesday 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.

- ✓ **Photopolymer composites containing s-triazine diepoxy monomers for holographic recording storage**, E. Kim, J. H. Kim, K. Rameshbabu, B. D. Sarwade, Yonsei Univ. (South Korea) [6657-17]
- ✓ **Sugar holograms with artificial organic colorants**, N. Mejías Brizuela, A. Olivares-Pérez, M. d. I. P. Hernández Garay, I. Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-18]
- ✓ **Sugar holograms with erioglaucine and tartrazine**, N. Mejías Brizuela, A. Olivares-Pérez, G. P. Páez-Trujillo, I. Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-19]
- ✓ **Fluorescence modulation of photochromic diarylethene**, S. I. Yang, K. H. Ahn, Y. C. Jeong, S. Kim, Kyung Hee Univ. (South Korea) [6657-20]
- ✓ **Synthesis and characterization of sulfur-oxidized diarylethenes**, K. H. Ahn, S. I. Yang, Kyung Hee Univ. (South Korea); Y. C. Jeong, Kyung Hee Univ. (South Korea); S. Kim, Kyung Hee Univ. (South Korea) [6657-21]
- ✓ **Adaptive detection of rough surface displacement using non-steady-state photo-EMF effect in photorefractive polymers**, P. Rodríguez, S. Mansurova, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); S. Köber, K. Meerholz, Univ. zu Köln (Germany) [6657-22]
- ✓ **Holograms recorded in organic dye-sensitized dichromate gelatin**, G. P. Páez-Trujillo, A. Olivares-Pérez, N. Mejías-Brizuela, M. P. Hernández-Garay, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-23]
- ✓ **Hologram with dichromated polyvinyl alcohol and natural colorant**, G. P. Páez-Trujillo, A. Olivares-Pérez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); E. Amigón-de León, Instituto Tecnológico Superior de Atlixco (Mexico); M. P. Hernández-Garay, I. Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-24]
- ✓ **Electro-optical characteristics of holographic gratings in real time with voltage applied**, R. Fontanilla-Urdaneta, M. P. Hernández-Garay, A. Olivares-Pérez, G. P. Páez-Trujillo, I. Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-25]
- ✓ **Diffraction efficiencies comparison of holographic gratings in PVA with metallic chlorides**, M. d. I. P. Hernández Garay, A. Olivares-Pérez, R. Baltasar-Arroyo, N. Mejías-Brizuela, I. Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-26]
- ✓ **Polarization analysis of holographic gratings recorded in organic conductive materials**, R. Fontanilla-Urdaneta, M. P. Hernández-Garay, A. Olivares-Pérez, G. P. Páez-Trujillo, I. Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6657-27]

Conference 6658 • Conv. Ctr. 31B

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6658

Organic Field-Effect Transistors VI

Conference Chairs: **Zhenan Bao**, Stanford Univ.; **David J. Gundlach**, National Institute of Standards and Technology

Program Committee: **Kilwon Cho**, Pohang Univ. of Science and Technology (South Korea); **Dean M. DeLongchamp**, National Institute of Standards and Technology; **C. Daniel Frisbie**, Univ. of Minnesota; **Thomas N. Jackson**, The Pennsylvania State Univ.; **Hagen Klauk**, Max-Planck-Institut für Festkörperforschung (Germany); **Sang Yoon Lee**, SAMSUNG Advanced Institute of Technology (South Korea); **Iain A. McCulloch**, Merck Chemicals Ltd. (United Kingdom); **Alberto Salleo**, Stanford Univ.; **Takao Someya**, The Univ. of Tokyo (Japan)

Sunday 26 August

SESSION 1

Conv. Ctr. 31B Sun. 8:30 to 10:10 am

Circuits and Displays

Chair: **Thokchom B. Singh**, Johannes Kepler Univ. Linz (Austria)

8:30 am: **Organic transistors and associated building blocks for smart labels and active-matrix displays (Invited Paper)**, G. H. Gelinck, TNO (Netherlands); J. Genoe, P. L. Heremans, IMEC (Belgium); D. M. De Leeuw, Philips Research Labs. (Netherlands) [6658-01]

8:55 am: **Organic thin-film transistor array for active-matrix organic light emitting diode (Invited Paper)**, S. Y. Lee, SAMSUNG Advanced Institute of Technology (South Korea) [6658-02]

9:20 am: **13.56MHz polymer rectifier by printing processes (Invited Paper)**, J. Hou, C. Lin, C. Chou, J. Hou, Y. Chan, Industrial Technology Research Institute (Taiwan) [6658-03]

9:45 am: **Contactless position sensing using printed organic transistors for power transmission sheets (Invited Paper)**, T. Someya, The Univ. of Tokyo (Japan) [6658-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 31B Sun. 10:40 to 11:50 am

Gate Dielectrics and Contacts

Chair: **John E. Anthony**, Univ. of Kentucky

10:40 am: **Using contacts to induce order and high mobility in solution processed organic TFTs**, D. J. Gundlach, J. Royer, B. H. Hamadani, L. C. Teague, C. A. Richter, J. G. Kushmerick, L. J. Richter, National Institute of Standards and Technology; S. Subramanian, J. E. Anthony, Univ. of Kentucky; S. K. Park, O. D. Jurchescu, T. N. Jackson, The Pennsylvania State Univ. [6658-24]

10:55 am: **High performance organic field-effect transistors with fluoropolymer gate dielectric**, W. L. Kalb, T. Mathis, S. Haas, A. F. Stassen, B. Batlogg, ETH Zürich (Switzerland) [6658-06]

11:10 am: **Low-temperature inorganic dielectrics for thin-film transistors made with semiconducting polymers**, M. L. Chabinyc, R. Lujan, F. Endicott, Palo Alto Research Ctr., Inc.; M. J. Heeney, I. A. McCulloch, Merck Chemicals Ltd. (United Kingdom) [6658-07]

11:25 am: **Metal interfaces in organic field effect transistors based on perylene derivatives (Invited Paper)**, D. R. T. Zahn, Technische Univ. Chemnitz (Germany) [6658-08]

Lunch Break 11:50 am to 1:30 pm

SESSION 3

Conv. Ctr. 31B Sun. 1:30 to 3:15 pm

Charge Transport

Chair: **David J. Gundlach**, National Institute of Standards and Technology

1:30 pm: **Microscopic charge transport mechanisms in high-mobility conjugated polymers (Invited Paper)**, J. Chang, J. Clark, N. Zhao, H. Sirringhaus, Univ. of Cambridge (United Kingdom); D. W. Breiby, J. W. Andreasen, Risø National Lab. (Denmark); M. M. Nielsen, Københavns Univ. (Denmark); M. Giles, M. J. Heeney, I. A. McCulloch, Merck Chemicals Ltd. (United Kingdom) [6658-09]

1:55 pm: **Insulator-to-metal transition in conjugated polymer field-effect transistors (Invited Paper)**, D. A. Moses, Univ. of California/Santa Barbara [6658-10]

2:20 pm: **Determination of the density of trap states in organic thin film transistors**, F. Yan, The Hong Kong Polytechnic Univ. (Hong Kong China) [6658-11]

2:35 pm: **Charge transport mechanisms in organic and microcrystalline silicon field-effect transistors (Invited Paper)**, S. J. Konezny, École Polytechnique Fédérale de Lausanne (Switzerland); M. Bussac, École Polytechnique (France); L. Zuppiroli, École Polytechnique Fédérale de Lausanne (Switzerland) [6658-12]

3:00 pm: **Current conduction in ambipolar organic field-effect transistor (OFET)**, H. L. Kwok, Univ. of Victoria (Canada) [6658-13]

Coffee Break 3:15 to 3:45 pm

SESSION 4

Conv. Ctr. 31B Sun. 3:45 to 5:30 pm

Organic Crystals

Chair: **Daniel A. Moses**, Univ. of California/Santa Barbara

3:45 pm: **High-mobility organic transistors (Invited Paper)**, T. T. M. Palstra, Univ. of Groningen (Netherlands); O. D. Jurchescu, National Institute of Standards and Technology; A. Arkenbout, Univ. of Groningen (Netherlands) [6658-14]

4:10 pm: **Modification of charge transport in single crystal rubrene (Invited Paper)**, O. Mitrofanov, Lucent Technologies/Bell Labs.; D. V. Lang, Columbia Univ.; T. Siegrist, Lucent Technologies/Bell Labs.; W. So, Columbia Univ.; C. Kloc, A. P. Ramirez, Lucent Technologies/Bell Labs. [6658-15]

4:35 pm: **Photo-induced phenomena in single-crystal organic field-effect transistors (Invited Paper)**, M. Calhoun, C. Hsieh, M. E. Gershenson, V. Podzorov, Rutgers Univ. [6658-16]

5:00 pm: **Fabrication of single crystal transistor arrays**, Z. Bao, Stanford Univ. [6658-17]

5:15 pm: **Cast assembly single crystalline nanoribbons of organic semiconductors for high performance field-effect transistors**, W. Hu, Institute of Chemistry (China) [6658-18]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6658 • Conv. Ctr. 31B

Monday 27 August

SESSION 5

Conv. Ctr. 31B Mon. 8:20 to 10:00 am

Molecular Design

Chair: Antonio F. Facchetti, Northwestern Univ.

8:20 am: **Predicting the growth habit and properties of organic semiconducting thin films (Invited Paper)**, P. Clancy, Cornell Univ.; M. Haran, Intel Corp.; J. Goose, Cornell Univ. [6658-19]

8:45 am: **Crystal design for soluble organic semiconductors (Invited Paper)**, J. E. Anthony, Univ. of Kentucky [6658-20]

9:10 am: **Semiconducting polythiophenes: synthesis and structure property relationships (Invited Paper)**, M. J. Heeney, B. Clare, R. Hamilton, I. A. McCulloch, M. N. Shkunov, D. Sparrowe, S. Tierney, W. Zhang, Merck Chemicals Ltd. (United Kingdom); M. L. Chabiny, Palo Alto Research Ctr., Inc.; D. M. DeLongchamp, R. J. Kline, National Institute of Standards and Technology [6658-21]

9:35 am: **High performance n-type FETs based on heterocyclic ring systems with trifluoromethylphenyl groups (Invited Paper)**, Y. Yamashita, Tokyo Institute of Technology (Japan) [6658-22]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 31B Mon. 10:30 am to 12:10 pm

OTFTs I

Chair: Takao Someya, The Univ. of Tokyo (Japan)

10:30 am: **In-situ TEM study of pentacene film morphology**, J. A. DeFranco, R. Ilic, G. G. Malliaras, Cornell Univ. [6658-23]

10:45 am: **Microstructural mobility of the polymeric gate insulator affecting pentacene charge transport (Invited Paper)**, A. F. Facchetti, C. Kim, M. J. Tobin, Northwestern Univ. [6658-05]

11:10 am: **Fast response ion gel gated polymer thin-film transistors**, J. Lee, J. H. Cho, B. Kim, Y. He, T. P. Lodge, C. D. Frisbie, Univ. of Minnesota [6658-25]

11:25 am: **Organic phototransistor behavior and light-accelerated bias stress**, M. Debucquoy, S. Verlaak, K. Myny, S. Steudel, J. Genoe, P. L. Heremans, IMEC (Belgium) [6658-26]

11:40 am: **High mobility solution-processed n-channel organic thin film transistors**, H. Yan, A. F. Facchetti, Polyera Corp. [6658-27]

11:55 am: **High performance organic field-effect transistors (OFETs) using high- κ dielectrics grown by atomic layer deposition (ALD)**, X. Zhang, B. Domezq, S. Yoo, X. Wang, Z. Wang, B. Kippelen, Georgia Institute of Technology [6658-28]

Lunch Break 12:10 to 1:30 pm

SESSION 7

Conv. Ctr. 31B Mon. 1:30 to 3:00 pm

OTFTs II

Chair: Kilwon Cho, Pohang Univ. of Science and Technology (South Korea)

1:30 pm: **N-channel field-effect transistors and ring oscillators based on epitaxially grown C₆₀ fullerene films**, T. B. Singh, N. S. Sariciftci, Johannes Kepler Univ. Linz (Austria); H. Yang, Rensselaer Polytechnic Institute; L. Yang, Brookhaven National Lab.; H. Sitter, B. Plockberger, Johannes Kepler Univ. Linz (Austria); T. Anthopoulos, Imperial College London (United Kingdom); M. Cölle, D. M. De Leeuw, Philips Research Labs. (Netherlands) [6658-29]

1:45 pm: **Influence of source-drain electric field on mobility and charge transport in organic field-effect transistors**, B. H. Hamadani, R. J. Kline, National Institute of Standards and Technology; I. A. McCulloch, M. J. Heeney, Merck Chemicals Ltd. (United Kingdom); C. A. Richter, D. J. Gundlach, National Institute of Standards and Technology [6658-30]

2:00 pm: **Dielectric interface modification by UV irradiation: a novel method to control OFET charge carrier transport properties**, N. J. Benson, M. Schidleja, Technische Univ. Darmstadt (Germany); C. Siol, University of Technology Darmstadt (Germany); C. Melzer, H. von Seggern, Technische Univ. Darmstadt (Germany) [6658-31]

2:15 pm: **Effect of surface polarity of polymer gate dielectrics on hysteresis behavior of pentacene field-effect transistor**, C. E. Park, S. H. Kim, S. Y. Yang, Pohang Univ. of Science and Technology (South Korea); H. Yang, Rensselaer Polytechnic Institute [6658-32]

2:30 pm: **Transfer printing as a method for the fabrication of organic electronics on flexible substrates**, D. R. Hines, A. E. Southard, A. Tunnell, E. D. Williams, Univ. of Maryland/College Park [6658-33]

2:45 pm: **Microstructured thin films, OTFTs, and PFBT-treated Au electrodes**, S. K. Park, D. Mourey, The Pennsylvania State Univ.; S. Subramanian, J. E. Anthony, Univ. of Kentucky; T. N. Jackson, The Pennsylvania State Univ. [6658-34]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Conv. Ctr. 31B Mon. 3:30 to 5:35 pm

Novel Processing of Soluble Organic Semiconductors

Chair: Gerwin H. Gelinck, TNO (Netherlands)

3:30 pm: **Mobility studies on new regioregular polythiophene block copolymers and other new structures (Invited Paper)**, R. D. McCullough, G. Sauve, Carnegie Mellon Univ. [6658-35]

3:55 pm: **Ink-jet printing of self-aligned soluble-pentacene crystals for high-performance organic field-effect transistors**, K. Cho, J. A. Lim, W. H. Lee, Y. D. Park, H. S. Lee, Pohang Univ. of Science and Technology (South Korea) [6658-36]

4:10 pm: **Solubility-driven high OFET performance thin film structures of thiophene derivatives using volatile solvents**, S. W. LeFevre, H. Yang, Rensselaer Polytechnic Institute; Z. Bao, Stanford Univ.; C. Y. Ryu, Rensselaer Polytechnic Institute [6658-37]

4:25 pm: **Simple patterning methodologies for functional organic thin-film transistors with solution-processed components (Invited Paper)**, Y. Loo, The Univ. of Texas at Austin [6658-38]

4:50 pm: **Fabrication of polymer thin film transistors by gravure contact printing**, A. J. Campbell, M. Voigt, D. Chung, A. Guite, J. Huang, F. Meng, J. Steinke, D. D. C. Bradley, Imperial College London (United Kingdom) [6658-39]

5:05 pm: **Tough, semiconducting bi-component systems**, N. Stingelin-Stutzmann, Queen Mary Univ. of London (United Kingdom); C. Müller, P. Wolfner, P. Smith, ETH Zürich (Switzerland); C. P. Radano, Degussa RohMax; R. A. J. Janssen, Technische Univ. Eindhoven (Netherlands); S. Goffri, H. Sirringhaus, Univ. of Cambridge (United Kingdom); D. J. Gundlach, National Institute of Standards and Technology; A. Kumar, T. Kreouzis, Queen Mary Univ. of London (United Kingdom) [6658-40]

5:20 pm: **Performance improvement and evaluation of an all-plastic organic field effect transistor**, S. Ochiai, A. Ohashi, K. Kojima, T. Mizutani, Aichi Institute of Technology (Japan) [6658-41]

Tuesday 28 August

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Tuesday. Poster presenters who have not set up by 5:00 pm on Tuesday 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.

- ✓ **Deoxyribonucleic acid (DNA)-based bio-organic field-effect transistors and memory elements**, T. B. Singh, P. Stadler, K. Oppelt, N. S. Sariciftci, Johannes Kepler Univ. Linz (Austria); J. Grote, Air Force Research Lab.; R. Schwödiauer, S. Bauer, H. Pigmayer-Brezina, D. Bäuerle, Johannes Kepler Univ. Linz (Austria) [6658-43]
- ✓ **Synthesis of bis-silylated oligothiophenes for solution-processable organic field-effect transistors**, J. H. Choi, U. C. Yoon, Pusan National Univ. (South Korea) [6658-45]
- ✓ **A novel structure of directly patterned isolating layer for organic thin-film transistors driven organic light emitting diodes**, Y. Wang, T. Lin, J. Yan, J. Wen, T. Lee, C. Kao, S. Yeh, M. Lin, Y. Shen, M. Tseng, T. Chen, P. Wu, J. Ho, Industrial Technology Research Institute (Taiwan) [6658-46]
- ✓ **Organic field-effect transistors based on solution-processable thiophene/phenylene oligomer derivatives**, H. Yang, S. W. LeFevre, Rensselaer Polytechnic Institute; J. Locklin, Univ. of Georgia; Z. Bao, Stanford Univ. [6658-47]
- ✓ **Understanding the mechanisms of photodecarbonylation of the photoprecursors of higher poly(acene)s**, R. Mondal, A. N. Okhrimenko, B. K. Shah, D. C. Neckers, Bowling Green State Univ. [6658-48]
- ✓ **Highly sensitive thin film polymer phototransistors**, X. Wang, K. Wasapinyokul, A. J. Campbell, D. D. C. Bradley, Imperial College London (United Kingdom) [6658-49]
- ✓ **Solution deposited liquid crystalline semiconducting materials on a photo alignment layer for organic thin-film transistors**, T. Fujiwara, J. Locklin, Z. Bao, Stanford Univ. [6658-51]
- ✓ **Surface modification with SAMs for patterning of organic semiconductors**, Y. Ito, Z. Bao, Stanford Univ. [6658-52]
- ✓ **Organic thin film transistor with suspended source/drain structure**, Y. U. Lee, Y. Kim, Korea Electronics Technology Institute (South Korea); M. Han, Seoul National Univ. (South Korea); J. Han, Korea Electronics Technology Institute (South Korea) [6658-53]
- ✓ **Capacitance reconstruction from measured C-V and direct extraction of mobility in polymer PFETs using C-V and I-V measurements**, M. Fadlallah, Commissariat à l'Energie Atomique (France); G. Klink, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) [6658-54]



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Conference 6659 • Conv. Ctr. 31B

Tuesday 28 August 2007 • Proceedings of SPIE Vol. 6659

Organic-based Chemical and Biological Sensors

Conference Chair: **Ruth Shinar**, Iowa State Univ.

Cochair: **George G. Malliaras**, Cornell Univ.

Program Committee: **Graciela B. Blanchet**, DuPont Electronic Polymers; **Emil J. W. List**, Technische Univ. Graz (Austria); **Roisin Owens**, Agave BioSystems; **Franky So**, Univ. of Florida; **Luisa Torsi**, Univ. degli Studi di Bari (Italy)

Tuesday 28 August

Solid State Lighting and OLEDs Plenary Session

Conv. Ctr. 32 A/B 8:30 to 10:00 am

8:30 am: **Solid State Lighting: Illumination and Communication (Invited Paper, Presentation Only)**, I. E. Ashdown, Senior Research Scientist for TIR Systems Ltd. (Canada) and Senior Software Engineer for Lighting Analysts Inc. and President of by.Heart Consultants Ltd. (Canada)

9:15 am: **Organic LEDs for Lighting Applications (Invited Paper, Presentation Only)**, J. Kido, Professor, Yamagata Univ. (Japan) and General Director, Research Institute for Organic Electronics (Japan)

See pg. 19-20 for presentation overviews.

Coffee Break 10:00 to 10:30 am

SESSION 1

Conv. Ctr. 31B Tues. 10:30 am to 12:10 pm

Organic-Based Sensing Applications I

Chair: **Luisa Torsi**, Univ. degli Studi di Bari (Italy)

10:30 am: **Sensitive four-terminal silicon/organic field-effect chemical vapor sensors (Invited Paper)**, A. Dodabalapur, The Univ. of Texas at Austin [6659-01]

11:00 am: **Organic electrochemical transistors in sensing applications**, D. A. Bernards, G. G. Malliaras, Cornell Univ. [6659-02]

11:20 am: **Organic field effect based sensors for physiological parameters monitoring (Invited Paper)**, A. Bonfiglio, I. Manunza, E. Orgiu, A. Caboni, W. Cambarau, M. Barbaro, Univ. degli Studi di Cagliari (Italy) [6659-03]

11:50 am: **Highly fluorescent bipyridazines for fluorogenic detector**, E. Kim, J. Do, Y. Kim, Yonsei Univ. (South Korea); A. Attias, Univ. Pierre et Marie Curie (France) [6659-04]

Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 2

Conv. Ctr. 31B Tues. 1:40 to 3:10 pm

Organic-Based Sensing Applications II

Chair: **George G. Malliaras**, Cornell Univ.

1:40 pm: **Recent developments in integrated OLED-based chemical and biological sensors (Invited Paper)**, J. Shinar, Z. Zhou, Y. Cai, R. Shinar, Iowa State Univ. [6659-05]

2:10 pm: **OLED-based sensor array for simultaneous monitoring of multiple analytes**, Y. Cai, R. Shinar, Z. Zhou, J. Shinar, Iowa State Univ. [6659-06]

2:30 pm: **Polymer-based micro-array sensors**, R. B. A. Sharpe, R. De Zwart, R. Houben, G. Van Heck, B. Allard, P. A. Rensing, S. J. F. Van Veen, M. M. Koetse, H. F. M. Schoo, TNO (Netherlands) [6659-07]

2:50 pm: **Organic semiconductor lasers as integrated light sources for optical sensor systems**, M. Punke, T. Woggon, M. Stroisch, B. Ebenhoch, U. Geyer, C. Karnutsch, M. Gerken, U. Lemmer, Univ. Karlsruhe (Germany); M. Bruendel, Forschungszentrum Karlsruhe (Germany); J. Wang, T. Weimann, Physikalisch-Technische Bundesanstalt (Germany) [6659-08]

Coffee Break 3:10 to 3:40 pm

SESSION 3

Conv. Ctr. 31B Tues. 3:40 to 5:20 pm

Organic-Based Sensing Applications III

Chair: **Ananth Dodabalapur**, The Univ. of Texas/Austin

3:40 pm: **Chiral recognition with enhanced sensing bilayer organic thin-film transistors (Invited Paper)**, L. Torsi, G. M. Farinola, M. C. Tanese, O. Hassan Omar, Univ. degli Studi di Bari (Italy); L. Valli, Univ. degli Studi di Lecce (Italy); F. Babudri, F. Palmisano, P. G. Zamboni, F. Naso, Univ. degli Studi di Bari (Italy) [6659-10]

4:10 pm: **Electrochemical sensors and actuators based PEDOT: PSS for bioelectronic applications (Invited Paper)**, M. Berggren, Linköpings Univ. (Sweden); P. Kjäll, Karolinska Institutet (Sweden); J. Isaksson, Linköpings Univ. (Sweden); D. Nilsson, Acreo AB (Sweden); K. Svennersten, Karolinska Institutet (Sweden); P. Svensson, Linköpings Univ. (Sweden); A. Richter-Dahlfors, Karolinska Institutet (Sweden); M. Bolin, E. Saindon, N. D. Robinson, Linköpings Univ. (Sweden) [6659-11]

4:40 pm: **Enzymatic conducting polymer sensor arrays**, J. A. DeFranco, D. A. Bernards, Y. Sylvester, D. Macaya, M. Nikolou, G. G. Malliaras, Cornell Univ. [6659-12]

5:00 pm: **Sensitivity control of optical fiber biosensors utilizing turnaround point long period gratings with self-assembled polymer coatings**, E. Gifford, Virginia Polytechnic Institute and State Univ.; S. Ramachandran, OFS Fitel, LLC; J. R. Heflin, Virginia Polytechnic Institute and State Univ. [6659-13]

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

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Demo Session

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✓ **Integrated photoluminescence-based sensor arrays: OLED excitation source/sensor film/thin-film photodetector**, D. Ghosh, R. Shinar, Y. Cai, Z. Zhou, V. Dalal, J. Shinar, Iowa State Univ. [6659-14]

✓ **Multiphoton excited fluorescence quenching of organic materials for TNT detection**, A. Narayanan, O. P. Varnavski, T. G. Goodson III, Univ. of Michigan [6659-15]

Conference 6660A • Conv. Ctr. 31A

Monday-Tuesday 27-28 August 2007 • Proceedings of SPIE Vol. 6660

Infrared Detectors and Focal Plane Arrays IX

Conference Chairs: **Eustace L. Dereniak**, The Univ. of Arizona; **John P. Hartke**, U.S. Military Academy

Program Committee: **Sarath D. Gunapala**, Jet Propulsion Lab.; **John E. Hubbs**, Ball Aerospace & Technologies Corp.; **Paul D. LeVan**, Air Force Research Lab.; **Herbert K. Pollehn**, Army Research Lab.; **Robert E. Sampson**, I Technology Applications; **James A. Stobie**, BAE Systems; **William B. Weissbard**, Teledyne Scientific Co.

Monday 27 August

SESSION 1

Conv. Ctr. 31A Mon. 8:30 to 10:00 am

Multi-Band Focal Planes

Chair: **John P. Hartke**, U.S. Military Academy

8:30 am: **Foveating infrared image sensors (Invited Paper)**, M. A. Massie, Nova Sensors [6660A-01]

9:00 am: **Multi-band large format infrared imaging arrays for spectrometer applications**, S. V. Bandara, S. D. Gunapala, J. K. Liu, D. Z. Ting, C. J. Hill, J. M. Mumolo, S. K. Keo, Jet Propulsion Lab. [6660A-02]

9:20 am: **Demonstration of a dual-band IR imaging spectrometer**, B. P. Beecken, Bethel Univ.; P. D. LeVan, Air Force Research Lab.; B. D. Todt, Bethel Univ. [6660A-03]

9:40 am: **Three dimensional simulation of detector parameters for backside illuminated InSb 2-D arrays**, T. A. Fishman, V. Nahum, E. Saguy, Z. Calahora, I. Shtrichman, SemiConductor Devices (Israel) [6660A-04]

Coffee Break 10:00 to 10:30 am

SESSION 2

Conv. Ctr. 31A Mon. 10:30 am to 12:00 pm

Infrared Polarimetry

Chair: **Paul D. LeVan**, Air Force Research Lab.

10:30 am: **A review of thermal infrared polarization phenomenology in the outdoors (Invited Paper)**, J. A. Shaw, Montana State Univ./Bozeman [6660A-05]

11:00 am: **Development of an MWIR polarimetric FPA**, D. P. Forrai, J. W. Devitt, L-3 Communications Cincinnati Electronics, Inc.; A. M. Sarangan, Q. Zhan, Univ. of Dayton; R. T. Mack, J. S. Harris, Air Force Research Lab. [6660A-06]

11:20 am: **A monolithically integrated longwave infrared polarimetric photodetector**, X. Lu, Univ. of Massachusetts/Lowell [6660A-07]

11:40 am: **Longwave infrared snapshot imaging spectropolarimeter**, R. W. Aumiller, E. L. Dereniak, R. E. Sampson, R. S. McMillan, College of Optical Sciences/The Univ. of Arizona [6660A-08]

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

SESSION 3

Conv. Ctr. 31A Mon. 1:30 to 3:00 pm

Astronomical Application of 2D Arrays

Chair: **Sarath D. Gunapala**, Jet Propulsion Lab.

1:30 pm: **SOI-based back-illuminated imaging technology for scientific UV/visible/NIR applications (Invited Paper)**, B. Pain, S. Seshadri, C. Sun, X. Zheng, C. J. Wrigley, T. J. Cunningham, Jet Propulsion Lab. [6660A-09]

2:00 pm: **High performance large infrared and visible astronomy arrays for low background applications: instruments performance data and future developments at Raytheon**, E. J. Beuville, D. Acton, E. Corrales, A. Levy, Raytheon Vision Systems; M. Merrill, National Optical Astronomy Observatory [6660A-10]

2:20 pm: **VIS/SWIR focal plane and detector development at Raytheon**, D. Acton, B. Starr, N. J. Therrien, W. D. Ritchie, Raytheon Vision Systems; C. W. McMurtry, Univ. of Rochester; A. Hoffman, Raytheon Vision Systems [6660A-11]

2:40 pm: **Optical thermal imaging for mass-market applications**, M. Wagner, RedShift Systems Corp. [6660A-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 31A Mon. 3:30 to 5:00 pm

QWIP Technology

Chair: **John E. Hubbs**, Air Force Research Lab.

3:30 pm: **Towards 16 megapixel focal plane arrays (Invited Paper)**, S. D. Gunapala, Jet Propulsion Lab. [6660A-13]

4:00 pm: **Far infrared and terahertz quantum well intrasubband photodetector (QWISP)**, D. Z. Ting, Jet Propulsion Lab.; Y. Chang, Univ. of Illinois at Urbana-Champaign; S. V. Bandara, S. D. Gunapala, Jet Propulsion Lab. [6660A-14]

4:20 pm: **LWIR QWIP focal plane array mounting and single cryocooler thermal treatment for rigid optics packaging**, W. R. Johnson, D. L. Johnson, J. M. Mumolo, S. D. Gunapala, Jet Propulsion Lab. [6660A-15]

4:40 pm: **MBE grown type-II superlattice photodiodes for MWIR and LWIR imaging applications**, C. J. Hill, J. V. Li, J. M. Mumolo, S. D. Gunapala, Jet Propulsion Lab.; D. R. Rhiger, R. E. Kvaas, S. F. Harris, Raytheon Vision Systems [6660A-16]

PHOTONICS

Conference 6660A • Conv. Ctr. 31A

Tuesday 28 August

SESSION 5

Conv. Ctr. 31A **Tues. 8:50 to 10:00 am**

Hyperspectral IR Imaging

Chair: James A. Stobie, BAE Systems, Inc.

8:50 am: **Hyperspectral visible and infrared focal plane arrays for planetary science studies (Invited Paper)**, W. B. Weissbard, J. Pan, T. Peihn, Teledyne Imaging Sensors [6660A-17]

9:20 am: **SWIR variable dispersion spectral imaging sensor**, F. D. Shepherd, J. M. Mooney, T. D. Reeves, D. S. Franco, J. E. Murguia, Solid State Scientific Corp.; M. M. Weeks, D. J. Leahy, Air Force Research Lab. [6660A-18]

9:40 am: **The spaceborne infrared atmospheric sounder for geosynchronous Earth orbit (SIRAS-G): pathfinder to space**, T. U. Kampe, Ball Aerospace & Technologies Corp. [6660A-20]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 31A **Tues. 10:30 am to 12:00 pm**

Special IR System Cameras

Chair: Herbert K. Pollehn, Army Research Lab.

10:30 am: **Very long wavelength infrared HgCdTe staring focal plane development (Invited Paper)**, J. A. Stobie, S. P. Tobin, BAE Systems [6660A-22]

11:00 am: **Performance of new IR detectors for wide field camera 3 (WFC3)**, R. J. Hill, R. Foltz, E. M. Malumuth, N. R. Collins, A. Waczynski, Y. Wen, R. A. Kimble, NASA Goddard Space Flight Ctr.; M. Robberto, Space Telescope Science Institute [6660A-23]

11:20 am: **An overview of teledyne imaging sensors for the James Webb Space Telescope**, J. D. Garnett, S. W. Anglin, P. Pettersson, T. Sprafke, M. Zandian, Teledyne Imaging Sensors; G. A. Luppino, GL Scientific . [6660A-24]

11:40 am: **Mid-IR photon counting array using HgCdTe APDs and the Medipix2 ROIC**, J. V. Vallerger, J. McPhate, Univ. of California/Berkeley; M. G. Stapelbroek, DRS Sensors & Targeting Systems, Inc. [6660A-25]

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

SESSION 7

Conv. Ctr. 31A **Tues. 1:30 to 3:00 pm**

Silicon Technology

Chair: William B. Weissbard, Teledyne Imaging Sensors

1:30 pm: **Silicon: IBC detectors for space based imaging at 2-28 μ m (Invited Paper)**, J. J. Drab, Raytheon Vision Systems [6660A-26]

2:00 pm: **Signal management with FPA multiplicative background and noise**, M. K. Rafailov, Defense Advanced Research Projects Agency Consultant [6660A-27]

2:20 pm: **Development of Si: as blocked impurity band detector for far IR detection**, D. S. Tezcan, J. Putzeys, K. De Munck, P. De Moor, P. J. Merken, P. Fiorini, C. A. van Hoof, IMEC (Belgium); T. Dartois, Alcatel Alenia Space (France); S. Birkmann, J. Stegmaier, U. Grozinger, O. Krause, Max-Planck-Institut für Astronomie (Germany) [6660A-28]

2:40 pm: **Focal plane detectors for the WISE 12- and 24- μ m bands**, H. H. Hogue, M. Reed, M. G. Stapelbroek, S. A. Masterjohn, DRS Sensors & Targeting Systems, Inc.; M. F. Larsen, J. D. Elwell, Space Dynamics Lab. [6660A-29]

Courses of Related Interest

See SPIE Cashier for information.

SC152 Infrared Focal Plane Arrays (Dereniak, Hubbs) Sunday 26,
1:30 - 5:30 pm

Conference 6660B • Conv. Ctr. 31A

Sunday 26 August 2007 • Proceedings of SPIE Vol. 6660

Infrared and Photoelectronic Imagers and Detectors III

Conference Chairs: **Randolph E. Longshore**, Raytheon Missile Systems; **Ashok K. Sood**, Magnolia Optical Technologies, Inc.

Program Committee: **Alexander C. Childs**, Raytheon Vision Systems; **Meimei Z. Tidrow**, Missile Defense Agency

Sunday 26 August

SESSION 8

Conv. Ctr. 31A Sun. 1:20 to 3:00 pm

Imagers

Chair: **Randolph E. Longshore**, Raytheon Missile Systems

1:20 pm: **CMOS pixel structures optimised for indirect detection of x-rays**, T. A. Greig, A. D. Holland, Brunel Univ. (United Kingdom); D. J. Burt, A. Pike, e2v (United Kingdom) [6660B-30]

1:40 pm: **Nearsighted photodetector and camera**, M. Matsumoto, Y. Buyo, S. Hashimoto, Waseda Univ. (Japan) [6660B-31]

2:00 pm: **Dark current reduction of GaInAsSb based photodetectors by surface treatment with octadecylthiol**, Y. Xiao, Crosslight Software Inc.; V. Bhagwat, I. B. Bhat, P. S. Dutta, Rensselaer Polytechnic Institute .. [6660B-32]

2:20 pm: **High performance back-illuminated CMOS imaging sensors**, M. E. Hoenk, T. J. Jones, M. R. Dickie, T. J. Cunningham, S. Nikzad, Jet Propulsion Lab. [6660B-34]

2:40 pm: **Large format silicon image sensors for high sensitivity UV/optical/NIR, soft x-ray and particle detection**, S. Nikzad, J. Blacksberg, M. E. Hoenk, Jet Propulsion Lab.; S. Holland, Lawrence Berkeley National Lab. . [6660B-35]

Coffee Break 3:00 to 3:30 pm

SESSION 9

Conv. Ctr. 31A Sun. 3:30 to 4:50 pm

IR Systems

Chair: **Ashok K. Sood**, Magnolia Optical Technologies, Inc.

3:30 pm: **Hg_{1-x}Cd_xTe mid-wavelength infrared (MWIR) avalanche photodiode (APD) grown on Si substrate**, S. Mallick, Univ. of Illinois at Chicago [6660B-36]

3:50 pm: **Study on the effective method to reduce the lens calibre of the un-cooled IR thermal imaging systems**, L. Dong, Beijing Institute of Technology (China) [6660B-38]

4:10 pm: **Corrugated QWIP developments for tactical infrared imaging (Invited Paper)**, D. P. Forrai, L-3 Communications Cincinnati Electronics, Inc.; K. Choi, Army Research Lab.; J. W. Devitt, L-3 Communications Cincinnati Electronics, Inc. [6660B-39]

4:30 pm: **Implementation a new real-time structure for driving an IRFPA and image enhancement**, A. Homaei, E. Koohestani, Rayan-Electronics (Iran) [6660B-37]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

✓ **Considerations concerning an image transceiver system design**, N. S. Thirer, I. David, I. Baalb Zedaka, Holon Institute of Technology (Israel); U. Efron, Ben-Gurion Univ. of the Negev (Israel) [6660B-33]

✓ **Experimental data on the reflection and transmission spectral response of photocathodes**, R. J. Brooks, J. Howorth, Photek Ltd. (United Kingdom); C. Joseph, Rutgers Univ. [6660B-41]

✓ **Modeling of resonant cavity enhanced separate absorption charge and multiplication avalanche photodiodes by crosslight APSYS**, Y. Xiao, Z. L. Li, Z. M. S. Li, Crosslight Software Inc. (Canada) [6660B-42]

✓ **Back-illuminated CMOS APS with low crosstalk level**, Y. David, Holon Institute of Technology (Israel); U. Efron, Ben-Gurion Univ. of the Negev (Israel) [6660B-43]

Conference 6661 • Conv. Ctr. 31A

Tuesday-Wednesday 28-29 August 2007 • Proceedings of SPIE Vol. 6661

Imaging Spectrometry XII

Conference Chairs: **Sylvia S. Shen**, The Aerospace Corp.; **Paul E. Lewis**, National Geospatial-Intelligence Agency

Cochair: **Robert T. Kroutil**, Los Alamos National Lab.

Program Committee: **Christoph C. Borel**, Ball Aerospace & Technologies Corp.; **Chein-I Chang**, Univ. of Maryland/Baltimore County; **Thomas W. Cooley**, Air Force Research Lab.; **Eustace L. Dereniak**, The Univ. of Arizona; **Michael R. Descour**, The Univ. of Arizona; **David B. Gillis**, Naval Research Lab.; **Terrence S. Lomheim**, The Aerospace Corp.; **Anthony Ratowski**, Air Force Research Lab.; **Luc Rochette**, LR Tech (Canada); **John R. Schott**, Rochester Institute of Technology; **Winthrop Wadsworth**, D&P Instruments

Tuesday 28 August

SESSION 1

Conv. Ctr. 31A Tues. 3:30 to 5:00 pm

Spectrometer Design and Development

Chair: **Paul E. Lewis**, National Geospatial-Intelligence Agency

3:30 pm: **Advanced responsive tactically effective military imaging spectrometer (ARTEMIS): system overview and objectives (Invited Paper)**, T. W. Cooley, R. B. Lockwood, Air Force Research Lab. [6661-01]

4:00 pm: **Fourier methods of improving reconstruction speed for CTIS imaging spectrometers**, N. A. Hagen, E. L. Dereniak, College of Optical Sciences/The Univ. of Arizona [6661-02]

4:20 pm: **Visible imaging spectro-polarimeter**, C. J. Vandervlugt, N. A. Hagen, College of Optical Sciences/The Univ. of Arizona; R. E. Sampson, I Technology Applications; E. L. Dereniak, College of Optical Sciences/The Univ. of Arizona; G. R. Gerhart, U.S. Army Tank-Automotive Research, Development and Engineering Ctr. [6661-03]

4:40 pm: **Portable spectrophotometer based on polarization independent tunable optical filters**, E. Nicolescu, M. J. Escuti, North Carolina State Univ. [6661-04]

Wednesday 29 August

SESSION 2

Conv. Ctr. 31A Wed. 8:30 to 10:20 am

Fourier Transform Spectrometer Design and Development

Chair: **Luc Rochette**, LR Tech (Canada)

8:30 am: **State-of-the-art imaging FTS with CCD camera (Invited Paper)**, J. E. Genest, S. A. Roy, P. Dubois, S. Potvin, Univ. Laval (Canada) [6661-05]

9:00 am: **Long wave focal plane array detector: development and performance assessment of an 8X8 Stirling-cooled photovoltaic MCT detector module**, L. Rochette, LR Tech (Canada); T. L. Smithson, Defence R&D Canada/Valcartier (Canada); F. J. Chateaufneuf, Institut National d'Optique (Canada); R. H. K. Gurgonian, Fermionics Corp. [6661-06]

9:20 am: **SHIELDS: a battlefield Fraunhofer line discrimination sensor**, S. R. Watchorn, J. Noto, M. A. Migliozi, Scientific Solutions, Inc. [6661-09]

9:40 am: **An interferometer for compact imaging spectrometers**, L. M. Moreau, M. A. Soucy, C. Deutsch, ABB Inc. (Canada) [6661-07]

10:00 am: **FTIR-based airborne spectral imagery for target interrogation**, T. L. Smithson, Defence R&D Canada/Valcartier (Canada) [6661-08]

Coffee Break 10:20 to 10:50 am

SESSION 3

Conv. Ctr. 31A Wed. 10:50 to 11:50 am

Imaging Systems and Components

Chair: **Robert T. Kroutil**, Los Alamos National Lab.

10:50 am: **Development of mercurous halide crystals for acousto-optic devices**, J. S. Kim, W. Palosz, J. I. Soos, S. B. Trivedi, Brimrose Corp. of America; N. Gupta, Army Research Lab. [6661-10]

11:10 am: **A high-resolution 2D imaging laser radar for occluded hard target viewing and identification**, R. J. Grasso, G. F. Dippel, K. D. Cecchetti, J. C. Wikman, D. P. Drouin, P. I. Egbert, BAE Systems [6661-11]

11:30 am: **Effect of light level and photon noise on hyperspectral target detection performance**, T. Skauli, R. Ingebrigtsen, I. Kåsen, Norwegian Defense Research Establishment (Norway) [6661-12]

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

SESSION 4

Conv. Ctr. 31A Wed. 1:30 to 3:10 pm

Spectral Data Analysis Techniques

Chair: **John R. Schott**, Rochester Institute of Technology

1:30 pm: **Linear unmixing using endmember subspaces and physics-based modeling**, D. B. Gillis, J. H. Bowles, Naval Research Lab.; E. J. Ientilucci, D. W. Messinger, Rochester Institute of Technology [6661-14]

1:50 pm: **Statistics-based endmember extraction algorithms for hyperspectral imagery**, S. Chu, C. Chang, Univ. of Maryland/Baltimore County [6661-15]

2:10 pm: **Synthetic data generation of high-resolution, hyperspectral data using DIRSIG**, M. K. Jakubowski, Univ. of California/Berkeley and Rochester Institute of Technology; D. W. Messinger, S. D. Brown, J. R. Schott, Rochester Institute of Technology [6661-16]

2:30 pm: **Atmospheric inversion in the presence of clouds: an adaptive ELM approach**, B. D. Bartlett, J. R. Schott, Rochester Institute of Technology [6661-17]

2:50 pm: **Unsupervised hyperspectral image classification**, X. Jiao, C. Chang, Univ. of Maryland/Baltimore County [6661-18]

Coffee Break 3:10 to 3:40 pm

SESSION 5

Conv. Ctr. 31A Wed. 3:40 to 5:20 pm

Spectral Methodologies and Applications

Chair: **Sylvia S. Shen**, The Aerospace Corp.

3:40 pm: **Use of lidar data to geometrically-constrain radiance subspaces for physics-based target detection**, M. S. Foster, Rochester Institute of Technology and Air Force Institute of Technology; D. W. Messinger, J. R. Schott, Rochester Institute of Technology [6661-19]

4:00 pm: **Airborne infrared spectroscopic analysis of emissions from swamps situated in the Southern Gulf Coast region of the United States**, R. T. Kroutil, P. E. Lewis, Los Alamos National Lab.; M. J. Thomas, U.S. Environmental Protection Agency; D. P. Miller, Northrop Grumman Corp.; S. S. Shen, The Aerospace Corp.; T. Curry, U.S. Environmental Protection Agency [6661-20]

4:20 pm: **Chemical agent detection and identification with a hyperspectral imaging infrared sensor**, V. Farley, M. Chamberland, P. Lagueux, A. Vallières, A. J. Villemaire, J. Giroux, Telops, Inc. (Canada) [6661-21]

4:40 pm: **Measuring the MTF of imaging spectrometers at infinite focus with roof-line images**, P. W. Nugent, J. A. Shaw, Montana State Univ./Bozeman; M. Kehoe, C. Smith, T. S. Moon, R. Swanson, Resonon Inc. [6661-22]

5:00 pm: **Application of mid-infrared and x-ray diffraction spectrum analysis in tobacco quality sorting**, X. Zhong, F. Yao, Chongqing Univ. [6661-23]

Courses of Related Interest

See SPIE Cashier for information.

SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm

Conference 6662 • Conv. Ctr. 30E

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6662

Optical Technologies for Arming, Safing, Fuzing, and Firing III

Conference Chairs: **William J. Thomes, Jr.**, NASA Goddard Space Flight Ctr.; **Fred M. Dickey**, Sandia National Labs.

Program Committee: **Adrian A. Akinci**, Los Alamos National Lab.; **Michael J. Barglowski**, Ensign-Bickford Aerospace & Defense Co.; **Dennis W. Baum**, Office of the Under Secretary of Defense; **Richard A. Beyer**, U.S. Army Research Lab.; **Mike D. Bowden**, AWE plc (United Kingdom); **Kevin R. Cochran**, Naval Surface Warfare Ctr.; **Andrew Forbes**, Council for Scientific and Industrial Research (South Africa); **Keren K. Hamilton**, AWE plc (United Kingdom); **Christopher R. Hardy**, Kigre, Inc.; **Stephen R. Lerner**, Laser Diode, Inc.; **Keith L. Lewis**, Electro-Magnetic Remote Sensing Defence Technology Ctr. (United Kingdom); **Robert V. McDaniel**, Kollsman, Inc.; **Thomas D. Milster**, The Univ. of Arizona; **Gregg L. Morelli**, Honeywell Technology; **Alex Rosiewicz**, EM4, Inc.; **Raymond J. Silva**, BAE Systems North America; **Kelly Simmons-Potter**, The Univ. of Arizona; **Bolesh J. Skutnik**, CeramOptec Industries, Inc.; **Gabriel L. Smith**, U.S. Army Research, Development and Engineering Command; **Donald R. Snyder**, Air Force Research Lab.; **John E. Spencer**, Photodigm Inc.; **Christian M. von der Lippe**, U.S. Army Research, Development and Engineering Command; **Louis S. Weichman**, Sandia National Labs.; **Eric J. Welle**, Sandia National Labs.; **Jan-Gustav Werthen**, JDS Uniphase Corp.; **James A. Wilder, Jr.**, Sandia National Labs.

Wednesday 29 August

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Practical internal combustion engine laser spark plug development**, M. J. Myers, J. D. Myers, B. Guo, C. Yang, C. R. Hardy, Kigre, Inc. . . . [6662-13]
- ✓ **High-efficiency side diode pumped breech mount laser ignition**, C. R. Hardy, B. Guo, C. Yang, M. J. Myers, J. D. Myers, Kigre, Inc. . . . [6662-14]
- ✓ **Optical fiber sensor based on thermo-responsive hydrogel**, J. C. Rueda, K. Contreras, C. Paragua, R. Coello Paria, G. Baldwin-Olguin, Pontificia Univ. Catolica del Peru (Peru); M. Lomer, Univ. de Cantabria (Spain); H. Komber, S. Zschoche, B. Voit, Leibniz-Institut für Polymerforschung Dresden e.V. (Germany) [6662-15]
- ✓ **Fiber-optic inclinometer for structural health monitoring**, Y. N. Kulchin, O. B. Vitrik, A. V. Dyshlyuk, Institute for Automation and Control Processes (Russia) [6662-16]
- ✓ **The coupling loss between single-mode fibers and waveguides**, J. Yang, Tianjin Univ. [6662-17]

Thursday 30 August

SESSION 1

Conv. Ctr. 30E Thurs. 8:10 to 10:10 am

Optical Firing and Fuzing Systems and Components

Chair: **Kelly Simmons-Potter**, The Univ. of Arizona

- 8:10 am: **Assembly and characterization of packaged laser-optical firing system**, G. L. Morelli, Honeywell Technology [6662-01]
- 8:30 am: **Challenges in high-intensity laser injection into multiple optical fibers**, R. E. Setchell, D. M. Berry, Sandia National Labs. [6662-02]
- 8:50 am: **Impact of ionizing radiation on the optical properties**, K. Simmons-Potter, The Univ. of Arizona; D. C. Meister, Sandia National Labs. . . [6662-03]
- 9:10 am: **Characterization of laser-optical systems packaged for use in harsh environments**, M. R. Bright, Honeywell Technology [6662-04]
- 9:30 am: **High-voltage optical power conversion with a series connected photovoltaic array**, J. W. Shelton, W. J. Thomes, Jr., F. M. Dickey, Sandia National Labs. [6662-05]
- 9:50 am: **Design and developmental aspects of holographic sight for rifles and carbine**, S. Kamineni, National Institute of Technology/Warangal (India); R. K. Palukuri, Bharat Electronics Ltd. (India) [6662-06]
- Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 30E Thurs. 10:30 am to 12:30 pm

Explosives and Optical Diagnostics

Chair: **Gregg L. Morelli**, Honeywell Technology

- 10:30 am: **Laser initiation of energetic materials: a historical overview**, M. D. Bowden, AWE plc (United Kingdom); J. Akhavan, Cranfield Univ.; R. C. Drake, AWE plc (United Kingdom) [6662-07]
- 10:50 am: **Development of a portable non-contact optical diagnostic system for the detection of delta-HMX**, A. J. Dale, M. W. Wright, C. T. Hughes, M. D. Bowden, AWE plc (United Kingdom) [6662-08]
- 11:10 am: **Optically based velocity and topographic measurement systems in the nano-scale for developing optical initiation**, A. R. Valenzuela, G. Rodriguez, S. A. Clarke, K. A. Thomas, Los Alamos National Lab. . . [6662-09]
- 11:30 am: **The development of a heterodyne velocimeter system for use in sub-microsecond time regimes**, M. D. Bowden, M. P. Maisey, AWE plc (United Kingdom); J. Akhavan, Cranfield Univ. (United Kingdom); R. C. Drake, AWE plc (United Kingdom) [6662-10]
- 11:50 am: **High-speed laser Schlieren movies for visualization of explosive events**, S. A. Clarke, K. A. Thomas, M. E. Martinez, A. A. Akinci, Los Alamos National Lab.; M. J. Murphy, R. J. Adrian, Arizona State Univ. [6662-11]
- 12:10 pm: **The initiation of high surface area pentaerythritol tetranitrate using fiber-coupled laser-driven flyer plates**, M. D. Bowden, M. P. Maisey, AWE plc (United Kingdom); J. Akhavan, Cranfield Univ. (United Kingdom); R. C. Drake, AWE plc (United Kingdom) [6662-12]

PHOTONICS

Conference 6663 • Conv. Ctr. 30E

Tuesday-Wednesday 28-29 August 2007 • Proceedings of SPIE Vol. 6663

Laser Beam Shaping VIII

Conference Chairs: **Fred M. Dickey**, Sandia National Labs.; **David L. Shealy**, The Univ. of Alabama/Birmingham

Program Committee: **Daniel M. Brown**, Optosensors Technology, Inc.; **Michael R. Duparré**, Friedrich-Schiller-Univ. Jena (Germany); **Andrew Forbes**, Council for Scientific and Industrial Research (South Africa); **Julio C. Gutierrez-Vega**, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico); **John A. Hoffnagle**, IBM Almaden Research Ctr.; **Kurt J. Kanzler**, Diffractive Laser Solutions; **R. John Koshel**, Lambda Research Corp.; **Alexis V. Kudryashov**, Moscow State Open Univ. (Russia); **Andrew F. Kurtz**, Eastman Kodak Co.; **Zsolt J. Laczik**, Univ. of Oxford (United Kingdom); **William P. Latham**, Air Force Research Lab.; **Todd E. Lizotte**, Hitachi Via Mechanics USA, Inc.; **Günter Luepke**, The College of William & Mary; **Olivier Magnin**, C2 Diagnostics (France); **Paul F. Michaloski**, Corning Tropel Corp.; **Thomas D. Milster**, The Univ. of Arizona; **Tasso R. M. Sales**, RPC Photonics, Inc.; **José M. Sasian**, The Univ. of Arizona; **Kenneth J. Weible**, SUSS MicroOptics SA (Switzerland); **Uwe-Detlef Zeitner**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Shuyan Zhang**, The College of William & Mary

Tuesday 28 August

SESSION 1

Conv. Ctr. 30E Tues. 1:00 to 3:10 pm

Theory

Chair: **John A. Hoffnagle**, IBM Almaden Research Ctr.

- 1:00 pm: **Microlens laser beam homogenizer: from theory to application (Invited Paper)**, M. Zimmermann, Bayerisches Laserzentrum gGmbH (Germany); N. Lindlein, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); R. Voelkel, K. J. Weible, SUSS MicroOptics SA (Switzerland) [6663-01]
- 1:30 pm: **Impact of phase errors at the conjugate step on the propagation of intensity and phase shaped beams**, A. Forbes, I. A. Litvin, Council for Scientific and Industrial Research (South Africa) [6663-02]
- 1:50 pm: **Irradiance distributions within refractive laser beam shapers**, J. A. Hoffnagle, IBM Almaden Research Ctr.; D. L. Shealy, The Univ. of Alabama/Birmingham [6663-03]
- 2:10 pm: **A model of the transverse modes of stable and unstable porro-prism resonators using symmetry considerations**, L. Burger, Council for Scientific and Industrial Research (South Africa) and Univ. of KwaZulu-Natal (South Africa); A. Forbes, Council for Scientific and Industrial Research (South Africa) [6663-04]
- 2:30 pm: **Unwound vortex beams for axial beam shaping**, C. López-Mariscal, J. C. Gutiérrez-Vega, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) [6663-05]
- 2:50 pm: **Helical Hermite-Gaussian beams**, C. López-Mariscal, J. C. Gutiérrez-Vega, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) [6663-06]
- Coffee Break 3:10 to 3:40 pm

Panel Discussion on State-of-the-Art of Laser Beam Shaping

Conv. Ctr. 30E Tues. 3:40 to 5:20 pm

Moderator: **Andrew Forbes**, Council for Scientific and Industrial Research (South Africa)

Panelists:

- Theory: **Fred M. Dickey**, Sandia National Labs.
Design: **John G. Smith**, MEMS Optical
Fabrication: **Ken J. Weible**, SUSS MicroOptics SA (Switzerland)
Application: **Todd E. Lizotte**, Hitachi Via Mechanics USA

Wednesday 29 August

SESSION 2

Conv. Ctr. 30E Wed. 8:30 to 10:10 am

Design

Chair: **Andrew Forbes**, Council for Scientific and Industrial Research (South Africa)

- 8:30 am: **Beam shaping based on lenslet arrays with the help of diffraction and interference effects**, Y. Miklyayev, D. Hauschild, M. Darscht, A. Mikhailov, V. Lissotschenko, LIMO-Lissotschenko Mikrooptik GmbH (Germany) [6663-07]
- 8:50 am: **Fly's eye condenser based on chirped microlens arrays**, F. C. Wippermann, U. Zeitner, P. Dannberg, A. Bräuer, Fraunhofer Institut Angewandte Optik und Feinmechanik (Germany); S. Sinzinger, Technische Univ. Ilmenau (Germany) [6663-08]
- 9:10 am: **Laser profile uniformity at the image plane: comparing hard and digital apertures illuminated by a diffractive optical beam shaper**, T. E. Lizotte, Hitachi Via Mechanics USA, Inc. [6663-09]
- 9:30 am: **Remapping diffractive beam shaping of a fiber laser for focused tophat profiles**, K. J. Kanzler, Lambda Research Optics, Inc.; A. P. Hout, SPI Lasers plc; V. Thorosian, Lambda Research Optics, Inc. [6663-10]
- 9:50 am: **Designing beam shaping systems basing on spherical catalog lenses**, H. Schimmel, LightTrans GmbH (Germany); F. Wyrowski, Friedrich Schiller Univ. (Germany) [6663-11]
- Coffee Break 10:10 to 10:40 am

SESSION 3

Conv. Ctr. 30E Wed. 10:40 to 11:50 am

Fabrication and Techniques I

Chair: **Todd E. Lizotte**, Hitachi Via Mechanics USA, Inc.

- 10:40 am: **Refractive beam shaping: from the solution of the Maxwell equations to products and its applications in laser material processing (Invited Paper)**, O. Homburg, D. Hauschild, L. Aschke, LIMO-Lissotschenko Mikrooptik GmbH (Germany); V. Lissotschenko, LIMO-Lissotschenko Mikrooptik GmbH [6663-13]
- 11:10 am: **Vacuum isostatic micro molding of diffractive structures into PTFE materials**, T. E. Lizotte, O. P. Ohar, Hitachi Via Mechanics USA, Inc. [6663-14]
- 11:30 am: **Methods of designing and fabricating: an equilateral triangle beam splitter**, J. G. Smith, A. Stockham, MEMS Optical, Inc. [6663-15]
- Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 4

Conv. Ctr. 30EWed. 1:20 to 2:20 pm

Fabrication and Techniques II

Chair: **Todd E. Lizotte**, Hitachi Via Mechanics USA, Inc.

1:20 pm: **High-power holographic masks for beam shaping**, W. P. Parker, Creative Microsystems Corp. [6663-17]

1:40 pm: **Characterization of a spinning pipe gas lens using a Shack-Hartmann wavefront sensor**, C. Mafusire, A. Forbes, Council for Scientific and Industrial Research (South Africa); M. M. Michaelis, Univ. of KwaZulu-Natal (South Africa); G. Snedden, Council for Scientific and Industrial Research (South Africa) [6663-18]

2:00 pm: **New approaches for manufacturing refractive beam shapers**, S. R. Kiontke, asphericon GmbH (Germany); H. Schimmel, LightTrans GmbH (Germany) [6663-19]

SESSION 5

Conv. Ctr. 30EWed. 2:20 to 5:40 pm

Applications

Chair: **David L. Shealy**, The Univ. of Alabama/Birmingham

2:20 pm: **Innovative optical techniques increase LED wafer scribing production (Invited Paper)**, L. Chen, R. Y. L. Hsu, R. J. Z. Lee, Uni-Via Technology Inc. (Taiwan); T. E. Lizotte, Hitachi Via Mechanics USA, Inc. [6663-20]

2:50 pm: **Beam shaping for cosmetic hair removal**, T. E. Lizotte, T. Tuttle, Hitachi Via Mechanics USA, Inc. [6663-21]

3:10 pm: **Wafer dicing utilizing unique beam shapes**, T. E. Lizotte, O. P. Ohar, Hitachi Via Mechanics USA, Inc. [6663-22]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Advances in MEMS deformable mirror technology and applications in laser beam shaping**, S. Menn, Boston Micromachines Corp. [6663-23]

4:20 pm: **Increased efficiency and performance in laser pump chambers through use of diffuse highly reflective materials**, B. Y. Chang, C. M. Chase, Labsphere, Inc. [6663-24]

4:40 pm: **The main peculiarities of arranging the optical scheme of acousto-optical spectrometer for the Mexican large millimeter telescope**, A. S. Shcherbakov, S. E. Balderas Mata, E. Tepichin-Rodriguez, A. Luna Castellanos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); J. Maximov, Molecular Technology GmbH (Germany) [6663-25]

5:00 pm: **Laser plasma waveguide for SHF radiation**, A. E. Dormidonov, V. P. Kandidov, M.V. Lomonosov Moscow State Univ. Chapter (Russia); V. V. Valuev, State Unitary Enterprise (Russia) [6663-26]

5:20 pm: **A design of optical resonator for donut mode generation**, S. Chu, National Cheng Kung Univ. (Taiwan) [6663-27]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/DWed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

✓ **Laser beam shaping limitations for laboratory simulation of turbulence using a phase-only spatial light modulator**, I. A. Litvin, A. Forbes, Council for Scientific and Industrial Research (South Africa) [6663-28]

✓ **Propagation of Helmholtz-Gauss beams in turbulent media**, R. J. Noriega-Manez, J. C. Gutierrez-Vega, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) [6663-31]

✓ **Characterization of higher-order Mathieu x-waves in the optical domain**, J. Davila-Rodriguez, J. C. Gutierrez-Vega, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) [6663-32]



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Optomechanics					
6666 Optical Materials and Structures Technologies III (Goodman), p. 119		6665 New Developments in Optomechanics (Hatheway), p. 117			
Optical Design					
6667 Current Developments in Lens Design and Optical Engineering VIII (Mouroulis/Smith/Johnson), p. 121		6668 Novel Optical Systems Design and Optimization X (Koshel/Gregory), p. 123			
Illumination Engineering					
6669 Seventh International Conference on Solid State Lighting (Ferguson/Narendran/Taguchi/Ashdown), p. 125					
6670 Nonimaging Optics and Efficient Illumination Systems IV (Winston/Koshel), p. 128					
Optical Manufacturing and Testing					
		6671 Optical Manufacturing and Testing VII (Burge/Faehnle/Williamson), p.130			

Conference Daily Schedule continues

Optical Engineering + Applications

Conference Daily Schedule continued

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		6672 Advanced Characterization Techniques for Optics, Semiconductors, and Nanotechnologies III (<i>Duparré/Singh/Gu</i>), p. 133			
			6673 Time and Frequency Metrology (<i>Jones</i>), p. 135		
Thin Films					
	6674 Thin-Film Coatings for Optical Applications IV (<i>Ellison</i>), p. 137				
Optical Systems Engineering					
	6676 Optical System Alignment and Tolerancing (<i>Sasian/Ruda</i>), p. 140		6675 Optical Modeling and Performance Predictions III (<i>Kahan</i>), p. 138		
Remote Sensing Instrumentation					
	6677 Earth Observing Systems XII (<i>Butler/Xiong</i>), p. 141				
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6680 Coastal Ocean Remote Sensing (<i>Frouin</i>), p. 150		6679 Remote Sensing and Modeling of Ecosystems for Sustainability IV (<i>Gao/Ustin</i>), p. 147			
6685 Assimilation of Remote Sensing and In Situ Data in Modern Numerical Weather and Environmental Prediction Models (<i>Zou</i>), p. 161	6684 Atmospheric and Environmental Remote Sensing Data Processing and Utilization III: Readiness for GEOSS (<i>Goldberg/Bloom</i>), p. 158		6681 Lidar Remote Sensing for Environmental Monitoring VIII (<i>Singh</i>), p. 152		
			6682 Polarization Science and Remote Sensing III (<i>Shaw/Tyo</i>), p. 154		
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Astronomical Optics and Instrumentation					
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6687 UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III (<i>MacEwen/Breckinridge</i>), p. 166			6691 Astronomical Adaptive Optics Systems and Applications III (<i>Tyson/Lloyd-Hart</i>), p. 176		
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Tuesday

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Friday

Image and Signal Processing

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6698 Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications (<i>Guo/Yin/Yu</i>), p. 195	6696 Applications of Digital Image Processing XXX (<i>Tescher</i>), p. 190
6700 Mathematics of Data/Image Pattern Recognition, Compression, Coding, and Encryption X, with Applications (<i>Ritter/Schmalz/Barrera/Astola</i>), p. 201	6699 Signal and Data Processing of Small Targets 2007 (<i>Drummond</i>), p. 198
6701 Wavelets XII (<i>Van De Ville/Goyal/Papadakis</i>), p. 203	

X-Ray, Gamma-Ray, and Particle Technologies

6703 Ultrafast X-Ray Sources and Detectors (<i>Chang/Kyrala/Kieffer</i>), p. 210	6702 Soft X-Ray Lasers and Applications VII (<i>Tallents/Dunn</i>), p. 207
6705 Advances in X-Ray/EUV Optics and Components II (<i>Khounsary/Morawe/Goto</i>), p. 213	6704 Advances in Metrology for X-Ray and EUV OpticsII (<i>Assoufid/Takacs/Ohtsuka</i>), p. 212
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Atmospheric and Space Optical Systems

6708 Atmospheric Optics: Models, Measurements, and Target-in-the-Loop Propagation (<i>Hammell/van Eijk/Valley/Vorontsov</i>), p. 221	6709 Free-Space Laser Communications VII (<i>Majumdar/Davis</i>), p. 223
6710 Quantum Communications and Quantum Imaging V (<i>Meyers/Shih/Deacon</i>), p. 226	6711 Advanced Wavefront Control: Methods, Devices, and Applications V (<i>Carreras/Gonglewski/Rhoadarmer</i>), p. 228
6712 Unconventional Imaging III (<i>Dolne/Gamiz/Idell</i>), p. 230	6713 Nano- and Macro- Photonics for Space Environments (<i>Taylor/Cardimona</i>), p. 231
	6714 Adaptive Coded Aperture Imaging and Non-Imaging Sensors (<i>Casasent/Clark</i>), p. 233

EXHIBITION, p. 40-41

10:00 am to 5:00 pm

10:00 am to 5:00 pm

10:00 am to 2:00 pm



Don't miss the Special Events, Plenaries, Receptions, Technical Workshops, Courses, Poster Sessions – and more!

See pages 9-41.

Tribute to Joseph W. Goodman

Conference Chair: **Masud Mansuripur**, College of Optical Sciences/The Univ. of Arizona



Joseph W. Goodman, Stanford Univ.

Professor Joseph W. Goodman is the recipient of SPIE's Gold Medal in 2007. Dr. Goodman was affiliated with Stanford University from 1963 until his retirement in 2000, serving in various academic and administrative positions including the William E. Ayer Professor of Electrical Engineering, the Chairman of the Electrical Engineering Department, and Senior Associate Dean of the School of Engineering. Dr. Goodman is the author of Introduction to Fourier Optics (1968, second edition 1996, third edition 2005), Statistical Optics (1985), Speckle Phenomena in Optics (2006), and (with R. M. Gray) Fourier Transforms: An Introduction for Engineers (1995). Professor Goodman has been the primary research supervisor for 49 Ph.D.s; he is the author of more than 220 scientific and technical papers, and has received numerous awards from the IEEE, the OSA, the SPIE and the ASEE.

Dr. Goodman has contributed to many areas of physical optics including holography, synthetic aperture optics, image processing, optical computing, and speckle theory. His first full-length publication (Proc. IEEE, Vol. 53, 168 (1965)) was named a "Citation Classic" by the Institute for Scientific Information. Professor Goodman is a member of the National Academy of Engineering and a Fellow of the American Academy of Arts and Sciences. He is the founder (or co-founder) of Optivision, Inc., ONI Systems, and Nanoprecision Products, Inc., and has served as the director, board member, or chairman of the board of several corporations.

SPIE is proud to announce that a special program honoring Professor Joseph W. Goodman will be held on Wednesday, August 29, 2007 at SPIE's Optics + Photonics meeting in San Diego, California. Many of Prof. Goodman's former students and colleagues will attend the event and give presentations (reminiscences or technical) to commemorate the event. The organizers invite all SPIE attendees to participate in the ceremonies and attend the symposium honoring one of the giants of 20th century optics.

Wednesday 29 August

SESSION 1

Room: Conv. Ctr. 31C Wed. 8:30 to 10:00 am

Session 1

8:30 am: **Fresnel reflection and Lensef reflection (Presentation Only)**, A. E. Siegman, Stanford Univ.

8:45 am: **How optical matrix-vector multiplication research spawned the reflective display industry (Presentation Only)**, K. M. Johnson, Duke Univ.

9:00 am: **Joe Goodman: mentor and shepherd (Presentation Only)**, A. Macovski, Stanford Univ.

9:15 am: **Title to be announced (Presentation Only)**, A. A. Sawchuk, Univ. of Southern California

9:30 am: **Recent advances in ESPI (Presentation Only)**, J. C. Wyant, College of Optical Sciences/The Univ. of Arizona

9:45 am: **Title to be announced (Presentation Only)**, L. Hesselink, Stanford Univ.

Coffee Break 10:00 to 10:15 am

SESSION 2

Room: Conv. Ctr. 31C Wed. 10:15 am to 12:00 pm

Session 2

10:15 am: **Progress in speckle statistics (Presentation Only)**, H. H. Barrett, College of Optical Sciences/The Univ. of Arizona

10:30 am: **Fourier transforms and logic (Presentation Only)**, J. Bruck, California Institute of Technology

10:45 am: **Dr. Goodman's contributions to the field of holography (Presentation Only)**, R. K. Kostuk, The Univ. of Arizona

11:00 am: **Title to be announced (Presentation Only)**, E. Ochoa, NASA Johnson Space Ctr.

11:15 am: **Title to be announced (Presentation Only)**, R. A. Sprague, SiPix Imaging Inc.

11:30 am: **Title to be announced (Presentation Only)**, J. R. Fienup, Univ. of Rochester

11:45 am: **From good man to gold man (Presentation Only)**, J. D. Gaskill, College of Optical Sciences/The Univ. of Arizona

Lunch Break 12:00 to 2:00 pm

SESSION 3

Room: Conv. Ctr. 31C Wed. 2:00 to 3:15 pm

Session 3

2:00 pm: **Title to be announced (Presentation Only)**, Y. Tsunoda, Hitachi-Maxell (Japan)

2:15 pm: **Memories from the early years of the Goodman Group (Presentation Only)**, J. F. Walkup, Emeritus Texas Tech. Univ.

2:30 pm: **Joe's first PhD student; Probe Storage at Nanochip, Inc. (Presentation Only)**, G. R. Knight, Nanochip, Inc.

2:45 pm: **Discrete optical computing research under Prof. Joseph W. Goodman (Presentation Only)**, A. R. Dias, Dias Associates

3:00 pm: **Title to be announced (Presentation Only)**, B. L. Shoop, U.S. Military Academy

Coffee Break 3:15 to 3:30 pm

SESSION 4

Room: Conv. Ctr. 31C Wed. 3:15 to 4:30 pm

Session 4

3:15 pm: **Limits in optics (Presentation Only)**, D. A. B. Miller, Stanford Univ.

3:30 pm: **Title to be announced (Presentation Only)**, M. Farn, Consultant

3:45 pm: **Engineering education and what I learned from Joe (Presentation Only)**, E. W. Hansen, Dartmouth College

4:00 pm: **Title to be announced (Presentation Only)**, C. J. Chang-Hasnain, Univ. of California/Berkeley

4:15 pm: **The concept of coherence in classical optics (Presentation Only)**, M. Mansuripur, College of Optical Sciences/The Univ. of Arizona

Conference 6664 • Conv. Ctr. 33B

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6664

The Nature of Light: What Are photons?

Conference Chairs: **Chandrasekhar Roychoudhuri**, Univ. of Connecticut; **Al F. Kracklauer**, Consultant (Germany); **Katherine Creath**, Optinering and Univ. of Arizona

Program Committee: **Shahriar S. Afshar**, Rowan Univ.; **Robert W. Boyd**, Univ. of Rochester; **Benjamin J. Eggleton**, The Univ. of Sydney (Australia); **Margaret H. Hawton**, Lakehead Univ. (Canada); **Subhash C. Kak**, Louisiana State Univ.; **Andrei Y. Khrennikov**, Växjö Univ. (Sweden); **Thomas F. Krauss**, Univ. of St. Andrews (United Kingdom); **Akhlesh Lakhtakia**, The Pennsylvania State Univ.; **Ashok Muthukrishnan**, Texas A&M Univ.; **John M. Myers**, Harvard Univ.; **Narasimha S. Prasad**, NASA Langley Research Ctr.; **Michael G. Raymer**, Univ. of Oregon; **Wolfgang P. Schleich**, Univ. Ulm (Germany); **Marlan O. Scully**, Texas A&M Univ. and Princeton Univ.; **Weilong She**, Sun Yat-Sen Univ. (China); **C. S. Unnikrishnan**, Tata Institute of Fundamental Research (India); **Ian A. Walmsley**, Univ. of Oxford (United Kingdom); **Herbert G. Winful**, Univ. of Michigan; **Ewan M. Wright**, Optical Sciences Ctr./Univ. of Arizona

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Sunday 26 August

Conv. Ctr. 33B Sun. 9:00 to 9:10 am

Welcome and Introduction

Chairs: **Chandrasekhar Roychoudhuri**, Univ. of Connecticut; **Al F. Kracklauer**, Bauhaus Univ. Weimar (Germany); **Katherine Creath**, The Univ. of Arizona

SESSION 1

Conv. Ctr. 33B Sun. 9:10 to 11:30 am

Information and Wave-Particle Duality

Chairs: **Al F. Kracklauer**, Bauhaus Univ. Weimar (Germany); **Chandrasekhar Roychoudhuri**, Univ. of Connecticut

9:10 am: **The inexhaustible source of insights revealed by every photon (Invited Paper)**, A. C. Elitzur, (Israel) [6664-36]

9:40 am: **What is the information in a photon? (Invited Paper)**, S. C. Kak, Louisiana State Univ. [6664-01]

10:10 am: **Can a deeper understanding of the nature of light remove the wave-particle duality?**, C. Roychoudhuri, R. Crudo, Univ. of Connecticut [6664-02]

10:30 am: **Can we get any new information about the nature of light by comparative study of the radio and light wave communication processes?**, C. Roychoudhuri, Univ. of Connecticut; P. Poulos, Manchester Community College [6664-12]

10:50 am: **Photons as beat frequency envelopes**, D. J. Maker, Photon Research Associates, Inc. [6664-03]

11:10 am: **A self-consistent picture of wave-particle duality of light**, Y. Gan, Hubei Univ. (China); W. Wang, Vrije Univ. Brussel (Netherlands) [6664-04]

Lunch Break 11:30 am to 1:10 pm

SESSION 2

Conv. Ctr. 33B Sun. 1:10 to 3:10 pm

Theoretical Formulations

Chairs: **Herbert G. Winful**, Univ. of Michigan; **Margaret H. Hawton**, Lakehead Univ. (Canada)

1:10 pm: **Photon position eigenvectors lead to Dirac-like wave mechanics (Invited Paper)**, M. H. Hawton, Lakehead Univ. (Canada) [6664-05]

1:40 pm: **Einstein's dream (Invited Paper)**, A. Y. Khrennikov, Växjö Univ. (Sweden) and International Center for Mathematical Modeling in Physics, Engineering, Economy and Cognitive Sc. (Sweden) [6664-06]

2:10 pm: **Light quantum from classical electromagnetic theory (Invited Paper)**, W. She, Sun Yat-Sen Univ. (China) [6664-07]

2:40 pm: **Single photons cannot be extracted from the light of multi-atom light sources (Invited Paper)**, K. O. Greulich, Fritz Lipmann Institute (Germany) [6664-08]

Coffee Break 3:10 to 3:30 pm

SESSION 3

Conv. Ctr. 33B Sun. 3:30 to 5:30 pm

Fundamental Properties of Photons

Chairs: **Wolfgang P. Schleich**, Univ. Ulm (Germany); **Narasimha S. Prasad**, NASA Langley Research Ctr.

3:30 pm: **Do single photons travel faster than light? (Invited Paper)**, H. G. Winful, Univ. of Michigan [6664-09]

4:00 pm: **The lateral displacement of a moving image on transmission through a stationary glass window (Invited Paper)**, M. J. Padgett, J. Leach, Univ. of Glasgow (United Kingdom); S. Franke-Arnold, L. Allen, A. J. Wright, J. M. Girkin, S. M. Barnett, Univ. of Strathclyde (United Kingdom) [6664-10]

4:30 pm: **Experimental detection of photons emitted during inhibited spontaneous emission (Invited Paper)**, D. A. Branning, Trinity College; A. L. Migdall, National Institute of Standards and Technology [6664-11]

5:00 pm: **The orthodox view of a photon and its problems (Invited Paper)**, W. P. Schleich, Univ. Ulm (Germany) [6664-32]

Reception 5:30 to 6:00 pm

Authors and Friends of "What Are Photons"

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6664 • Conv. Ctr. 33B

Monday 27 August

SESSION 4

Conv. Ctr. 33B **Mon. 8:30 to 10:30 am**

Entanglement, EPR and Stochastic Models

Chairs: **Andrei Y. Khrennikov**, Växjö Univ. (Sweden); **Philip Walther**, Harvard Univ.

8:30 am: **Multi-photon entanglement: from quantum curiosity to linear optics quantum computing** (*Invited Paper*), P. Walther, Harvard Univ. [6664-13]

9:00 am: **What EPR correlations tell us about light** (*Invited Paper*), A. F. Kracklauer, Bauhaus Univ. Weimar (Germany) [6664-15]

9:30 am: **Is the fair sampling assumption supported by EPR experiments?**, G. Adenier, A. Y. Khrennikov, Växjö Univ. (Sweden) [6664-16]

9:50 am: **The natural philosophy of fundamental particles**, R. C. Storti, Delta Group Engineering, P/L (Australia) [6664-29]

10:10 am: **Observation of a significant influence of Earth's motion on the velocity of photons in our terrestrial laboratory**, H. A. Munera, Univ. Nacional de Colombia (Colombia) and Ciudad Univ. (Colombia); D. Hernandez-Deckers, G. Arenas, E. Alfonso, Univ. Nacional de Colombia (Colombia) [6664-37]

Coffee Break 10:30 to 11:00 am

SESSION 5

Conv. Ctr. 33B **Mon. 11:00 am to 12:30 pm**

Experimental Measurements

Chairs: **Shahriar S. Afshar**, Rowan Univ.; **C. S. Unnikrishnan**, Tata Institute of Fundamental Research (India)

11:00 am: **Modifications of the Sagnac effect to detect the chirality of space time** (*Invited Paper*), R. M. Kiehn, Univ. of Houston (France) [6664-17]

11:30 am: **Coherence vortex with orbital angular coherence momentum and wave-particle duality in correlation function**, W. Wang, M. Takeda, The Univ. of Electro-Communications (Japan) [6664-18]

11:50 am: **New tests and clarification of some conceptual issues in the superposition of monochromatic light fields**, A. Gilra, V. Gokhroo, C. S. Unnikrishnan, Tata Institute of Fundamental Research (India) [6664-19]

12:10 pm: **Why Kastner analysis does not apply to a modified Afshar experiment**, E. Flores, E. Knoesel, Rowan Univ. [6664-20]

Lunch Break 12:30 to 2:00 pm

SESSION 6

Conv. Ctr. 33B **Mon. 2:00 to 3:30 pm**

Reconciling Theory and Measurement

Chairs: **Katherine Creath**, The Univ. of Arizona; **Weilong She**, Sun Yat-Sen Univ. (China)

2:00 pm: **Title to be announced**, K. Wharton, San José State Univ. [6664-34]

2:20 pm: **Theory and practice: how do we teach our students about light?**, K. Creath, The Univ. of Arizona [6664-22]

2:40 pm: **Light and the observer: new experiments and a critique of our common beliefs** (*Invited Paper*), C. S. Unnikrishnan, Tata Institute of Fundamental Research (India) [6664-23]

3:10 pm: **Can the hypothesis 'photon interferes only with itself' be reconciled with heterodyne mixing of various sources and the consequent temporal correlations?**, C. Roychoudhuri, Univ. of Connecticut; N. S. Prasad, NASA Langley Research Ctr. [6664-24]

Coffee Break 3:40 to 4:00 pm

Panel Discussion **4:00 to 5:00 pm**
Can a photon be both localized within a laser pulse and non-localized when in an interferometer?

Reception **5:00 to 6:00 pm**
Networking, and Discussion - Authors and Friends of "What Are Photons"

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D **Mon. 6:00 to 7:30 pm**

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **A complete description and applications for a photon**, Z. Yao, J. Zhong, B. Pan, Zhejiang Univ. (China) [6664-25]
- ✓ **Nonlocality as consequence of PDE type**, D. J. Maker, Photon Research Associates, Inc. [6664-28]
- ✓ **The principle of frequency interaction and photo-electronic conversion of the mass wave**, C. Dayong, Beijing Natural Providence Science & Technology [6664-31]
- ✓ **Photon as a classical wave packet from classically stabilized electron orbits**, J. O. Jonson, Stockholm Univ. (Sweden) [6664-33]
- ✓ **What is a photon?**, G. Mardari, Rutgers Univ. [6664-35]

Conference 6665 • Conv. Ctr. 24C

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6665

New Developments in Optomechanics

Conference Chair: **Alson E. Hatheway**, Alson E. Hatheway, Inc.

Program Committee: **Anees Ahmad**, Raytheon Co.; **Joseph Antebi**, Simpson Gumpertz & Heger Inc.; **Patrick A. Bournes**, MicroMeasure, Inc.; **John M. Casstevens**, Dallas Optical Systems, Inc.; **Robert G. Chave**, RCAP Inc.; **Patrick A. Coronato**, Raytheon Co.; **John G. Daly**, Vector Engineering; **Keith B. Doyle**, Sigmadyne, Inc.; **Robert C. Guyer**, BAE Systems; **Mark J. Hegge**, Ball Aerospace & Technologies Corp.; **Tony B. Hull**, L3 Communications Tinsley; **William J. Lees**, Johns Hopkins Univ.; **Ann F. Shipley**, Univ. of Colorado/Boulder; **Deming Shu**, Argonne National Lab.; **David M. Stubbs**, Lockheed Martin Advanced Technology Ctr.; **Daniel Vukobratovich**, Raytheon Co.; **Paul R. Yoder, Jr.**, Optical Engineering Consultant; **Carl H. Zweben**, Composites Consultant

Tuesday 28 August

Wednesday 29 August

Optomechanical/Instrument Technical Event Marriott Cardiff Tues. 8:00 to 10:00 pm

Chair: **Alson E. Hatheway**, Alson E. Hatheway Inc.

This is the annual meeting of the premier group of optomechanical engineers that design and analyze the world's optical instruments and systems. Our feature speaker will be Larry Stepp who will discuss, **Optomechanical Challenges of the Thirty Meter Telescope**

The Thirty Meter Telescope (TMT) will be an extremely large, ground-based segmented-mirror optical-infrared telescope. Although similar in concept to the Keck Observatory 10-meter telescopes, each Keck telescope has just 36 hexagonal segments, while TMT will have 492! TMT faces new technical challenges because of its size and complexity and new programmatic challenges because of the strong pressure to limit its cost and complete its construction as quickly as possible. Larry Stepp is the TMT Telescope Department Head. His department is responsible for the telescope structure, optics and controls.

This gathering is open to all attendants to the Optics and Photonics Symposium. Anyone who wishes to put an item on the agenda should contact the Chair [Al Hatheway: aeh@aehinc.com]. One agenda item will certainly be the advance planning of our biennial conference on Optomechanics for year-after-next's (2009's) Optics and Photonics Symposium.

Following the speakers and other agenda items the floor will be open for our traditional 'Problems and Solutions Workshop' session so bring some challenges for the group.

Courses of Related Interest

See SPIE Cashier for information.

SC014 Introduction to Optomechanical Design (Vukobratovich)
Sunday/Monday 26-27, 8:30 am - 5:30 pm

SC015 Structural Adhesives for Optical Bonding (Daly) Wednesday
29, 8:30 am - 12:30 pm

SC218 Advanced Composite Materials for Optomechanical Systems
(Zweben) Tuesday 28, 8:30 am - 5:30 pm

SC219 Materials: Properties and Fabrication for Stable Optical
Systems (Paquin) Wednesday 29, 8:30 am - 5:30 pm

SC254 Integrated Opto-Mechanical Analysis (Genberg, Michels,
Doyle) Wednesday 29, 8:30 am - 5:30 pm

SC447 Principles for Mounting Optical Components (Yoder) Tuesday/
Wednesday 28-29, 8:30 am - 5:30 pm

SC561 Optomechanics for Space Applications (Shipley) Tuesday 28,
8:30 am - 5:30 pm

SC781 Optomechanical Analysis (Hatheway) Tuesday 28, 8:30 am -
5:30 pm

SESSION 1

Conv. Ctr. 24C Wed. 1:30 to 3:10 pm

Design I

Chair: **Alson E. Hatheway**, Alson E. Hatheway, Inc.

1:30 pm: **Design and test of an airborne IR countermeasures hyper-hemispherical silicon dome**, M. J. Bender, R. C. Guyer, BAE Systems; T. E. Fenton, Exotic Electro-Optics, Inc. [6665-01]

1:50 pm: **Athermal bonded mounts**, C. L. Monti, Raytheon Missile Systems [6665-02]

2:10 pm: **Designing elastomeric mirror mountings**, A. E. Hatheway, Alson E. Hatheway, Inc. [6665-03]

2:30 pm: **Design and analysis of the composite spider structure within the Kepler Schmidt telescope**, M. J. Hegge, R. G. Wendland, C. D. Miller, Ball Aerospace & Technologies Corp. [6665-04]

2:50 pm: **An integrated LED luminance-uniform device for light guide plate applications**, Z. Chen, C. Chien, Tatung Univ. (Taiwan) [6665-05]

Coffee Break 3:10 to 3:40 pm

SESSION 2

Conv. Ctr. 24C Wed. 3:40 to 5:40 pm

Adhesives and Composites

Chair: **John G. Daly**, Vector Engineering

3:40 pm: **A survey of technical literature on adhesive applications for optics**, K. S. Prabhu, Univ. of Florida; J. G. Daly, Vector Engineering; T. L. Schmitz, P. G. Ifju, Univ. of Florida [6665-06]

4:00 pm: **Index matching silicone for optoelectronic applications**, B. Riegler, R. Thomaier, R. Elgiin, NuSil Technology LLC [6665-07]

4:20 pm: **Advances in adhesive-free bonding technologies for precision optics**, T. Turner, J. A. Aust, D. C. Ness, A. Woolverton, Research Electro-Optics, Inc. [6665-08]

4:40 pm: **Lightweight optical telescope structures fabricated from CFRP composites**, R. N. Martin, R. C. Romeo, Composite Mirror Applications, Inc. [6665-09]

5:00 pm: **Calculation of the elastic properties of a triangular cell core for lightweight composite mirrors**, F. E. Penado, Northern Arizona Univ.; J. H. Clark III, J. P. Walton, Naval Research Lab.; R. C. Romeo, R. N. Martin, Composite Mirror Applications, Inc. [6665-10]

5:20 pm: **Final assembly of the ULTRA 1-m carbon fiber optical telescope**, R. C. Romeo, R. N. Martin, Composite Mirror Applications, Inc.; P. B. Etzel, San Diego State Univ.; B. Twarog, Univ. of Kansas [6665-11]

Conference 6665 • Conv. Ctr. 24C

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

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- ✓ **Design and performance of a compact collimator at GM/CA-CAT**, S. Xu, R. Fischetti, Argonne National Lab. [6665-33]
- ✓ **MIRI telescope simulator (MTS) current status**, F. J. Herrada, Instituto Nacional de Técnica Aeroespacial (Spain) [6665-35]
- ✓ **Mechanical support system of some laser megajoule large-dimension optical components**, S. Noailles, T. Bart, P. Schmitz, A. Hugget, R. Ferbos, S. Bouillet, C. Leymarie, S. Martin, Commissariat à l'Energie Atomique (France) [6665-36]
- ✓ **Analysis and design of an optical spherometer with an adaptive lens**, A. Santiago-Alvarado, Univ. Tecnológica de la Mixteca (Mexico); S. Vazquez-Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); J. Gonzalez-Garcia, Univ. Tecnológica de la Mixteca (Mexico) [6665-38]
- ✓ **Current techniques and tools for aligning an optical array at the Navy prototype optical interferometer**, J. H. Clark III, Naval Research Lab.; J. P. Walton, Interferometrics Inc. [6665-39]
- ✓ **Optical mount modifications for increased articulation at the Navy prototype optical interferometer**, J. H. Clark III, Naval Research Lab.; J. P. Walton, Interferometrics Inc.; F. E. Penado, D. L. Smith, Northern Arizona Univ. [6665-40]
- ✓ **Design of asymmetrically-loaded end-plates with vacuum seal surfaces for the Navy prototype optical interferometer**, J. P. Walton, Interferometrics Inc.; J. H. Clark III, Naval Research Lab.; F. E. Penado, Northern Arizona Univ. [6665-41]

Thursday 30 August

SESSION 3

Conv. Ctr. 24C Thurs. 8:30 to 10:10 am

Design II

Chair: **Alson E. Hatheway**, Alson E. Hatheway, Inc.

- 8:30 am: **Fine steering mirror for the James Webb space telescope**, M. A. Ostaszewski, W. Vremeer, Ball Aerospace & Technologies Corp. ... [6665-12]
- 8:50 am: **Design of a flex pivot protection device and a stress-free beamsplitter mount for GOSAT FTS**, D. Duquette, N. Etienne, H. L. Buijs, ABB Inc. (Canada) [6665-13]
- 9:10 am: **Active tangent link system for transverse support of large thin meniscus mirrors**, D. R. Neill, V. L. Krabbendam, J. R. Andrew, National Optical Astronomy Observatory; S. R. Heathcote, Cerro Tololo Inter-American Observatory (Chile); M. Warner, B. Gregory, G. Schumacher, NOAO/Cerro Tololo (Chile) [6665-14]
- 9:30 am: **Design optimization of a multi-axis passive isolation configuration for MLC D**, K. B. Doyle, Sigmadyne, Inc. [6665-15]
- 9:50 am: **A study on the optomechanical tolerance model for lens assembly**, C. C. Cheng, National Chiao Tung Univ. (Taiwan); T. Y. Lin, Chung Cheng Institute of Technology (Taiwan); R. H. Chen, National Chiao Tung Univ. (Taiwan) [6665-16]
- Coffee Break 10:10 to 10:40 am

SESSION 4

Conv. Ctr. 24C Thurs. 10:40 am to 12:20 pm

System Analysis

Chair: **Deming Shu**, Argonne National Lab.

- 10:40 am: **Line-of-sight jitter analysis for MLC D**, K. B. Doyle, Sigmadyne, Inc. [6665-17]
- 11:00 am: **Design and analysis of a rotationally resistant floor for a telescope enclosure**, P. G. Wood, F. E. Penado, Northern Arizona Univ.; J. H. Clark III, J. P. Walton, Naval Research Lab. [6665-18]
- 11:20 am: **Analysis of thermal stress and deformation in elastically bonded optics**, V. M. Ryaboy, Newport Corp. [6665-19]
- 11:40 am: **Pier vibration isolation for lightweight interferometry telescopes**, P. G. Wood, F. E. Penado, Northern Arizona Univ.; J. H. Clark III, J. P. Walton, Naval Research Lab. [6665-20]
- 12:00 pm: **Ivory optomechanical tools for controlling random vibration effects**, A. E. Hatheway, Alson E. Hatheway, Inc. [6665-21]
- Lunch/Exhibition Break 12:20 to 1:40 pm

SESSION 5

Conv. Ctr. 24C Thurs. 1:40 to 3:00 pm

Design III

Chair: **Anees Ahmad**, Raytheon Co.

- 1:40 pm: **Mechanical design of a high-resolution x-ray powder diffractometer at the advanced photon source**, D. Shu, P. L. Lee, C. A. Preissner, M. Ramanathan, M. A. Beno, R. Von Dreele, R. Ranay, L. Ribaud, C. Kurtz, J. Xuesong, P. R. Jemian, B. Toby, Argonne National Lab. ... [6665-22]
- 2:00 pm: **Precision mechanical design of an UHV-compatible artificial channel-cut x-ray monochromator**, D. Shu, S. Narayanan, A. R. Sandy, M. S. Sprung, C. A. Preissner, J. Sullivan, Argonne National Lab. [6665-23]
- 2:20 pm: **Experimental investigation and model development**, C. A. Preissner, D. Shu, Argonne National Lab.; T. J. Royston, Univ. of Illinois/Chicago [6665-24]
- 2:40 pm: **Performance evaluations of the ATST secondary mirror**, M. K. Cho, J. R. DeVries, National Optical Astronomy Observatory; E. R. Hansen, National Solar Observatory [6665-25]
- Coffee Break 3:00 to 3:30 pm

SESSION 6

Conv. Ctr. 24C Thurs. 3:30 to 5:30 pm

Design of Systems

Chair: **Alson E. Hatheway**, Alson E. Hatheway, Inc.

- 3:30 pm: **Shroud Debris Modeling Techniques for IR Sensors in Space**, A. Ahmad, A. VanderWyst, D. G. Jenkins, Raytheon Missile Systems ... [6665-27]
- 3:50 pm: **Actuators with 10 mm stroke and less than 300 nm of runout**, A. E. Hatheway, Alson E. Hatheway, Inc. [6665-28]
- 4:10 pm: **Optomechanical design for the SCUBA-2 polarimeter**, S. Bernier, Institut National d'Optique (Canada); P. Bastien, Univ. de Montreal (Canada); M. R. Leclerc, Institut National d'Optique (Canada); É. Bissonnette, Univ. de Montréal (Canada) [6665-29]
- 4:30 pm: **New design of the laser megajoule final optics assembly**, A. Hugget, E. Journot, R. Ferbos, F. Macias, P. Fayollas, Commissariat à l'Energie Atomique (France) [6665-30]
- 4:50 pm: **Optomechanical design of a field-deployable thermal weapon sight**, M. Boucher, N. J. Desnoyers, S. Bernier, A. Bergeron, M. Doucet, F. Lagacé, Institut National d'Optique (Canada); P. Laou, Defence Research and Development Canada (Canada) [6665-31]
- 5:10 pm: **Three-dimensional MCAD parametric solid modeling as a tool for conceptual opto-mechanical hardware development programs**, R. M. Friedman, DTCL [6665-32]

Conference 6666 • Conv. Ctr. 25A

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6666

Optical Materials and Structures Technologies III

Conference Chair: **William A. Goodman**, Schafer Corp.

Cochair: **Joseph L. Robichaud**, L-3 SSG-Tinsley

Program Committee: **Ray Boucarut**, NASA Goddard Space Flight Ctr.; **Carol A. Click**, SCHOTT North America, Inc.; **David A. Content**, NASA Goddard Space Flight Ctr.; **Brett J. de Blonk**, Air Force Research Lab.; **Douglas Deason**, U.S. Army Space and Missile Defense Command; **Marc T. Jacoby**, Schafer Corp.; **Matthias R. Krödel**, ECM GmbH (Germany); **Thomas B. Parsonage**, Brush Wellman Inc.; **John W. Pepi**, L-3 SSG-Tinsley; **David N. Strafford**, ITT Industries, Inc.; **Marc Tricard**, QED Technologies Inc.; **David V. Wick**, Sandia National Labs.

Sunday 26 August

SESSION 1

Conv. Ctr. 25A Sun. 8:30 to 9:50 am

Glass and Glass-Ceramics

Chair: **Carol A. Click**, SCHOTT North America, Inc.

8:30 am: **Manufacturing of lightweighted ZERODUR components at SCHOTT**, T. Doehring, R. Jedamzik, H. Kohlmann, A. Thomas, P. Hartmann, SCHOTT AG (Germany) [6666-01]

8:50 am: **Strength aspects for the design of ZERODUR glass ceramics structures**, P. Hartmann, K. Nattermann, T. Doehring, M. Kuhr, P. Thomas, SCHOTT AG (Germany); G. Kling, P. F. Gath, S. Lucarelli, EADS Astrium GmbH (Germany) [6666-02]

9:10 am: **Athermal glass by design**, W. A. Goodman, Schafer Corp. [6666-03]

9:30 am: **Optimization of spectralon through numerical modeling and improved processes**, B. Y. Chang, R. M. Huppe, Jr., D. P. D'Amato, Labsphere, Inc. [6666-04]

SESSION 2

Conv. Ctr. 25A Sun. 9:50 am to 12:00 pm

SiC Processing and Characterization I

Chair: **Brett J. de Blonk**, Air Force Research Lab.

9:50 am: **Chemical vapor composite silicon carbide fabrication methods and techniques**, K. Webb, C. T. Tanaka, Kauai Advanced Materials [6666-05]

10:10 am: **Development of lightweight SiC mirrors for the space infrared telescope for cosmology and astrophysics (SPICA) mission**, H. Kaneda, T. Nakagawa, K. Enya, H. Kataza, S. Makiuti, H. Matsuhara, H. Murakami, Y. Y. Yui, Japan Aerospace Exploration Agency (Japan); T. Onaka, The Univ. of Tokyo (Japan) [6666-06]

Coffee Break 10:30 to 11:00 am

11:00 am: **Development of a systematic approach to space qualification of SiC for mirror applications**, I. A. Palusinski, The Aerospace Corp. . [6666-07]

11:20 am: **Metrology guided laser micromachining of SiC for mirrors**, R. L. Jacobsen, M. B. Scott, J. Pitz, Mound Laser & Photonics Ctr., Inc.; A. A. Goshtasby, D. Smith, Wright State Univ. [6666-08]

11:40 am: **Rapid fabrication of lightweight SiC aspheres using reactive atom plasma (RAP) processing**, P. Fiske, G. J. Gardopee, Y. Verma, N. Li, P. K. Subrahmanyam, T. H. Yu, P. R. Sommer, T. E. Kyler, RAPT Industries, Inc. [6666-09]

Lunch Break 12:00 to 1:00 pm

SESSION 3

Conv. Ctr. 25A Sun. 1:00 to 1:40 pm

SiC Processing and Characterization II

Chair: **Brett J. de Blonk**, Air Force Research Lab.

1:00 pm: **Characterization of hydrogenated silicon carbide produced by plasma enhanced chemical vapor deposition at low temperature**, G. Taglioni, Galileo Avionica SpA (Italy) [6666-10]

1:20 pm: **Ultrasonic nondestructive evaluation of silicon carbide lightweight mirror systems**, R. A. Haber, Rutgers Univ. [6666-11]

SESSION 4

Conv. Ctr. 25A Sun. 1:40 to 3:00 pm

Silicon + Carbon = Silicon Carbide I

Chair: **John W. Pepi**, L-3 SSG-Tinsley

1:40 pm: **SiC-SiC composite optics for UV applications**, W. Kowbel, Materials and Electrochemical Research Corp. [6666-12]

2:00 pm: **HBCesicâ composites for space optics and structures**, M. R. Krödel, ECM GmbH (Germany); T. Ozaki, Mitsubishi Electric Corp. (Japan) [6666-13]

2:20 pm: **Design and fabrication of a single crystal silicon (SCSi) telescope: a success story**, D. R. McCarter, R. A. Paquin, E. T. McCarter, McCarter Machine, Inc. [6666-14]

2:40 pm: **Investigation of bonding methods for single crystal silicon (SCSi) to itself and to other materials**, R. A. Paquin, D. R. McCarter, E. T. McCarter, McCarter Machine, Inc. [6666-15]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Conv. Ctr. 25A Sun. 3:30 to 4:50 pm

Silicon + Carbon = Silicon Carbide II

Chair: **Matthias R. Krödel**, ECM GmbH (Germany)

3:30 pm: **Carbon-carbon mirrors for exoatmospheric and space applications**, D. E. Krumweide, San Diego Composites LLC [6666-16]

3:50 pm: **Converted silicon carbide technology developments for optics**, C. J. Duston, K. M. Woestman, H. Vargus, Poco Graphite, Inc.; B. J. de Blonk, Air Force Research Lab. [6666-17]

4:10 pm: **NTSIC: progress in recent two years**, K. Tsuno, H. Irikado, K. Ono, NEC TOSHIBA Space Systems, Ltd. (Japan); Y. Itoh, S. Suyama, Toshiba Corp. (Japan) [6666-18]

4:30 pm: **NT-SiC(r) mirror for space application: new advances in manufacture of high-strength reaction-sintered silicon carbide**, S. Suyama, Y. Itoh, Toshiba Corp. (Japan); K. Tsuno, K. Ohno, H. Irikado, NEC TOSHIBA Space Systems, Ltd. (Japan) [6666-19]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6666 • Conv. Ctr. 25A

Monday 27 August

SESSION 6

Conv. Ctr. 25A Mon. 8:30 to 10:30 am

Silicon + Carbon = Silicon Carbide III

Chair: Joseph L. Robichaud, L-3 SSG-Tinsley

8:30 am: **Fabrication and optical characterization of a segmented and brazed mirror assembly**, D. A. Bath, S. C. Williams, CoorsTek, Inc.; M. Bougoin, BOOSTEC S.A. (France); G. J. Gardopée, RAPT Industries, Inc. [6666-20]

8:50 am: **Cesic(r) and silicon: a perfect combination for high-performance applications**, M. R. Krödel, ECM GmbH (Germany); R. Graue, Kayser-Threde GmbH (Germany); M. J. Collon, cosine Research B.V. (Netherlands) [6666-21]

9:10 am: **Manufacturing of a 3D complex hyperstable Cesic(r) structure**, M. R. Krödel, ECM GmbH (Germany) [6666-22]

9:30 am: **Polishability and thermal stability of reaction bonded silicon carbide**, J. L. Robichaud, S. E. Mason, M. Peters, G. Deveau, A. Akerstrom, D. Landry, B. Cozzens, L-3 SSG-Tinsley [6666-23]

9:50 am: **Lightweight optical assembly using graphite composite structure, C/SiC interface, and silicon mirrors**, T. G. Stern, DR Technologies Inc. [6666-24]

10:10 am: **SLMS(tm) athermal technology for high-quality wavefront control of HEL tactical airborne and relay mirror beam control applications**, W. A. Goodman, M. T. Jacoby, Schafer Corp. [6666-25]

Coffee Break 10:30 to 11:00 am

SESSION 7

Conv. Ctr. 25A Mon. 11:00 am to 12:00 pm

Beryllium and Metals I

Chair: Thomas B. Parsonage, Brush Wellman Inc.

11:00 am: **Laser produced Fe-TiC composite coatings on Al-Si alloy**, A. Viswanathan, D. Sastikumar, National Institute of Technology (India); K. Harish, N. Ashish Kumar, Raja Ramanna Ctr. for Advanced Technology (India) [6666-26]

11:20 am: **Cryogenic design and predicted performance of the James Webb space telescope beryllium aft optics subsystem optical bench**, K. L. Martinez, J. F. Sullivan, A. A. Barto, J. A. Lewis, R. A. Franck, T. E. Dreher, B. A. Shogrin, J. T. Sokol, Ball Aerospace & Technologies Corp. [6666-27]

11:40 am: **Beryllium optics and beryllium-aluminum structures for reconnaissance applications**, M. J. Russo, J. Bernabeo, B. Coon, M. Engelhardt, W. Pinzon, BAE Systems [6666-28]

Lunch Break 12:00 to 1:30 pm

SESSION 8

Conv. Ctr. 25A Mon. 1:30 to 2:30 pm

Beryllium and Metals II

Chair: Thomas B. Parsonage, Brush Wellman Inc.

1:30 pm: **Mirrors from light-weight sintered micro-spheres combined with replication techniques**, M. P. Ulmer, Northwestern Univ.; D. Baker, Advanced Powder Solutions; A. J. Davis, S. R. Ehlert, Northwestern Univ.; T. Kaye, Spectrashift.com; M. E. Graham, S. Vaynman, Northwestern Univ. . . [6666-29]

1:50 pm: **The limits of classical beam theory for bent strip residual stress measurements in plated metals**, T. M. Sanderson, Raytheon Missile Systems and The Univ. of Arizona [6666-30]

2:10 pm: **AlBe shaped blank technology**, J. Knapp, Brush Wellman Inc. [6666-31]

SESSION 9

Conv. Ctr. 25A Mon. 2:30 to 5:40 pm

MASTER's Session

Chair: William A. Goodman, Schafer Corp.

2:30 pm: **Telescope materials (r)evolution: a historical perspective (Invited Paper)**, R. A. Paquin, Advanced Materials Consultant [6666-32]

3:00 pm: **The evolution of thin surface films for space optical systems (Invited Paper)**, J. B. Heaney, Swales Aerospace [6666-33]

Coffee Break 3:30 to 3:55 pm

3:55 pm: **Materials for high-energy laser windows: how thermal lensing and thermal stresses control the performance (Invited Paper)**, C. A. Klein, C.A.K. Analytics, Inc. [6666-34]

4:25 pm: **Optomechanical design, engineering, and fabrication: 60 years of evolution (Invited Paper)**, P. R. Yoder, Jr., Optical Engineering Consultant [6666-35]

4:55 pm: **History of the development of hot-pressed and chemical-vapor-deposited zinc sulfide and zinc selenide in the United States (Invited Paper, Presentation Only)**, D. C. Harris, Naval Air Warfare Ctr. [6666-36]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

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✓ **Theoretical analysis for double-liquid variable focus lens**, R. Peng, J. Chen, S. Zhuang, Shanghai Univ. of Science and Technology (China) [6666-38]

✓ **Cryogenic performance of piezo-electric actuators for opto-mechanical applications**, P. G. Halverson, T. J. Parker, M. B. Levine, Jet Propulsion Lab. [6666-42]

Courses of Related Interest

See SPIE Cashier for information.

SC014 Introduction to Optomechanical Design (Vukobratovich) Sunday/Monday 26-27, 8:30 am - 5:30 pm

SC015 Structural Adhesives for Optical Bonding (Daly) Wednesday 29, 8:30 am - 12:30 pm

SC218 Advanced Composite Materials for Optomechanical Systems (Zweben) Tuesday 28, 8:30 am - 5:30 pm

SC219 Materials: Properties and Fabrication for Stable Optical Systems (Paquin) Wednesday 29, 8:30 am - 5:30 pm

SC254 Integrated Opto-Mechanical Analysis (Genberg, Michels, Doyle) Wednesday 29, 8:30 am - 5:30 pm

SC561 Optomechanics for Space Applications (Shiple) Tuesday 28, 8:30 am - 5:30 pm

SC781 Optomechanical Analysis (Hatheway) Tuesday 28, 8:30 am - 5:30 pm

Conference 6667 • Conv. Ctr. 24C

Monday 27 August 2007 • Proceedings of SPIE Vol. 6667

Current Developments in Lens Design and Optical Engineering VII

Conference Chairs: **Pantazis Z. Mouroulis**, Jet Propulsion Lab.; **Warren J. Smith**, Rockwell Collins Optronics; **R. Barry Johnson**, PanTechne Corp.

Program Committee: **Florian Bociort**, Technische Univ. Delft (Netherlands); **Apostolos Deslis**, InPhase Technologies; **Robert E. Fischer**, OPTICS 1, Inc.; **Virendra N. Mahajan**, The Aerospace Corp.; **Simon Thibault**, ImmerVision (Canada); **Daniel W. Wilson**, Jet Propulsion Lab.; **Andrew P. Wood**, QIOPTIQ (United Kingdom); **James M. Zavislan**, Univ. of Rochester

Monday 27 August

SESSION 1

Conv. Ctr. 24C Mon. 8:00 to 10:10 am

Lens Design and Applications

Chair: **Virendra N. Mahajan**, The Aerospace Corp.

- 8:00 am: **Advances in tuneable imaging technologies: electrically variable lens (Invited Paper)**, T. V. Galstian, V. V. Presniakov, K. E. Asatryan, A. Tork, A. V. Zohrabyan, A. Bagramyan, Univ. Laval (Canada) [6667-01]
- 8:30 am: **New generation of high-resolution panoramic lenses**, S. Thibault, ImmerVision (Canada) [6667-02]
- 8:50 am: **Design and analysis of a diffractive astigmatic lens for DVD pickup**, W. Chen, Univ. of Minnesota/Twin Cities; C. Chen, National Tsing Hua Univ. (Taiwan) [6667-03]
- 9:10 am: **Large-format telecentric lens**, H. Bai, S. P. Sadoulet, Edmund Optics Inc. [6667-04]
- 9:30 am: **Rear landscape on steroids**, P. Z. Mouroulis, Jet Propulsion Lab. [6667-05]
- 9:50 am: **Optical encoder based on a nondiffractive beam**, A. Lutenberg, F. L. Perez-Quintan, M. A. Rebollo, Univ. de Buenos Aires (Argentina) . [6667-06]
- Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 24C Mon. 10:40 am to 12:10 pm

Aberration Theory and Design

Chair: **Simon Thibault**, ImmerVision (Canada)

- 10:40 am: **Practical guide to saddle-point construction in lens design (Invited Paper)**, F. Bociort, M. van Turnhout, O. Marinescu, Technische Univ. Delft (Netherlands) [6667-07]
- 11:10 am: **Predictability and unpredictability in optical system optimization**, M. van Turnhout, F. Bociort, Technische Univ. Delft (Netherlands) . . . [6667-08]
- 11:30 am: **Some properties of Mertz type aspheric surfaces**, T. B. Andersen, Lockheed Martin Corp. [6667-09]
- 11:50 am: **Third order aberration solution using aberration polynomials for a general zoom lens design**, H. K. An, The Univ. of Alabama in Huntsville [6667-10]
- Lunch Break 12:10 to 1:30 pm

SESSION 3

Conv. Ctr. 24C Mon. 1:30 to 3:30 pm

System Modeling I

Chair: **R. Barry Johnson**, PanTechne Corp.

- 1:30 pm: **Vision multiplexing: an optical engineering concept for low-vision aid (Invited Paper)**, E. Peli, Schepens Eye Research Institute [6667-11]
- 2:00 pm: **Bi-centenary celebration of successes of Fourier theorem: not a principle and yet a principal tool for optical system designs (Invited Paper)**, C. Roychoudhuri, Univ. of Connecticut [6667-18]
- 2:30 pm: **Modeling of polychromatic MTF losses due to secondary effects in diffractive lenses**, M. D. Thorpe, R. P. Jonas, S. Szapiel, ELCAN Optical Technologies (Canada) [6667-12]
- 2:50 pm: **Scene-based sensor modeling using optical design software**, J. Fisher, Brandywine Optics, Inc. [6667-13]
- 3:10 pm: **Spectral response evaluation and computation for pushbroom imaging spectrometers**, P. Z. Mouroulis, Jet Propulsion Lab.; R. O. Green, Jet Propulsion Lab. and California Institute of Technology [6667-14]
- Coffee Break 3:30 to 4:00 pm

SESSION 4

Conv. Ctr. 24C Mon. 4:00 to 5:10 pm

System Modeling II

Chair: **James M. Zavislan**, Univ. of Rochester

- 4:00 pm: **Space-variant polarization in optical design (Invited Paper)**, T. G. Brown, Univ. of Rochester [6667-15]
- 4:30 pm: **Stress-induced focal splitting**, A. K. Spilman, T. G. Brown, Institute of Optics [6667-16]
- 4:50 pm: **Analysis of stray light in most complex situations**, J. Perrin, Consultant (France) [6667-17]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Aplanatic hybrid lenses**, S. Vazquez-Montiel, O. García-Liévanos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6667-19]
- ✓ **Mechanical design and analysis of a variable focal length lens**, J. Gonzalez-Garcia, V. M. Cruz-Martinez, A. Santiago-Alvarado, Univ. Tecnológica de la Mixteca (Mexico); S. Vazquez-Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); J. A. Rayas-Alvarez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); A. J. Mendoza-Jasso, Univ. Tecnológica de la Mixteca (Mexico) [6667-20]

Conference 6667 • Conv. Ctr. 24C

- ✓ **Estimating the factors restricting potential dynamic range in the optical scheme of acousto-optical spectrometer for the Mexican large millimeter telescope**, A. S. Shcherbakov, S. E. Balderas-Mata, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6667-21]
- ✓ **A compact camera/handlens/microscope with laser spectroscopy for lunar in-situ resource prospecting**, C. A. Sepulveda, G. S. Mungas, K. R. Johnson, G. Olarte, J. L. Lambert, C. C. La Baw, J. E. Feldman, M. S. Anderson, J. Boynton, Jet Propulsion Lab. [6667-22]
- ✓ **Studies of the manufacturability of the HOE included in objective of BD/DVD combined optical pick-up head according to the objective lens glass type**, N. V. Lisitsyna, Bauman Moscow State Technical Univ. (Russia) [6667-23]
- ✓ **A compact and cost effective design for cell phone zoom lens**, C. Chang, Industrial Technology Research Institute (Taiwan); C. Wu, EFUN Technology (Taiwan) [6667-25]
- ✓ **Simulation of x-ray beamlines with the new ray tracing tool XTrace**, S. Trabelsi-Bauer, Forschungszentrum Karlsruhe (Germany); M. Bauer, Precision Motors Deutsche Minebea GmbH (Germany); R. Steininger, T. Baumbach, Forschungszentrum Karlsruhe (Germany) [6667-26]
- ✓ **Optical design method for high zoom ratio lens with liquid lens and digital signal processing**, Y. Fang, Y. C. Lin, National Kaohsiung First Univ. of Science and Technology (Taiwan) [6667-27]

Tuesday 28 August

Lens Design Technical Event

Marriott Marina D Tues. 8:00 to 10:00 pm

Chairs: **Mary Turner**, Breault Research Organization, Inc.; **Steve Johnston**, Photon Engineering, LLC; **Rich Pfisterer**, Photon Engineering, LLC

Modern Lens Design Methods

Six completely different methods for designing and optimizing optical systems, starting from scratch, will be discussed. Many design examples will illustrate these methods of generating new designs, and some will be demonstrated in real time during the talk. Systems shown range in complexity from a 27 element lithographic lens to a very simple new type of stereo viewer designed for Salvador Dali. Some design methods, like starting from a set of parallel plates, show a very surprising sensitivity to the exact initial conditions. A new and very simple type of perfect optical system (no aberrations of any kind and it forms a flat real image of a flat real object) was invented using no computations of any kind, using one of the six design methods. This material should lead to some interesting discussions by the group.

About the author: **David Shafer** has been a lens designer for 41 years. He is a Fellow of the O.S.A. and received the SPIE Conrady Award in 2005. Dave has had his own design and consulting business since 1980 and mainly works with lithographic and wafer inspection designs. He has a special interest in using aberration theory to generate new types of optical designs and in optimization methods. Dave is 64, but he reads on a 66 year old level.

Courses of Related Interest

See SPIE Cashier for information.

SC003 Practical Optical System Design - EXPANDED 2 Day Format (Fischer) Sunday/Monday 26-27, 8:30 am - 5:30 pm

SC006 Modern Lens Design (Smith) Monday/Tuesday 27-28, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

SC134 Optical Design Fundamentals for Infrared Systems (Riedl) Sunday 26, 8:30 am - 5:30 pm

SC384 The Design of Plastic Optical Systems (Schaub) Monday 27, 1:30 - 5:30 pm

SC552 Aspheric Optics: Design, Fabrication, and Test (Fischer) Wednesday 29, 1:30 - 5:30 pm

SC560 Exploring Optical Aberrations (Mahajan) Sunday 26, 8:30 am - 5:30 pm

SC659 Understanding Reflective Optical Design (Contreras) Monday 27, 8:30 am - 5:30 pm

SC720 Cost-Conscious Tolerancing of Optical Systems (Youngworth) Monday 27, 1:30 - 5:30 pm

SC792 Polarization in Optical Design (Chipman) Sunday 26, 8:30 am - 12:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

Conference 6668 • Conv. Ctr. 24C

Tuesday-Wednesday 28-29 August 2007 • Proceedings of SPIE Vol. 6668

Novel Optical Systems Design and Optimization X

Conference Chairs: **R. John Koshel**, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona; **G. Groot Gregory**, Optical Research Associates

Program Committee: **Jyh-Long Chern**, National Chiao Tung Univ. (Taiwan); **Alexander Epple**, Carl Zeiss AG (Germany); **Joseph M. Howard**, NASA Goddard Space Flight Ctr.; **Richard C. Juergens**, Raytheon Missile Systems; **Scott A. Lerner**, Hewlett-Packard Co.; **Rongguang Liang**, Eastman Kodak Co.; **Andrew B. Locke**, ZEMAX Development Corp.; **Paul K. Manhart**, ASML; **Richard N. Pfisterer**, Photon Engineering, LLC; **Andrew Rakich**, EOS Space Systems Pty. Ltd. (Australia); **Jannick P. Rolland**, College of Optics & Photonics/Univ. of Central Florida; **José M. Sasian**, The Univ. of Arizona; **David L. Shealy**, The Univ. of Alabama/Birmingham; **Donn M. Silberman**, PI Physik Instrumente L.P. and Optics Institute of Southern California; **Marija Strojnik-Scholl**, Ctr. de Investigaciones en Óptica, A.C.; **Kevin P. Thompson**, Optical Research Associates; **Mary G. Turner**, Breault Research Organization, Inc.

Tuesday 28 August

Novel Introduction

Conv. Ctr. 24C Tues. 8:30 to 8:40 am

Chair: **R. John Koshel**, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona

SESSION 1

Conv. Ctr. 24C Tues. 8:40 to 10:10 am

Optical Design

Chair: **Scott A. Lerner**, Hewlett-Packard Co.

8:40 am: **Direct methods for freeform surface design (Invited Paper)**, R. A. Hicks, Drexel Univ. [6668-02]

9:10 am: **Automated transfer of opto-mechanical tolerances from CAD programs to optical codes**, M. S. Boren, R. C. Juergens, Raytheon Missile Systems [6668-03]

9:30 am: **Optical modeling activities for NASA's James Webb Space Telescope (JWST): IV. overview and introduction of Matlab based toolkits used to interface with optical design software**, J. M. Howard, NASA Goddard Space Flight Ctr. [6668-04]

9:50 am: **Evaluation of the wavefront and caustic surfaces within refractive laser beam shapers**, D. L. Shealy, The Univ. of Alabama at Birmingham; J. A. Hoffnagle, IBM Almaden Research Ctr. [6668-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 24C Tues. 10:40 to 11:50 am

'Reduced' Optics

Chair: **Joseph M. Howard**, NASA Goddard Space Flight Ctr.

10:40 am: **Broadband endoscopic imaging through a single fiberoptic channel**, A. L. Kano, A. Gmitro, College of Optical Sciences/The Univ. of Arizona; R. J. Koshel, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona [6668-07]

11:00 am: **Arc-sectioned annular folded imagers (Invited Paper)**, E. J. Tremblay, Univ. of California/San Diego; R. A. Stack, R. L. Morrison, Distant Focus Corp.; J. Ford, Univ. of California/San Diego [6668-08]

11:30 am: **A study of LED light-linear device for light guide plate applications**, Z. Chen, C. Chien, Tatung Univ. (Taiwan) [6668-09]

Lunch Break 11:50 am to 1:30 pm

SESSION 3

Conv. Ctr. 24C Tues. 1:30 to 2:20 pm

Optics Education I

Chair: **Donn M. Silberman**, PI Physik Instrumente L.P. and Optics Institute of Southern California

1:30 pm: **Creating scientific and technical talent through educational outreach**, D. E. Diggs, J. G. Grote, Air Force Research Lab.; K. W. Jones, L. C. Jenkins, U.S. Air Force; I. L. Turner, Freescale Semiconductor, Inc. [6668-10]

1:50 pm: **Professional development in photonics: the advanced technology education projects of the New England board of education (Invited Paper)**, J. F. Donnelly, Three Rivers Community College; F. D. Hanes, New England Board of Higher Education; N. M. Massa, Central Connecticut State Univ. [6668-11]

Break 2:20 to 2:30 pm

SESSION 4

Conv. Ctr. 24C Tues. 2:30 to 3:30 pm

Historical Perspectives in Optical Design

Chair: **G. Groot Gregory**, Optical Research Associates

2:30 pm: **Evidence supporting the primacy of Joseph Petzval in the development of aberration coefficients and their application to lens design (Invited Paper)**, A. Rakich, EOS Space Systems Pty. Ltd. (Australia); R. N. Wilson, European Southern Observatory (Germany) [6668-12]

3:00 pm: **The earliest history of computer-aided optical design on large computers: the previously classified work by James G. Baker 1945-1954 (Invited Paper)**, K. P. Thompson, Optical Research Associates [6668-13]

Coffee Break 3:30 to 4:00 pm

SESSION 5

Conv. Ctr. 24C Tues. 4:00 to 5:40 pm

Optics Education II

Chair: **José M. Sasian**, College of Optical Sciences/The Univ. of Arizona

4:00 pm: **Hands-on optics: an informal science education initiative**, A. M. Johnson, Univ. of Maryland/Baltimore County; S. M. Pompea, National Optical Astronomy Observatory; E. G. Arthurs, SPIE; C. E. Walker, R. T. Sparks, National Optical Astronomy Observatory [6668-14]

4:20 pm: **Teaching lens, optical systems and opto-mechanical systems design at the Irvine Center for Applied Competitive Technologies (CACT)**, V. V. Doushkina, MetroLaser, Inc.; D. M. Silberman, PI Physik Instrumente L.P. and Optics Institute of Southern California [6668-15]

4:40 pm: **A course in illumination engineering**, R. J. Koshel, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona [6668-16]

5:00 pm: **Art + technology in optics educational outreach programs**, D. M. Silberman, Optics Institute of Southern California [6668-17]

5:20 pm: **Finding science is fun in a 'Magic Show of Light' from optical demonstrations on an overhead projector for elementary school students**, J. J. Lones, Adroit Engineering, Inc.; N. K. Maltseva, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russia) and Adroit Engineering, Inc.; K. N. Peterson, Ford Motor Co. and Clarenceville School District Board of Education [6668-18]

Conference 6668 • Conv. Ctr. 24C

Lens Design Technical Event

Marriott Marina D Tues. 8:00 to 10:00 pm

Chairs: **Mary Turner**, Breault Research Organization, Inc.; **Steve Johnston**, Photon Engineering, LLC; **Rich Pfisterer**, Photon Engineering, LLC

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Wednesday 29 August

SESSION 6

Conv. Ctr. 24C Wed. 8:20 to 10:00 am

Optical Systems and Applications

Chair: **Andrew Rakich**, EOS Space Systems Pty. Ltd. (Australia)

8:20 am: **High NA line scanning system**, R. Liang, Eastman Kodak Co. [6668-19]

8:40 am: **Space imaging optical guidance for ground vehicle**, A. Akiyama, Kanazawa Technical College (Japan); N. Kobayashi, Kanazawa Institute of Technology (Japan); E. Mutoh, Kawasaki Heavy Industries, Ltd. (Japan); H. Kumagai, Tamagawa Seiki Co., Ltd. (Japan); H. Yamada, Kanazawa Technical College (Japan); H. Ishii, Nihon Univ. (Japan) [6668-20]

9:00 am: **Volume holographic beam splitter for hyperspectral imaging applications**, J. D. Matchett, R. I. Billmers, E. J. Billmers, M. E. Ludwig, RL Associates Inc. [6668-21]

9:20 am: **A dual channel lens for simultaneous VIS and SWIR imaging in harsh radiation environments**, S. M. Dets, Mattson Technology Canada (Canada) [6668-22]

9:40 am: **Optical deformation sensor based on morphology dependent resonances**, A. M. Rahman, R. Eze, S. Kumar, Polytechnic Univ. [6668-23]

Coffee Break 10:00 to 10:30 am

SESSION 7

Conv. Ctr. 24C Wed. 10:30 to 11:30 am

Optics for Mobile Systems

Chair: **Rongguang Liang**, Eastman Kodak Co.

10:30 am: **Design issues for semi-passive optical communication devices**, I. Glaser, Holon Institute of Technology (Israel) [6668-25]

10:50 am: **Micro-Lens (ML) maker equation of a CMOS image sensor**, Y. Wu, OmniVision Technologies, Inc. [6668-26]

11:10 am: **Zoom lens design of mobilephone camera with global-explorer optimization**, C. Hung, J. Chern, National Chiao Tung Univ. (Taiwan) [6668-28]

Closing Remarks

Conv. Ctr. 24C Wed. 11:30 to 11:40 am

Chairs: **R. John Koshel**, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona; **G. Groot Gregory**, Optical Research Associates

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Design of diffraction optical element applied to resonant cavity LED**, S. Chang, Far East College (Taiwan); T. Liang, National Kaohsiung First Univ. of Science and Technology (Taiwan); H. Huang, National Kaohsiung First Univ. of Science and Technology (Taiwan) [6668-24]
- ✓ **Variable focus photographic lens without mechanical movements**, J. Chen, R. Peng, S. Zhuang, Univ. of Shanghai for Science and Technology (China) [6668-30]
- ✓ **Structural design of a lens component**, S. Chatterjee, L. N. Hazra, Univ. of Calcutta (India) [6668-32]
- ✓ **Novel microscopy in arbitrary step digital holography**, C. Lin, National Central Univ. (Taiwan); G. L. Chen, M. K. Kuo, National Defense Univ. (Taiwan); C. C. Chang, Ming Dao Univ. (Taiwan) [6668-33]
- ✓ **The design of a noble VCSEL with DOE**, T. Liang, National Kaohsiung First Univ. of Science and Technology (Taiwan); S. Chang, Far East College (Taiwan); H. Huang, National Kaohsiung First Univ. of Science and Technology (Taiwan) [6668-34]
- ✓ **Innovative global approach for high-performance low-cost integral field unit (IFU)**, S. Vivès, E. Prieto, Observatoire Astronomique de Marseille Provence (France); Y. Salaun, Winlight Optics (France) [6668-35]
- ✓ **Design of a wavelength-tunable light source using an acousto-optic tunable filter**, H. L. Hall, M. Bridges, Eastman Kodak Co.; S. J. Leavesley, J. P. Robinson, Purdue Univ. [6668-37]

Courses of Related Interest

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SC384 The Design of Plastic Optical Systems (Schaub) Monday 27, 1:30 - 5:30 pm

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SC720 Cost-Conscious Tolerancing of Optical Systems (Youngworth) Monday 27, 1:30 - 5:30 pm

SC792 Polarization in Optical Design (Chipman) Sunday 26, 8:30 am - 12:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

Conference 6669 • Conv. Ctr. 33A

Monday-Wednesday 27-29 August 2007 • Proceedings of SPIE Vol. 6669

Seventh International Conference on Solid State Lighting

Conference Chairs: **Ian T. Ferguson**, Georgia Institute of Technology; **Nadarajah Narendran**, Rensselaer Polytechnic Institute; **Tsunemasa Taguchi**, Yamaguchi Univ. (Japan); **Ian E. Ashdown**, Philips Lighting Co. (Canada)

Program Committee: **Srinath K. Aanegola**, GELcore LLC; **Andrew A. Allerman**, Sandia National Labs.; **William J. Cassarly**, Optical Research Associates; **Lianghui Chen**, Institute of Semiconductors (China); **Makarand H. Chipalkatti**, OSRAM Opto Semiconductors Inc.; **Steven P. DenBaars**, Univ. of California/Santa Barbara; **Kevin J. Dowling**, Color Kinetics Inc.; **Ivan Eliashevich**, IQE RF; **Volker K. Härle**, OSRAM Opto Semiconductors GmbH (Germany); **Matthew H. Kane**, Univ. of Oklahoma; **Asif W. Khan**, Univ. of South Carolina; **Michael R. Krames**, Philips Lumileds Lighting Co.; **Yung-Sheng Liu**, National Tsing Hua Univ. (Taiwan); **Shuji Nakamura**, Univ. of California/Santa Barbara; **Eun-Hyun Park**, Epivalley Co., Ltd. (South Korea); **Seong-Ju Park**, Gwangju Institute of Science and Technology (South Korea); **Yoon-Soo Park**, Rensselaer Polytechnic Institute; **Robert V. Steele**, Strategies Unlimited; **Brent K. Wagner**, Georgia Institute of Technology; **Chih-Chung Yang**, National Taiwan Univ. (Taiwan)

Monday 27 August

SESSION 1

Conv. Ctr. 33A Mon. 8:45 to 10:00 am

LED I

Chair: **Ian T. Ferguson**, Georgia Institute of Technology

- 8:45 am: **History of high-power light emitting diodes (Invited Paper)**, N. F. Gardner, Philips Lumileds Lighting Co. [6669-01]
- 9:15 am: **Vertical GaN based light emitting diodes on metal alloy substrate boosts high power LED performance**, T. Doan, C. Tran, C. Chu, C. Cheng, W. Liu, J. Chu, J. Yen, H. Cheng, F. Fan, Semi-Photonics Co., Ltd. (Taiwan) [6669-02]
- 9:30 am: **Enhancement of light-output and reliability of GaN-based high power green light-emitting diodes using gallium-doped ZnO electrode grown by oxygen plasma enhance PLD**, M. Oh, D. Hwang, J. Lim, J. Kim, Y. Choi, S. Park, Kwangju Institute of Science and Technology (South Korea) [6669-03]
- 9:45 am: **Improving performance of mixed-color white LED systems by using scattered photon extraction technique**, H. Wu, N. Narendran, Y. Gu, A. Bierman, Rensselaer Polytechnic Institute [6669-59]
- Coffee Break 10:00 to 11:00 am

SESSION 2

Conv. Ctr. 33A Mon. 11:00 am to 12:15 pm

Application

Chair: **Nathan F. Gardner**, Philips Lumileds Lighting Co.

- 11:00 am: **High-pressure chemical vapor deposition: an enabling technology for the fabrication of embedded indium rich In_{1-x}Ga_xN heterostructures (Invited Paper)**, N. Dietz, M. Alevli, G. Durkaya, R. Atalay, Georgia State Univ.; W. Fenwick, I. T. Ferguson, Georgia Institute of Technology [6669-19]
- 11:30 am: **Efficient calculation of luminance variation of a luminaire using LED light sources**, P. Goldstein, Dialight Corp. [6669-06]
- 11:45 am: **Solid state lighting applications for volumetric diffusers**, T. L. Kelly, Z. A. Coleman, K. Osborn, M. Chu, Fusion Optix, Inc. [6669-07]
- 12:00 pm: **Direct RGB LED backlight for large area LCD tv**, S. Chung, C. Hsieh, National Central Univ. (Taiwan); I. Moreno, National Central Univ. (Taiwan) and Univ. Autonoma de Zacatecas (Mexico); W. Chien, T. Lee, C. Sun, National Central Univ. (Taiwan) [6669-08]
- Lunch Break 12:15 to 1:30 pm

SESSION 3

Conv. Ctr. 33A Mon. 1:30 to 3:00 pm

Source Performance I

Chair: **Eun-Hyun Park**, Georgia Institute of Technology

- 1:30 pm: **Recent progress on n-UV chip based high-Ra white LEDs (Invited Paper)**, T. Taguchi, Yamaguchi Univ. (Japan) [6669-10]
- 2:00 pm: **Performance and trends of high luminance light emitting diodes**, S. J. Bierhuizen, G. Harbers, Philips Lumileds Lighting Co. [6669-11]
- 2:15 pm: **Peak wavelength shifts and opponent-colors theory**, I. E. Ashdown, M. Salisbury, TIR Systems Ltd. (Canada) [6669-12]
- 2:30 pm: **Uniform color space based on color matching**, S. Liao, C. Lee, T. Yang, National Central Univ. (Taiwan) [6669-13]
- 2:45 pm: **Achieving high CRI from warm to super white**, E. Bailey, Transducin Optics LLC and Lamina Ceramics Inc.; E. S. Tormey, Lamina Ceramics Inc. [6669-14]
- Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 33A Mon. 3:30 to 4:45 pm

LED II

Chair: **Tsunemasa Taguchi**, Yamaguchi Univ. (Japan)

- 3:30 pm: **Surface plasmon coupling with the InGaN/GaN quantum well in a single-quantum-well blue light-emitting diode (Invited Paper)**, D. Yeh, C. Huang, T. Tang, Y. Lu, C. Chen, C. Yang, National Taiwan Univ. (Taiwan) [6669-05]
- 4:00 pm: **Design of high-efficient large area GaN-based LEDs**, T. Lee, C. Chien, C. Hu, C. Sun, National Central Univ. (Taiwan) [6669-16]
- 4:15 pm: **Improved electrostatic discharge withstand capability and optical output power of GaN-based LEDs by wet chemical etching of p-GaN**, T. Park, K. Lee, J. Kim, S. Park, Kwangju Institute of Science and Technology (South Korea); K. Min, SAMSUNG Electro-Mechanics Co., Ltd. (South Korea) [6669-17]
- 4:30 pm: **Photoluminescence dynamics investigation of InGaN/GaN multiple quantum well light-emitting diodes grown by metalorganic chemical vapor deposition**, T. W. Kuo, Z. S. Lee, S. .. Hung, Z. Feng, National Taiwan Univ. (Taiwan); A. G. Li, ShenZhen Fangda GuoKe Optronics Technical Co. Ltd. (China); N. Li, I. T. Ferguson, Georgia Institute of Technology; T. Y. Lin, National Taiwan Ocean Univ. (Taiwan); Y. F. Chen, National Taiwan Univ. (Taiwan) [6669-18]

Conference 6669 • Conv. Ctr. 33A

Illumination Technical Event

Marriott Mission Hills Mon. 8:00 to 10:00 pm

Chair: R. John Koshel, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona

We will present two topics: étendue and state-of-the-art concepts for displays. For the former, speakers from display manufacturers, such as Philips, will be on hand to discuss such display topics as:

- LED displays,
- Visual experience of viewing displays, and
- Future trends in displays.

For the étendue topic, a panel with a moderator will be convened to discuss this very important topic of illumination system design. Étendue describes the geometrical propagation characteristics of optical systems, and for illumination systems it provides a metric for design analysis and limitations. This provides a physical limit analogous to that of the diffraction limit of imaging/lens design. For both topics, each presenter will give a short overview, followed by questions from the audience. If you would like to participate as a presenter in either of these areas, or possibly in another area, please contact John Koshel (john.koshel@osa.org). At the conclusion of the planned agenda the floor will be open to impromptu presentations and questions. Light refreshments will be served. We look forward to your participation.

Tuesday 28 August

Solid State Lighting and OLEDs Plenary Session

Conv. Ctr. 32 A/B 8:30 to 10:00 am

8:30 am: Solid State Lighting: Illumination and Communication (Invited Paper, Presentation Only), I. E. Ashdown, Senior Research Scientist for TIR Systems Ltd. (Canada) and Senior Software Engineer for Lighting Analysts Inc. and President of byHeart Consultants Ltd. (Canada)

9:15 am: Organic LEDs for Lighting Applications (Invited Paper, Presentation Only), J. Kido, Professor, Yamagata Univ. (Japan) and General Director, Research Institute for Organic Electronics (Japan)

See pg. 19-20 for presentation overviews.

Coffee Break 10:00 to 10:30 am

SESSION 5

Conv. Ctr. 32A/B Tues. 10:30 am to 12:10 pm

OLEDs and Solid State Lighting

Joint Session with Conference 6655: Organic Light Emitting Materials and Devices XI

Chair: Ian T. Ferguson, Georgia Institute of Technology

10:30 am: Employing microcavity effects to enhance performances of white-emitting OLEDs (Invited Paper), C. Wu, Y. Lu, T. Cho, National Taiwan Univ. (Taiwan) [6655-31]

10:55 am: InGaN based high efficiency light emitting diode (Invited Paper), E. Park, S. Jeon, C. Kim, D. Kim, J. Park, Epivalley Co., Ltd. (South Korea) [6669-15]

11:20 am: Low-cost manufacturing processes for OLEDs (Invited Paper), J. Liu, C. Ye, L. N. Lewis, A. R. Duggal, GE Global Research [6655-32]

11:45 am: Circadian photoreception and the use of physiologically adaptive LEDs (PALs) to treat dysfunctions of the circadian system (Invited Paper), G. Tosini, Morehouse School of Medicine; I. T. Ferguson, Georgia Institute of Technology [6669-21]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 6

Conv. Ctr. 33A Tues. 1:30 to 3:00 pm

Phosphors

Chair: Ian T. Ferguson, Georgia Institute of Technology

1:30 pm: Enhanced performance of solid state lighting phosphors (Invited Paper), H. Menkara, B. K. Wagner, C. J. Summers, Phosphor Technology Ctr. of Excellence [6669-22]

2:00 pm: Study of rare-earth-doped borate phosphor thin films prepared by pulsed laser deposition, J. Hao, The Hong Kong Polytechnic Univ. (Hong Kong China); G. He, Huazhong Univ. of Science and Technology (China) [6669-23]

2:15 pm: A precise optical model of phosphor-based multi-chip LEDs, W. Chien, C. Tsai, H. Ho, C. Sun, S. Ma, National Central Univ. (Taiwan); C. Chen, NeoPac Lighting, Inc. (Taiwan) [6669-24]

2:30 pm: Silicate phosphors and white LED technology - improvements and opportunities, P. Hartmann, Tridonic Optoelectronics GmbH (Austria); F. Wenzl, JOANNEUM RESEARCH GmbH (Austria); D. Starick, Leuchtstoffwerk Breitung GmbH (Germany) [6669-25]

2:45 pm: Materials design and properties of nitride phosphors for LEDs, P. J. Schmidt, A. Tuecks, J. Meyer, H. Bechtel, D. U. Wiechert, Philips Research Labs. (Germany); R. Mueller-Mach, G. O. Mueller, Lumileds Lighting, LLC; W. Schnick, Ludwig-Maximilians-Univ. München (Germany) [6669-26]

Coffee Break 3:00 to 3:30 pm

SESSION 7

Conv. Ctr. 33A Tues. 3:30 to 5:00 pm

Source Performance II

Chair: Wang N. Wang, Univ. of Bath (United Kingdom)

3:30 pm: Lighting with diodes (Invited Paper), J. Nause, B. Nemeth, V. Rengarajan, M. Pan, Cermet, Inc.; N. Li, S. Wang, Z. C. Feng, I. T. Ferguson, Georgia Institute of Technology [6669-27]

4:00 pm: Efficiency improvements of white-light CdSe nanocrystal-based LEDs, J. D. Gosnell, M. A. Schreuder, S. J. Rosenthal, S. M. Weiss, Vanderbilt Univ. [6669-28]

4:15 pm: An improved method for measuring LED intensity distribution from a single CCD image, I. Moreno, National Central Univ. (Taiwan) and Univ. Autonoma de Zacatecas (Mexico); M. Han, W. Jian, T. Lee, C. Sun, National Central Univ. (Taiwan) [6669-29]

4:30 pm: Large, thin, flexible and low-cost light emitting surfaces, B. A. Salters, M. C. P. M. Krijn, Philips Research Labs. (Netherlands) [6669-30]

4:45 pm: Investigation of thermal management techniques in blue LED airport taxiway fixtures, Y. Gu, N. Narendran, A. Baker, M. Overington, Rensselaer Polytechnic Institute [6669-31]

Courses of Related Interest

See SPIE Cashier for information.

SC011 Design of Efficient Illumination Systems (Cassarly) Monday 27, 1:30 - 5:30 pm

SC388 Non-Imaging Optics (Winston) Monday 27, 8:30 am - 12:30 pm

SC490 Solid State Lighting I (Ferguson) Sunday 26, 1:30 - 5:30 pm

SC657 Accurate Measurement of LED Optical Properties (Tirpak) Tuesday 28, 8:30 am - 12:30 pm

SC799 Solid State Lighting Phosphors (Summers) Sunday 26, 8:30 am - 12:30 pm

Poster/Demo Session-Tuesday

✓ Posters-Tuesday

Conv. Ctr. Ballroom 20D Tue. 8:00 to 10:00 pm

Poster authors will begin displaying posters after 10:00 am Tuesday morning. A poster session, with authors present at their posters, will be held Tuesday evening from 8:00 to 10:00 pm. Light refreshments will be served.

Demo Session

There will be a demo session during the poster session and companies such as Crosslink, Universal Display Corp., Yamagata Univ., Konarka, and Solaranix will be presenting their latest OLED or OPV demos.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Tuesday. Poster presenters who have not set up by 5:00 pm on Tuesday 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.

- ✓ **Design and development of a new method for enhancing LED beam pattern to wider angles**, A. Rahmani Nejad, Civil Aviation Organization (Iran) [6669-09]
- ✓ **III-nitride LEDs with high quality InGaN/GaN MQWs grown with different growth conditions**, S. J. Leem, Y. C. Shin, C. M. Kim, S. J. Kim, Korea Univ. (South Korea); Y. Moon, Seoul National Univ. of Technology (South Korea); T. G. Kim, Korea Univ. (South Korea) [6669-35]
- ✓ **Description of caustic structures in non-linear media: envelope of characteristic trajectories for the non-linear Schrodinger equation**, J. C. Juárez-Morales, J. L. Muñoz-Lopez, G. C. Martínez-Niconoff, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6669-52]
- ✓ **Structural and optical properties of Si/β-FeSi₂/Si heterostructures fabricated by ion implantation and Si MBE**, N. G. Galkin, E. A. Chusovitin, D. L. Goroshko, Institute for Automation and Control Processes (Russia); R. I. Batalov, R. M. Bayzitov, Kazan Physical-Technical Institute (Russia); T. S. Shamirzaev, K. S. Zhuravlev, Institute of Semiconductor Physics (Russia) [6669-53]
- ✓ **Investigation of material properties for zincblende AlGaIn alloys applied in UV LEDs**, B. Liou, Hsiuping Institute of Technology (Taiwan); C. Liu, Soochow Univ. (Taiwan); Y. Kuo, National Changhua Univ. of Education (Taiwan) [6669-54]
- ✓ **Effect of spontaneous and piezoelectric polarization on the optical characteristics of blue light-emitting diodes**, B. Liou, Hsiuping Institute of Technology (Taiwan); S. Yen, M. Tsai, Y. Kuo, National Changhua Univ. of Education (Taiwan) [6669-55]
- ✓ **Simulation of deep ultraviolet light-emitting diodes**, Y. Kuo, S. Yen, National Changhua Univ. of Education (Taiwan) [6669-56]
- ✓ **Enhancement of light extraction of GaN light-emitting diode by opals layer**, Z. Zhou, B. Zhang, I. T. Ferguson, Georgia Institute of Technology [6669-60]

Wednesday 29 August

SESSION 8

Conv. Ctr. 33A Wed. 8:45 to 10:00 am

LED III

Chair: **Ian E. Ashdown**, Philips Lighting Co. (Canada)

- 8:45 am: **Study and issues of thin-GaN LED (Invited Paper)**, C. Liu, C. Lin, P. H. Chen, C. Chang, Y. C. Lin, National Central Univ. (Taiwan) [6669-32]
- 9:15 am: **All-InGaIn white-light light-emitting diode of stable spectrum with prestrained growth of InGaIn/GaN quantum wells**, C. Huang, C. Lu, T. Tang, J. Huang, C. Yang, National Taiwan Univ. (Taiwan) [6669-33]
- 9:30 am: **MOCVD growth of high in content in InGaIn on ZnO substrates**, N. Li, S. Wang, E. Park, Z. Feng, Georgia Institute of Technology; A. Valencia, J. Nause, Cermet, Inc.; I. T. Ferguson, Georgia Institute of Technology [6669-34]
- 9:45 am: **Psychophysical evaluations of various color rendering from LED-based architectural lighting**, M. R. Thompson, U. O'Reilly, Massachusetts Institute of Technology; R. E. Levin, Osram Sylvania [6669-58]
- Coffee Break 10:00 to 10:30 am

SESSION 9

Conv. Ctr. 33A Wed. 10:30 am to 12:00 pm

Characterization

Chair: **Jeff Nause**, Cermet, Inc.

- 10:30 am: **Thermal management methods for compact high power LED (Invited Paper)**, T. Martin, M. Ha, S. Graham, Georgia Institute of Technology [6669-37]
- 11:00 am: **EpiEL: electroluminescence directly on LED epi-wafers**, M. X. Ma, H. J. Jia, MaxMile Technologies, LLC [6669-38]
- 11:15 am: **Is the thermal resistance coefficient from junction to board for a high-power LED a constant?**, L. Jayasinghe, N. Narendran, Rensselaer Polytechnic Institute [6669-39]
- 11:30 am: **Adapting radio technology to LED feedback systems**, M. Salsbury, I. E. Ashdown, Philips Lighting Co. (Canada) [6669-40]
- 11:45 am: **Thermal stability analysis of high brightness LEDs during high temperature and electrical aging**, L. R. Trevisanello, M. Meneghini, C. Sanna, S. Buso, G. Spiazzi, G. Meneghesso, E. Zanoni, Univ. degli Studi di Padova (Italy) [6669-41]
- Lunch/Exhibition Break 12:00 to 1:30 pm

SESSION 10

Conv. Ctr. 33A Wed. 1:30 to 3:00 pm

Source Performance III

Chair: **Cheng-Yi Liu**, National Central Univ. (Taiwan)

- 1:30 pm: **High brightness directional photonic quasicrystal LEDs (Invited Paper)**, W. N. Wang, P. Shields, Univ. of Bath (United Kingdom); M. E. Zoorob, T. D. M. Lee, Mesophotonics Ltd. (United Kingdom) [6669-42]
- 2:00 pm: **Modulated the light pattern and enhanced light extraction in photonic-crystal light-emitting diodes**, J. Chang, M. Wu, Y. Lee, P. Lee, National Central Univ. (Taiwan) [6669-43]
- 2:15 pm: **Photoluminescent nanofibers for solid-state lighting**, L. Davis, H. Walls, L. Han, T. Walker, A. L. Andrad, D. S. Ensor, RTI International [6669-44]
- 2:30 pm: **Narrow beam RGB array optic**, E. Bailey, Transducin Optics LLC and Lamina Ceramics Inc. [6669-45]
- 2:45 pm: **Pseudorandom pulse code modulation of LEDs**, I. Toma, B. Bjeljac, I. E. Ashdown, TIR Systems Ltd. (Canada) [6669-46]
- Coffee Break 3:00 to 3:30 pm

SESSION 11

Conv. Ctr. 33A Wed. 3:30 to 4:30 pm

Modeling

Chair: **Nadarajah Narendran**, Rensselaer Polytechnic Institute

- 3:30 pm: **A comprehensive model to predict solid state lighting performance**, M. Salsbury, I. E. Ashdown, TIR Systems Ltd. (Canada) [6669-47]
- 3:45 pm: **Modelling of non-Lambertian LED sources in lighting applications**, M. Bennahmias, Physical Optics Corp.; E. Arik, K. Yu, E. Poliakov, Luminit LLC; K. Chua, R. D. Pradhan, T. C. Forrester, Physical Optics Corp. [6669-48]
- 4:00 pm: **Algorithm to illustrate context using dynamic lighting effects**, R. Manayil John, T. Balasubramanian, National Institute of Technology/ Tiruchirappalli (India) [6669-49]
- 4:15 pm: **An electrical model of InGaIn based high power light emitting diodes with self-heating effect**, B. Li, Foshan Univ. (China); Y. Feng, Shenzhen Univ. (China); Y. Liu, Foshan Univ. (China) [6669-50]

Conference 6670 • Conv. Ctr. 33A

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6670

Nonimaging Optics and Efficient Illumination Systems IV

Conference Chairs: **Roland Winston**, Univ. of California/Merced; **R. John Koschel**, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona

Program Committee: **Pablo Benítez**, Univ. Politécnica de Madrid and Light Prescriptions Innovators LLC; **William J. Cassarly**, Optical Research Associates; **Philip L. Gleckman**, Energy Innovations; **Jeffrey M. Gordon**, Ben-Gurion Univ. of the Negev (Israel); **Anurag Gupta**, Optical Research Associates; **Douglas A. Kirkpatrick**, Defense Advanced Research Projects Agency; **Kenneth K. Li**, Wavien, Inc.; **Juan C. Miñano**, Univ. Politécnica de Madrid (Spain) and Light Prescriptions Innovators LLC; **Holger Moench**, Philips Research Labs. (Germany); **Narkis E. Shatz**, Science Applications International Corp.; **John F. Van Derlofske**, 3M Co.

Sunday 26 August

SESSION 1

Conv. Ctr. 33A Sun. 8:00 to 8:10 am

Introduction

Chair: **R. John Koschel**, Lambda Research Corp.

8:00 am: **Why illumination engineering?**, R. J. Koschel, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona [6670-01]

SESSION 2

Conv. Ctr. 33A Sun. 8:10 to 10:00 am

Solar and Energy Applications

Chair: **Jeffrey M. Gordon**, Ben-Gurion Univ. of the Negev (Israel)

8:10 am: **Opportunities for fiber optics (Invited Paper)**, J. M. Davenport, Energy Focus, Inc. [6670-02]

8:40 am: **Optimal integration of daylighting and electric lighting systems by the way of nonimaging optics**, J. Scartezini, E. Kaegi-Kolisnychenko, F. Linhart, École Polytechnique Fédérale de Lausanne (Switzerland) .. [6670-03]

9:00 am: **The XR nonimaging photovoltaic concentrator**, M. M. Hernandez, Light Prescriptions Innovators Europe, S. L. (Spain); P. Benítez, J. C. Miñano, Light Prescriptions Innovators, LLC and Univ. Politécnica de Madrid (Spain); A. Cvetkovic, Univ. Politécnica de Madrid (Spain); O. Dross, R. Moledano Arroyo, Light Prescriptions Innovators Europe, S. L. (Spain); R. Jones, The Boeing Co.; G. S. Kinsey, Spectrolab, Inc.; R. Alvarez, Light Prescriptions Innovators, LLC [6670-04]

9:20 am: **Field results from concentrating photovoltaic system using Kohler integration**, L. D. Reed, R. Winston, A. Ritschel, Univ. of California/Merced [6670-05]

9:40 am: **Light-loss when measuring transmittance of thick scattering samples with an integrating sphere**, J. C. Jonsson, M. D. Rubin, Lawrence Berkeley National Lab. [6670-06]

Coffee Break 10:00 to 10:20 am

SESSION 3

Conv. Ctr. 33A Sun. 10:20 am to 12:10 pm

Theory and Design

Chair: **Roland Winston**, Univ. of California/Merced

10:20 am: **Elliptical reflector: efficiency gain by defocusing**, H. Rehn, OSRAM GmbH (Germany) [6670-07]

10:40 am: **An analytical approach to the design of efficient reflectors (Invited Paper)**, G. Kloos, Hella KGaA Hueck & Co. (Germany) [6670-08]

11:10 am: **Recursive generalized functional method of nonimaging optical design**, J. C. Bortz, N. E. Shatz, Science Applications International Corp. [6670-09]

11:30 am: **Aberrations of asymmetric reflector design**, F. Zhao, Zumtobel Staff Lighting, Inc. [6670-10]

11:50 am: **Electromagnetic modelling of non-paraxial propagation and illumination**, H. Schimmel, LightTrans GmbH (Germany); J. P. Turunen, P. Vahimaa, Joensuu Yliopisto (Finland); M. Kuhn, LightTrans GmbH (Germany); F. Wyrowski, Friedrich Schiller Univ. (Germany) [6670-11]

Lunch Break 12:10 to 1:10 pm

SESSION 4

Conv. Ctr. 33A Sun. 1:10 to 3:00 pm

Sources: Characterization, Mixing, and Recycling

Chair: **R. John Koschel**, Lambda Research Corp.

1:10 pm: **A compact LED color mixing scheme with the etendue of a single chip**, G. X. Ouyang, K. K. Li, Wavien, Inc. [6670-12]

1:30 pm: **Etendue conserved color mixing (Invited Paper)**, R. P. Van Gorkom, Philips Research Eindhoven (Netherlands); M. A. Van As, Philips Lighting B.V. (Netherlands); G. M. Verbeek, Philips Research Eindhoven (Netherlands); C. G. A. Hoelen, Philips Lighting B.V. (Netherlands); R. G. Alferink, Philips LumiLEDs (Netherlands); K. A. Mutseers, Philips Research Eindhoven (Netherlands); H. Cooijmans, Philips Lighting B.V. (Netherlands) [6670-13]

2:00 pm: **Light recycling characteristics of ultra-bright lamps**, A. Malul, D. Nakar, D. Feuermann, J. M. Gordon, Ben-Gurion Univ. of the Negev (Israel) [6670-14]

2:20 pm: **Radiometric characterization of ultra-bright xenon short-arc discharge lamps for novel applications**, D. Nakar, A. Malul, D. Feuermann, J. M. Gordon, Ben-Gurion Univ. of the Negev (Israel) [6670-15]

2:40 pm: **An analytic model for the radiation pattern of LEDs**, I. Moreno, Univ. Autónoma de Zacatecas (Mexico) and National Central Univ. (Taiwan); C. Tsai, National Central Univ. (Taiwan); D. Bermúdez, Univ. Autónoma de Zacatecas (Mexico); C. Sun, National Central Univ. (Taiwan) [6670-16]

Coffee Break 3:00 to 3:20 pm

SESSION 5

Conv. Ctr. 33A Sun. 3:20 to 5:50 pm

Design and Application

Chair: **Narkis E. Shatz**, Science Applications International Corp.

- 3:20 pm: **Efficient collimator design for extended light sources with the flux tube method (Invited Paper)**, T. W. Tukker, Philips Lighting B.V. (Netherlands) [6670-30]
- 3:50 pm: **Beyond NURBS: enhancement of local refinement through T-splines**, E. Bailey, S. Carayon, Transducin Optics LLC [6670-17]
- 4:10 pm: **Illumination merit functions**, W. J. Cassarly, Optical Research Associates [6670-18]
- 4:30 pm: **Optical design of LED-based automotive tail lamps**, A. Domhardt, Univ. Karlsruhe (Germany); U. Rohlfing, Hochschule Darmstadt (Germany); K. D. Klingler, D. Kooß, K. Manz, U. Lemmer, Univ. Karlsruhe (Germany) .. [6670-19]
- 4:50 pm: **High-efficiency reflector optics for LED forward lighting**, J. Jiao, B. Wang, North American Lighting, Inc. [6670-20]
- 5:10 pm: **Light sources and output couplers for a backlight with switchable emission angles**, I. Fujieda, K. Imai, Y. Takagi, Ritsumeikan Univ. (Japan) [6670-21]
- 5:30 pm: **Lightweight CFRP spherical mirrors for the LHCb RICH-1 detector**, R. N. Martin, R. C. Romeo, Composite Mirror Applications, Inc.; G. Barber, Imperial College London (United Kingdom); A. Braem, CERN (Switzerland); N. Brook, Univ of Bristol (United Kingdom); B. Cameron, Imperial College London (United Kingdom); C. D'Ambrosio, CERN (Switzerland); N. Harnew, Univ. of Oxford (United Kingdom); K. Lessnoff, F. Metlica, Univ. of Bristol (United Kingdom); D. Websdale, Imperial College London (United Kingdom) [6670-22]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

- 6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research
- 6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Shape and illumination as a function of path length**, S. Mulder, Optical Research Associates [6670-24]
- ✓ **Diffuser array for a light-emitting diode backlight system**, J. Lee, Y. Hu, Y. Wu, Y. Wang, Northern Taiwan Institute of Science and Technology (Taiwan) [6670-25]
- ✓ **The generation of random non-overlapping dot patterns for light guides using molecular dynamics simulations with variable r-cut and reflective boundary techniques**, J. Chang, Y. Fang, National Ctr. for High-Performance Computing (Taiwan) [6670-26]
- ✓ **The application of toroidal surface and free shape surface for pillow optics**, V. K. Berger, Mark IV Industries, Inc. [6670-27]

Illumination Technical Event

Marriott Mission Hills Mon. 8:00 to 10:00 pm

Chair: **R. John Koschel**, Lambda Research Corp. and College of Optical Sciences/The Univ. of Arizona

We will present two topics: étendue and state-of-the-art concepts for displays. For the former, speakers from display manufacturers, such as Philips, will be on hand to discuss such display topics as:

- LED displays,
- Visual experience of viewing displays, and
- Future trends in displays.

For the étendue topic, a panel with a moderator will be convened to discuss this very important topic of illumination system design. Étendue describes the geometrical propagation characteristics of optical systems, and for illumination systems it provides a metric for design analysis and limitations. This provides a physical limit analogous to that of the diffraction limit of imaging/lens design. For both topics, each presenter will give a short overview, followed by questions from the audience. If you would like to participate as a presenter in either of these areas, or possibly in another area, please contact John Koschel (john.koschel@osa.org). At the conclusion of the planned agenda the floor will be open to impromptu presentations and questions. Light refreshments will be served. We look forward to your participation.

Courses of Related Interest

See SPIE Cashier for information.

SC011 Design of Efficient Illumination Systems (Cassarly) Monday 27, 1:30 - 5:30 pm

SC388 Non-Imaging Optics (Winston) Monday 27, 8:30 am - 12:30 pm

Conference 6671 • Conv. Ctr. 25A

Tuesday-Wednesday 28-29 August 2007 • Proceedings of SPIE Vol. 6671

Optical Manufacturing and Testing VII

Conference Chairs: **James H. Burge**, The Univ. of Arizona/Steward Observatory; **Oliver W. Faehnle**, FISBA OPTIK AG (Switzerland); **Ray Williamson**, Ray Williamson Consulting

Program Committee: **Dave Baiocchi**, Sandia National Labs.; **Michael Bray**, MB Optique SARL (France); **Andrew R. Clarkson**, L-3 Brashear; **Glen C. Cole**, L3 Communications Tinsley; **David A. Content**, NASA Goddard Space Flight Ctr.; **Peter J. de Groot**, Zygo Corp.; **Roland Geyl**, SAGEM SA (France); **John E. Greivenkamp**, College of Optical Sciences/The Univ. of Arizona; **Stephen D. Jacobs**, Univ. of Rochester; **Stephen E. Kendrick**, Ball Aerospace & Technologies Corp.; **Stephen J. Martinek**, 4D Technology Corp.; **Gary Matthews**, ITT Industries, Inc.; **Robert E. Parks**, Optical Perspective Group, LLC; **Joseph L. Robichaud**, L-3 SSG-Tinsley; **Joanna Schmit**, Veeco Instruments Inc.; **Peter Z. Takacs**, Brookhaven National Lab.; **Martin J. Valente**, College of Optical Sciences/The Univ. of Arizona; **David D. Walker**, OptIC Technium (United Kingdom); **Xuejun Zhang**, Changchun Institute of Optics, Fine Mechanics and Physics (China)

Tuesday 28 August

SESSION 1

Conv. Ctr. 25A Tues. 8:00 to 10:00 am

Mirrors

Chair: **Dave Baiocchi**, Sandia National Labs.

8:00 am: **JWST mirror technology development results**, H. P. Stahl, NASA Marshall Space Flight Ctr. [6671-01]

8:20 am: **Production status of the JWST primary mirror segments at Tinsley**, G. C. Cole, T. B. Hull, R. S. Garfield, T. Peters, A. Lee, R. J. Bernier, A. N. Zertuche, P. J. Johnson, C. D. Kiiikka, J. M. Kincade, L3 Communications Tinsley; B. B. Gallagher, R. J. Brown, Ball Aerospace & Technologies Corp.; A. G. McKay, Northrop Grumman Space Technology; L. M. Cohen, Smithsonian Astrophysical Observatory [6671-02]

8:40 am: **JWST primary mirror segment metrology**, R. J. Bernier, L. R. Dettmann, C. D. Kiiikka, A. N. Zertuche, P. J. Johnson, G. C. Cole, T. B. Hull, R. S. Garfield, J. M. Kincade, J. Daniel, L3 Communications Tinsley; R. J. Brown, B. B. Gallagher, Ball Aerospace & Technologies Corp.; L. M. Cohen, Smithsonian Astrophysical Observatory; D. M. Chaney, Ball Aerospace & Technologies Corp.; A. G. McKay, Northrop Grumman Space Technology [6671-03]

9:00 am: **Comparison of metrology to FEA predictions for the Kepler primary mirror assembly**, J. W. Zinn, G. W. Jones, L-3 Brashear .. [6671-04]

9:20 am: **Manufacturing meter-scale aspheric optics**, W. J. Messner, P. Dumas, R. W. Hallock, C. A. Hall, M. Tricard, QED Technologies Inc.; S. M. Miller, The Univ. of Arizona/Steward Observatory [6671-05]

9:40 am: **Fabrication and testing of large flats**, J. Yellowhair, M. Novak, P. Su, J. H. Burge, College of Optical Sciences/The Univ. of Arizona [6671-06]

Coffee Break 10:00 to 10:30 am

SESSION 2

Conv. Ctr. 25A Tues. 10:30 to 11:50 am

Systems

Chair: **Stephen E. Kendrick**, Ball Aerospace & Technologies Corp.

10:30 am: **Cryogenic in-vacuum vertically configured collimator system for testing of meter scale optical systems**, D. S. Sabatke, S. Meyer, N. J. Siegel, P. D. Atcheson, M. A. Martella, Ball Aerospace & Technologies Corp. [6671-07]

10:50 am: **Manufacturing development of visor for binocular helmet mounted display**, D. H. Krevor, T. J. Edwards, E. W. Larkin, Kaiser Electronics; R. Speirs, Ferris State Univ.; J. Skubon, MXL Industries, Inc.; T. M. Sowden, Contour Metrological Manufacturing, Inc. [6671-08]

11:10 am: **Structure function analysis of mirror fabrication and support errors**, S. Hvisc, J. H. Burge, College of Optical Sciences/The Univ. of Arizona [6671-09]

11:30 am: **Zernike-like orthogonal basis functions for wavefront characterization over sampled, irregular apertures**, D. L. Aronstein, B. H. Dean, J. S. Smith, NASA Goddard Space Flight Ctr.; H. Schreiber, T. Tienvier, P. F. Michalowski, Corning Tropol Corp. [6671-10]

Lunch/Exhibition Break 11:50 am to 1:20 pm

SESSION 3

Conv. Ctr. 25A Tues. 1:20 to 3:00 pm

New Measurement Methods

Chair: **Andrew R. Clarkson**, L-3 Brashear

1:20 pm: **Flexible and accurate metrology of aspheric surfaces**, S. D. O'Donohue, P. E. Murphy, G. M. DeVries, J. F. Fleig, QED Technologies Inc. [6671-11]

1:40 pm: **The JWST infrared scanning Shack Hartman system: a new in-process way to measure large mirrors during optical fabrication at Tinsley**, C. D. Kiiikka, L3 Communications Tinsley; D. R. Neal, Wavefront Sciences, Inc.; R. J. Bernier, J. M. Kincade, T. B. Hull, L3 Communications Tinsley; D. M. Chaney, B. B. Gallagher, Ball Aerospace & Technologies Corp. [6671-12]

2:00 pm: **Three Gaussian beam heterodyne interferometer for surface profiling**, L. Juárez, M. Cywiak, B. Barrientos, J. M. Flores Moreno, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6671-13]

2:20 pm: **New null tests for convex surfaces**, R. F. Royce, R.F. Royce-Precision Optical Components; R. C. Romeo, R. N. Martin, Composite Mirror Applications, Inc. [6671-14]

2:40 pm: **Technique for diamond turning poly-crystalline silicon**, D. L. Lehner, NASA Marshall Space Flight Ctr.; M. T. Jacoby, Schafer Corp.; A. D. Lapietra, ERC, Inc. [6671-61]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 25A Tues. 3:30 to 5:10 pm

Materials, Forming

Chair: **David D. Walker**, OptIC Technium (United Kingdom)

3:30 pm: **Thermal shock testing of lapped optical glass**, J. C. Lambropoulos, Univ. of Rochester [6671-17]

3:50 pm: **In-process non-destructive subsurface damage measurements and correlations to both laser damage and surface roughness**, K. C. Robinson, A. Ghanbari, J. J. Nelson, T. Kamprath, VLOC [6671-18]

4:10 pm: **Removal mechanism and subsurface damage in hard optical ceramics**, S. N. Shafirir, J. C. Lambropoulos, S. D. Jacobs, Univ. of Rochester [6671-19]

4:30 pm: **Moore's law and mold making: staying in the megapixel race**, K. Renkema, Philips High Tech Plastics Inc. (Netherlands) [6671-20]

4:50 pm: **High-precision aspheres for professional cine lenses: design and manufacturing**, T. Koehler, Carl Zeiss Jena GmbH (Germany); C. Beder, Carl Zeiss AG (Germany) [6671-21]

Panel Discussion I 5:10 to 6:30 pm

Optical Testing and Alignment in Cryo/Vacuum

Panel Moderator: **James H. Burge**, The Univ. of Arizona/Steward Observatory

Wednesday 29 August

SESSION 5

Conv. Ctr. 25A **Wed. 8:00 to 10:00 am**

Interferometry I

Chair: John E. Greivenkamp, College of Optical Sciences/The Univ. of Arizona

- 8:00 am: **Surface reconstruction based on transmission interferometric testing**, K. Seong, G. A. Williby, J. E. Greivenkamp, College of Optical Sciences/The Univ. of Arizona [6671-22]
- 8:20 am: **New interferometric technique to measure the length (thickness) of opaque objects using a commercial interferometer**, A. R. Suratkar, A. Davies, The Univ. of North Carolina at Charlotte [6671-23]
- 8:40 am: **A fast demodulation method for single fringe patterns with closed fringes by using local quadrature filters**, J. C. Estrada Rico, M. Servin, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6671-24]
- 9:00 am: **Segmented wave-front measurements by lateral shearing interferometry**, B. Toulon, J. Primot, N. Guérineau, ONERA (France); S. Velgue, PHASICS SA (France); R. Haïdar, ONERA (France) [6671-25]
- 9:20 am: **Stitching interferometry and absolute calibration: progress**, M. Bray, MB Optique SARL (France) [6671-26]
- 9:40 am: **Shear test of the off-axis surface with axis-symmetric parent**, P. Su, J. H. Burge, J. M. Sasian, College of Optical Sciences/The Univ. of Arizona [6671-27]
- Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 25A **Wed. 10:30 am to 12:30 pm**

Interferometry II

Chair: Ray Williamson, Ray Williamson Consulting

- 10:30 am: **Full surface mapping and calibration of large interferometer flats**, F. Tinker, Flemming Tinker, LLC; M. Bray, MB Optique SARL (France); D. Smith, Plymouth Grating Lab Inc.; T. Takahashi, Okamoto Optics Works, Inc. (Japan) [6671-28]
- 10:50 am: **Weighted least-square approach for simultaneous measurement of multiple reflective surfaces**, S. Tang, R. E. Bills, K. R. Freischlad, ADE Phase Shift [6671-29]
- 11:10 am: **Measuring surface slope error on precision aspheres**, J. J. Kumler, Coastal Optical Systems Inc.; J. B. Caldwell, Caldwell Photographic Inc [6671-59]
- 11:30 am: **Speckle metrology based study on the effect of chatter on machined surface**, P. A. Cheriyan, U. Nair, V. Kas, V. N. N. Nambhothiri, N. P. N. Vadakedathu, Cochin Univ. of Science & Technology (India) [6671-31]
- 11:50 am: **Design of partial nulls for testing of fast aspheric surfaces**, J. J. Sullivan, J. E. Greivenkamp, College of Optical Sciences/The Univ. of Arizona [6671-32]
- 12:10 pm: **3D-measurement of grinded optical surfaces by means of short coherence interferometry**, T. Hellmuth, R. Boerret, K. Khrennikov, Hochschule Aalen (Germany) [6671-33]
- Lunch/Exhibition Break 12:30 to 1:30 pm

SESSION 7

Conv. Ctr. 25A **Wed. 1:30 to 4:20 pm**

Novel Finishing

Chair: Oliver W. Föhnle, FISBA OPTIK AG (Switzerland)

- 1:30 pm: **Calculation of MRF influence functions**, M. Schinhaerl, Fachhochschule Deggendorf (Germany); G. Smith, Univ. of the West of England (United Kingdom); A. Geiss, Fachhochschule Deggendorf (Germany); L. N. Smith, Univ. of the West of England (United Kingdom); R. Rascher, P. Sperber, Fachhochschule Deggendorf (Germany); R. J. Stamp, Univ. of the West of England (United Kingdom); E. G. Pitschke, Fachhochschule Deggendorf (Germany) [6671-34]
- 1:50 pm: **Modeling the optical glass material removal rate for magnetorheological finishing (MRF) with nanodiamond MR fluids**, J. E. DeGroot, A. E. Marino, J. P. Wilson, A. L. Bishop, S. D. Jacobs, Univ. of Rochester [6671-35]
- 2:10 pm: **Magnetorheological fluid template for basic studies of mechanical-chemical effects during polishing**, C. Miao, Univ. of Rochester; K. M. Bristol, U.S. Army ARDEC; A. E. Marino, S. N. Shafir, J. E. DeGroot, S. D. Jacobs, Univ. of Rochester [6671-36]
- 2:30 pm: **Complete pre-polishing and finishing solution to improve speed and determinism in asphere manufacture**, P. Dumas, R. W. Hallock, C. A. Hall, A. Price, QED Technologies Inc. [6671-37]
- 2:50 pm: **Deterministic shape correction with fluid jet polishing using a sub-aperture footprint**, W. A. C. M. Messelink, O. W. Faehnle, M. Forrer, FISBA OPTIK AG (Switzerland) [6671-38]
- Coffee Break 3:10 to 3:40 pm
- 3:40 pm: **High-speed form preserving polishing of precision aspheres**, R. Boerret, A. Kelm, Hochschule Aalen (Germany); H. Thiess, Carl Zeiss AG (Germany) [6671-39]
- 4:00 pm: **Correction of high spatial frequencies errors on optical surfaces by means of ion beam figuring**, M. Ghigo, R. Canestrari, Osservatorio Astronomico di Brera (Italy); A. Novi, SELEX Sensors and Airborne Systems SpA (Italy) [6671-40]

Panel Discussion II **4:20 to 5:30 pm**

Non-traditional Optical Figuring

Panel Moderator: Oliver W. Föhnle, FISBA OPTIK AG (Switzerland)

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D **Wed. 5:30 to 7:00 pm**

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Nondestructive evaluation (NDE) using multiaperture DSPI system and fast Fourier transform method**, B. Bhaduri, N. Krishna Mohan, M. P. Kothiyal, Indian Institute of Technology Madras (India) [6671-30]
- ✓ **An analytical method for measuring the decentration of lens module**, C. Chang, Industrial Technology Research Institute (Taiwan) [6671-41]
- ✓ **Optical tests of a space mechanism under an adverse environment: GAIA secondary mirror mechanism under pressure and thermal controlled conditions**, T. Belenguier, Instituto Nacional de Técnica Aeroespacial (Spain) [6671-42]
- ✓ **3D profile measurement of large-scale curvature plates using structured light source**, B. Kim, S. H. Kim, E. Heo, Kyungnam Univ. (South Korea); H. Lee, J. M. Han, DSME Co. Ltd. (South Korea) [6671-43]

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- ✓ **Aspheric measurement based on the curvature sensing method**, B. Kim, Y. Kwon, D. H. Wang, Kyungnam Univ. (South Korea); Y. Lee, H. Yang, H. Rhee, Korea Research Institute of Standards and Science (South Korea) [6671-44]
- ✓ **Stimulated and uncertainty analysis for Hartmann-Shack wavefront sensor**, C. Chang, Industrial Technology Research Institute (Taiwan); C. Lee, National Central Univ. (Taiwan) [6671-45]
- ✓ **Three-dimensional imaging with acousto-optic fringe projector and piecewise temporal phase unwrapping**, J. D. Tian, X. B. Zhao, X. L. Liu, X. Peng, Shenzhen Univ. (China) [6671-46]
- ✓ **A new design of furnace for modern fiber draw based on computational thermal fluid model**, X. Wang, Shanghai Institute of Optics and Fine Mechanics (China); Q. Nie, Ningbo Univ. (China); L. Liu, Shanghai Institute of Optics and Fine Mechanics (China); T. Xu, C. Xu, Ningbo Univ. (China); D. Liu, Shanghai Institute of Optics and Fine Mechanics (China) ... [6671-47]
- ✓ **Phase detection from two phase-shifting interferograms**, Y. Zhu, L. Liu, Z. Luan, J. Sun, Shanghai Institute of Optics and Fine Mechanics (China) [6671-49]
- ✓ **Fourier analysis of two-run-times-two-frame phase shift algorithm**, X. Zhong, Shanghai Institute of Optics and Fine Mechanics (China) . [6671-50]
- ✓ **Fiber Bragg gratings for laser interferometry with VCSEL diode at 760 nm wavelength**, B. Mikel, R. Helan, O. Cip, Institute of Scientific Instruments (Czech Republic) [6671-51]
- ✓ **Extended range interferometry based on wavefront shaping**, M. L. Szczupak, L. A. Salbut, R. Sitnik, Politechnika Warszawska (Poland) [6671-53]
- ✓ **A quantitative comparison of three grolishing techniques for the precessions process**, D. D. Walker, OpTIC Technium (United Kingdom) and Zeeko Ltd. (United Kingdom); R. Evans, G. Yu, OpTIC Technium (United Kingdom); S. Wei, R. R. Freeman, Zeeko Ltd. (United Kingdom) . [6671-56]
- ✓ **High performance optical materials cyclo olefin polymer ZEONEX(r)**, K. Obuchi, M. Komatsu, K. Minami, Zeon Corp. (Japan) [6671-58]
- ✓ **Lens production enhancement by adoption of artificial influence functions and a knowledge-based system in a magnetorheological finishing process**, E. G. Pitschke, Fachhochschule Deggendorf (Germany); R. J. Stamp, Univ. of the West of England (United Kingdom); P. Sperber, EOS Optronics GmbH (Germany); M. Schinhaerl, Fachhochschule Deggendorf (Germany); M. L. Smith, Univ. of the West of England (United Kingdom); R. Rascher, Fachhochschule Deggendorf (Germany); L. N. Smith, Univ. of the West of England (United Kingdom) [6671-60]

Courses of Related Interest

See *SPIE Cashier* for information.

SC020 Optical Scattering: Measurement and Analysis (Stover)
Sunday 26, 1:30 - 5:30 pm

SC492 Predicting, Modeling, and Interpreting Light Scattered by Surfaces (Germer) Monday 27, 8:30 am - 12:30 pm

SC848 Fundamentals of Single Point Diamond Turning (Schaefer)
Monday 27, 1:30 - 5:30 pm

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Advanced Characterization Techniques for Optics, Semiconductors, and Nanotechnologies III

Conference Chairs: **Angela Duparré**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Bhanwar Singh**, Advanced Micro Devices, Inc.; **Zu-Han Gu**, Surface Optics Corp.

Program Committee: **Lionel R. Baker**, Consultant (United Kingdom); **Salvador Bosch Puig**, Univ. de Barcelona (Spain); **Russell A. Chipman**, The Univ. of Arizona; **Iraj Emami**, Advanced Micro Devices, Inc.; **Thomas A. Germer**, National Institute of Standards and Technology; **Daniel J. C. Herr**, Semiconductor Research Corp.; **Alexei A. Maradudin**, Univ. of California/Irvine; **Akira Matsumoto**, Nikon Corp. (Japan); **Eugenio R. Méndez**, Ctr. de Investigación Científica y de Educación Superior de Ensenada; **Soe-Mie F. Nee**, Naval Air Warfare Ctr.; **Hendrik Rothe**, Helmut-Schmidt Univ. (Germany); **Michael Schulz**, Physikalisch-Technische Bundesanstalt (Germany); **Costas J. Spanos**, Univ. of California/Berkeley; **John C. Stover**, The Scatter Works Inc.; **John F. Valley**, Raytex USA Corp.; **Alexander V. Vinogradov**, P.N. Lebedev Physical Institute (Russia)

Tuesday 28 August

SESSION 1

Conv. Ctr. 33C Tues. 8:30 to 10:00 am

Interferometry and 3D Techniques I

Chairs: **Angela Duparré**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Bhanwar Singh**, Advanced Micro Devices, Inc.

8:30 am: **Interferometry for wafer dimensional metrology (Invited Paper)**, K. R. Freischlad, S. Tang, J. Grenfell, ADE Phase Shift [6672-01]

9:00 am: **Warpage of thin wafers using computer aided reflection moire method**, C. S. Ng, Infineon Technologies (M) Sdn. Bhd (Malaysia) and Nanyang Technological Univ. (Singapore); K. Y. Chua, M. T. Ong, Y. C. Goh, S. F. Loo, Infineon Technologies (M) Sdn. Bhd (Malaysia); T. Y. Khoo, A. K. Asundi, Nanyang Technological Univ. (Singapore) [6672-02]

9:20 am: **Auto-scanning white-light interferometer**, J. Chen, C. C. Chang, C. Tung, Industrial Technology Research Institute (Taiwan); C. Kao, MingDao Univ. (Taiwan) [6672-03]

9:40 am: **Use of light-emitting diode (LED) in interference microscopy**, M. Jobin, R. Foschia, Ecole d'ingénieurs de Genève (Switzerland) [6672-05]

Coffee Break 10:00 to 10:20 am

SESSION 2

Conv. Ctr. 33C Tues. 10:20 am to 12:00 pm

Interferometry and 3D Techniques II

Chair: **Klaus R. Freischlad**, KLA-Tencor Corp.

10:20 am: **Optical system for investigations of low-cost diffraction gratings**, P. Czapski, L. Platos, M. Józwiak, Politechnika Warszawska (Poland) [6672-06]

10:40 am: **Calibration of a reversed wavefront interferometer for polarization coherence metrology**, D. P. Brown, A. K. Spilman, T. G. Brown, M. A. Alonso, Univ. of Rochester; R. Borghi, M. Santarsiero, Univ. degli Studi di Roma Tre (Italy) [6672-07]

11:00 am: **High resolution interferometric metrology for patterned wafers**, S. Tang, K. R. Freischlad, P. Yam, KLA-Tencor Corp. [6672-08]

11:20 am: **Measuring height variation over entire wafer surface with high lateral resolution**, S. Tang, B. C. Clendenin, KLA-Tencor Corp. [6672-09]

11:40 am: **Three-dimensional phase microobject studies by means of digital holography tomography supported by algebraic reconstruction technique**, B. J. Bilski, A. Jozwicka, M. Kujawinska, Politechnika Warszawska (Poland) [6672-10]

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

SESSION 3

Conv. Ctr. 33C Tues. 1:30 to 3:10 pm

Scatter and Diffraction I

Chairs: **Angela Duparré**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Marc Jobin**, Ecole d'Ingenieurs (Switzerland)

1:30 pm: **Limitations of Rayleigh Rice perturbation theory for describing surface scatter (Invited Paper)**, J. C. Stover, The Scatter Works Inc.; J. E. Harvey, College of Optics & Photonics/Univ. of Central Florida [6672-11]

2:00 pm: **Unified scatter model for rough surfaces at large incident and scatter angles (Invited Paper)**, J. E. Harvey, A. Krywonos, College of Optics & Photonics/Univ. of Central Florida; J. C. Stover, The Scatter Works Inc. [6672-12]

2:30 pm: **Applications in the optical characterization of grating roughness**, L. Arnaud, C. Deumié-Raviol, C. Amra, Institut Fresnel (France); E. Roisin, P. Maillot, STMicroelectronics (France) [6672-13]

2:50 pm: **Inverse scattering simulation for a 1D surface reconstruction**, A. Wang, Z. Gu, Surface Optics Corp. and Univ. of California/San Diego [6672-14]

Coffee Break 3:10 to 3:30 pm

SESSION 4

Conv. Ctr. 33C Tues. 3:30 to 5:30 pm

Scatter and Diffraction II

Chair: **James E. Harvey**, College of Optics & Photonics/Univ. of Central Florida

3:30 pm: **BRDF and MBR of a retro-reflected tag for free-space optical communication**, Z. Gu, Surface Optics Corp. [6672-15]

3:50 pm: **A structure that more than doubles the intensity of an enhanced backscattering peak**, T. A. Leskova, A. A. Maradudin, Univ. of California/Irvine; E. R. Mendez, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Z. Gu, Surface Optics Corp. [6672-16]

4:10 pm: **Experimental reconstruction for inverse scattering of one-dimensional surfaces**, Z. Gu, A. Wang, Surface Optics Corp. and Univ. of California/San Diego [6672-17]

4:30 pm: **Generation of partially coherent light in rough surface scattering and suppression of the speckle it produces**, T. A. Leskova, A. A. Maradudin, Univ. of California/Irvine; E. R. Méndez, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); A. Wang, Z. Gu, Surface Optics Corp. [6672-18]

4:50 pm: **Polarization of grating diffraction simulated by a vector Kirchhoff model**, S. F. Nee, T. Nee, National Yang-Ming Univ. (Taiwan) [6672-19]

5:10 pm: **Theoretical and experimental investigations of non-goniometric scatterometry**, H. Rothe, C. F. Hahlweg, Helmut-Schmidt Univ. (Germany) [6672-33]

OPTICS

Conference 6672 • Conv. Ctr. 33C

Wednesday 29 August

SESSION 5

Conv. Ctr. 33C Wed. 8:30 to 9:50 am

Roughness and Structure

Chairs: Laurent Arnaud, Institut Fresnel (France); Zu-Han Gu, Surface Optics Corp.

8:30 am: **Progress towards traceable nanoscale optical critical dimension metrology for semiconductors**, H. J. Patrick, T. A. Germer, National Institute of Standards and Technology [6672-20]

8:50 am: **A novel parameter proposed for 2D and 3D topography comparisons and measurements**, J. Song, T. Vorbueger, National Institute of Standards and Technology [6672-21]

9:10 am: **Metrology and application of precision optical surfaces and laser mirrors**, V. V. Azarova, M.F. Stelmakh Polyus Research and Development Institute (Russia); V. E. Asadchikov, Institute of Crystallography (Russia); Y. D. Golyaev, M.F. Stelmakh Polyus Research and Development Institute (Russia); M. L. Zhanavskiy, Institute of Crystallography (Russia) [6672-22]

9:30 am: **Roughness correction in optical calibration of gauge blocks by using an integrating sphere**, C. Kang, J. W. Kim, J. Kim, T. B. Eom, Korea Research Institute of Standards and Science (South Korea) [6672-23]

Coffee Break 9:50 to 10:20 am

SESSION 6

Conv. Ctr. 33C Wed. 10:20 to 11:20 am

Thin Film Analysis

Chair: Bhanwar Singh, Advanced Micro Devices, Inc.

10:20 am: **Measurement of ultra low film stress, local stress distribution and flatness by imaging nanotopography based on low coherence phase shifting interferometry in conjunction with wafer and film thickness metrology**, A. Pravdivtsev, U. M. Wielsch, M. Santos II, A. Koo, Frontier Semiconductor, Inc. [6672-24]

10:40 am: **Ellipsometric porosimetry: fast and non destructive method of porosity characterization of solid oxide fuel cell material based on YSZ thin film**, A. Bondaz, L. Kitzinger, SOPRA, Inc. [6672-25]

11:00 am: **Nano-meter measurement of oxide barrier (compact) film thickness of aluminum by electrochemical impedance spectroscopy (EIS)**, K. J. Habib, Kuwait Institute for Scientific Research (Kuwait) [6672-26]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

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✓ **A hybrid phase unwrapping method for correction the error**, Y. Zou, C. Tung, C. C. Chang, Industrial Technology Research Institute (Taiwan) [6672-27]

✓ **Development of a precision dual level stage system for the dimensional metrology of large range surface topography**, J. Kim, J. W. Kim, T. B. Eom, C. Kang, Korea Research Institute of Standards and Science (South Korea) [6672-28]

✓ **Three-dimensional phase object measurement using an off-axis Fresnel hologram**, C. Lin, National Central Univ. (Taiwan); G. L. Chen, M. K. Kuo, National Defense Univ. (Taiwan); C. Chang, Ming Dao Univ. (Taiwan) [6672-29]

✓ **Vibration insensitive measurement of variation in thickness of glass plates by using optical interferometry**, J. W. Kim, J. Kim, C. Kang, T. B. Eom, Korea Research Institute of Standards and Science (South Korea) [6672-30]

✓ **Coherent control and spectroscopy of excitonic states in semiconductor nanostructures**, O. K. Khasanov, Institute of Solid State and Semiconductor Physics (Belarus); L. Dementsova, Belarusian State Univ. (Belarus); O. M. Fedotova, G. V. Rusetsky, Institute of Solid State and Semiconductor Physics (Belarus); N. N. Rubtsova, Institute of Semiconductor Physics (Russia) [6672-31]

✓ **Precision measurement of LED angular intensity distribution**, O. Muzychko, National Technical Univ. of Ukraine (Ukraine) [6672-32]

Courses of Related Interest

See SPIE Cashier for information.

SC020 Optical Scattering: Measurement and Analysis (Stover)
Sunday 26, 1:30 - 5:30 pm

SC211 Practical Interferometry and Fringe Analysis (Creath)
Wednesday 29, 8:30 am - 12:30 pm

SC213 Introduction to Interferometric Optical Testing (Wyant)
Monday 27, 8:30 am - 12:30 pm

SC492 Predicting, Modeling, and Interpreting Light Scattered by Surfaces (Germer) Monday 27, 8:30 am - 12:30 pm

SC850 Metrology for Modern Optical Manufacturing (Murphy)
Monday 27, 8:30 am - 12:30 pm

Conference 6673 • Conv. Ctr. 30A

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6673

Time and Frequency Metrology

Conference Chair: **R. Jason Jones**, College of Optical Sciences/The Univ. of Arizona

Program Committee: **James C. Bergquist**, National Institute of Standards and Technology; **Andre Clairon**, Observatoire de Paris (France); **Peter J. Delfyett, Jr.**, College of Optics & Photonics/Univ. of Central Florida; **Patrick Gill**, National Physical Lab. (United Kingdom); **Feng-Lei Hong**, National Institute of Advanced Industrial Science and Technology (Japan); **Tetsuya Ido**, National Institute of Information and Communications Technology (Japan); **David J. Jones**, The Univ. of British Columbia (Canada); **Ekkehard Peik**, Physikalisch-Technische Bundesanstalt (Germany); **John D. Prestage**, Jet Propulsion Lab.; **Thomas Udem**, Max-Planck-Institut für Quantenoptik (Germany); **Jun Ye**, Univ. of Colorado/Boulder

Wednesday 29 August

SESSION 1

Conv. Ctr. 30A Wed. 8:10 to 10:10 am

Optical Clocks I: Ions

Chair: **John D. Prestage**, Jet Propulsion Lab.

8:10 am: **A single trapped strontium ion optical frequency standard with application as an optical clock (Invited Paper)**, P. Gill, G. P. Barwood, G. Huang, H. A. Klein, National Physical Lab. (United Kingdom) [6673-01]

8:40 am: **Optical frequency standards based on mercury and aluminum ions (Invited Paper)**, W. M. Itano, J. C. Bergquist, A. Bruschi, S. A. Diddams, T. M. Fortier, T. P. Heavner, L. W. Hollberg, D. B. Hume, S. R. Jefferts, L. Lorini, T. E. Parker, T. Rosenband, J. E. Stalnaker, National Institute of Standards and Technology [6673-02]

9:10 am: **Ultra-stable local oscillator and optical frequency standard based on the 2S_{1/2} - 2F_{7/2} transition in 171Yb⁺ (Invited Paper)**, S. A. Webster, M. Oxborrow, K. Hosaka, A. Stannard, B. Walton, P. Gill, National Physical Lab. (United Kingdom) [6673-03]

9:40 am: **High-resolution spectroscopy of the 88Sr⁺ single ion optical frequency standard (Invited Paper)**, P. Dubé, A. A. Madej, J. E. Bernard, A. D. Shiner, National Research Council Canada (Canada) [6673-04]

Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 30A Wed. 10:30 am to 12:00 pm

Portable Clocks and Standards

Chair: **Patrick Gill**, National Physical Lab. (United Kingdom)

10:30 am: **Hg ion atomic clock for deep space navigation and science (Invited Paper)**, J. D. Prestage, Jet Propulsion Lab. [6673-05]

11:00 am: **Advances in chip-scale atomic frequency references at NIST (Invited Paper)**, S. A. Knappe, National Institute of Standards and Technology; V. Shah, A. Brannon, Univ. of Colorado/Boulder; V. P. Gerginov, Univ. of Notre Dame; H. G. Robinson, National Institute of Standards and Technology; Z. Popovic, Univ. of Colorado/Boulder; L. W. Hollberg, J. E. Kitching, National Institute of Standards and Technology [6673-06]

11:30 am: **The space program PHARAO/ACES (Invited Paper)**, P. Laurent, Observatoire de Paris (France); M. Abgrall, ALTEN SUD-OUEST (France); A. Clairon, P. Lemonde, G. Santarelli, Observatoire de Paris (France); C. Salomon, Lab. Kastler Brossel (France); C. Sirmain, Ctr. National d'Études Spatiales (France); L. Cacciapuoti, European Space Agency (France) [6673-07]

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

SESSION 3

Conv. Ctr. 30A Wed. 1:30 to 3:00 pm

Atomic Fountain Clocks

Chair: **Nathan R. Newbury**, National Institute of Standards and Technology

1:30 pm: **NIST cesium fountains current status and future prospects (Invited Paper)**, S. R. Jefferts, T. P. Heavner, T. E. Parker, J. Shirley, National Institute of Standards and Technology [6673-08]

2:00 pm: **Operation of a caesium fountain standard at zero collisional frequency shift (Invited Paper)**, K. Szymaniec, W. Chalupczak, National Physical Lab. (United Kingdom); S. Weyers, R. Wynands, Physikalisch-Technische Bundesanstalt (Germany); E. Tiesinga, C. J. Williams, National Institute of Standards and Technology [6673-09]

2:30 pm: **Comparisons between atomic fountains at LNE-SYRTE (Invited Paper)**, S. Bize, Observatoire de Paris (France) [6673-10]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 30A Wed. 3:30 to 5:20 pm

Optical Clocks II: Neutrals

Chair: **Chad W. Hoyt**, Bethel Univ.

3:30 pm: **Ultra-high resolution spectroscopy with a 87Sr optical lattice clock (Invited Paper)**, G. K. Campbell, M. M. Boyd, A. D. Ludlow, T. Zelevinsky, S. Blatt, S. M. Foreman, T. Zanon, J. Ye, Univ. of Colorado/Boulder . [6673-11]

4:00 pm: **A light source for ytterbium optical lattice clocks**, F. Hong, M. Yasuda, T. Kohno, A. Onae, National Institute of Advanced Industrial Science and Technology (Japan) and Japan Science and Technology Agency (Japan) [6673-12]

4:20 pm: **Lattice-based optical clock using an even isotope of Yb (Invited Paper)**, Z. W. Barber, National Institute of Standards and Technology and Univ. of Colorado; C. W. Hoyt, Bethel Univ.; J. E. Stalnaker, C. W. Oates, L. W. Hollberg, National Institute of Standards and Technology [6673-13]

4:50 pm: **Towards compact strontium optical lattice clock (Invited Paper)**, N. Poli, R. E. Drullinger, G. Ferrari, Univ. degli Studi di Firenze (Italy); M. Prevedelli, Univ. degli Studi di Bologna (Italy); F. Sorrentino, M. G. Tarallo, G. M. Tino, Univ. degli Studi di Firenze (Italy) [6673-14]

OPTICS

Conference 6673 • Conv. Ctr. 30A

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **A precise length etalon generator controlled by femtosecond mode-lock laser**, R. Smid, O. Cip, J. Lazar, Institute of Scientific Instruments (Czech Republic) [6673-23]
- ✓ **Absolute frequency shifts of iodine cells for laser stabilization**, J. Lazar, J. Hrabina, F. Petru, P. Jedlicka, O. Cip, R. Smid, Institute of Scientific Instruments (Czech Republic) [6673-24]
- ✓ **A compact and efficient hyper coherent light source of visible violet laser diode based on Pound-Drever-Hall technique**, W. Sasaki, H. Yashiro, Y. Miura, K. Mizutani, J. Nakajima, Doshisha Univ. (Japan) [6673-25]
- ✓ **High precision thermal expansion measurements using small Fabry-Perot etalons**, M. J. Davis, J. S. Hayden, SCHOTT North America, Inc.; D. L. Farber, Lawrence Livermore National Lab. [6673-26]
- ✓ **Measurements of the spectral response of loudspeakers using speckle photo-EMF technique**, K. Contreras, Pontificia Univ. Catolica del Peru (Peru); L. Mosquera, Univ. Nacional de Ingenieria (Peru); G. Baldwin-Olguin, Pontificia Univ. Catolica del Peru (Peru) [6673-27]
- ✓ **Compact and inexpensive frequency stabilization technique for 850nm vertical cavity surface emitting lasers based on Fabry-Perrot resonator**, Y. Miura, J. Nakajima, K. Mizutani, W. Sasaki, Doshisha Univ. (Japan) [6673-28]

Thursday 30 August

SESSION 5

Conv. Ctr. 30A Thurs. 8:10 to 10:10 am

FS Combs and Frequency Transfer

Chair: **David J. Jones**, The Univ. of British Columbia (Canada)

- 8:10 am: **Precise time and frequency transfer link used for the uncertainty evaluation of Sr. optical lattice clock (Invited Paper)**, M. Imae, Y. Fujii, F. Hong, National Institute of Advanced Industrial Science and Technology (Japan); M. Takamoto, R. Higashi, H. Katori, The Univ. of Tokyo (Japan) [6673-15]
- 8:40 am: **Coherent fiber-based frequency combs and CW lasers at 1550 nm (Invited Paper)**, N. R. Newbury, W. C. Swann, National Institute of Standards and Technology [6673-16]
- 9:10 am: **Frequency and timing transfer for an 87Sr optical clock (Invited Paper)**, S. M. Foreman, A. D. Ludlow, M. M. Boyd, S. Blatt, T. Zelevinsky, G. K. Campbell, J. Ye, Univ. of Colorado/Boulder; J. E. Stalnaker, S. A. Diddams, National Institute of Standards and Technology [6673-17]
- 9:40 am: **Erbium fiber laser-based frequency combs from THz to VIS (Invited Paper)**, F. Tauser, A. Zach, F. Lison, TOPTICA Photonics AG (Germany) [6673-18]
- Coffee Break 10:10 to 10:30 am

SESSION 6

Conv. Ctr. 30A Thurs. 10:30 to 11:50 am

FS Combs and Precision Spectroscopy

Chair: **Feng-Lei Hong**, National Institute of Advanced Industrial Science and Technology (Japan)

- 10:30 am: **High-precision spectroscopy of antiprotonic helium atoms using femtosecond frequency comb, and related topics in low-energy antiproton physics (Invited Paper)**, H. A. Torii, The Univ. of Tokyo (Japan) [6673-19]
- 11:00 am: **Sub-transit-time limited saturated absorption in hollow-core photonic bandgap fibers**, J. Hald, Dansk Fundamental Metrologi A/S (Denmark); J. Henningsen, Niels Bohr Institute (Denmark); J. C. Petersen, Dansk Fundamental Metrologi A/S (Denmark) [6673-21]
- 11:20 am: **Generation of an octave-spanning Raman comb with carrier-envelope-offset control (Invited Paper)**, M. Katsuragawa, T. Suzuki, T. Onose, The Univ. of Electro-Communications (Japan); K. Misawa, Tokyo Univ. of Agriculture and Technology (Japan); F. Hong, A. Onae, National Institute of Advanced Industrial Science and Technology (Japan) [6673-22]

Conference 6674 • Conv. Ctr. 33A

Monday-Thursday 27-30 August 2007 • Proceedings of SPIE Vol. 6674

Thin-Film Coatings for Optical Applications IV

Conference Chair: Michael J. Ellison, Alpine Research Optics Corp.

Monday 27 August

Solar Energy Plenary Session

Conv. Ctr. Ballroom 20A Mon. 1:30 to 5:30 pm

1:30 pm: **The Solar-hydrogen Economy: An Analysis (Invited Paper)**, W. Reynolds, Eco-Engineers, Inc. [6650-101]

2:00 pm: **Solar Hydrogen Production by Tandem Cell System Composed of Metal Oxide Semiconductor Film Photoelectrode and Dye-Sensitized Solar Cell (Invited Paper)**, H. Arakawa, C. Shiraishi, M. Tatemoto, H. Kishida, D. Usui, A. Suma, A. Takamisawa, T. Yamaguchi, Tokyo Univ. of Science (Japan) [6650-102]

2:30 pm: **New Opportunities in Concentrator Photovoltaics with Low-cost 40% Efficient Multijunction III-V Solar Cells (Invited Paper, Presentation Only)**, R. R. King, R. A. Sherif, G. S. Kinsey, D. C. Law, K. M. Edmondson, H. Yoon, H. L. Cotal, C. M. Fetzer, J. H. Ermer, P. Hebert, P. Pien, N. H. Karam, Spectrolab, Inc.

3:00 pm: **Module Design and Development: Progress and Opportunities (Invited Paper, Presentation Only)**, D. Rose, Sunpower Corp.

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Delivering Service at Scale: Old Requirements for the New Energy Industry (Invited Paper, Presentation Only)**, M. Culpepper, VP/ Strategic Marketing, SunEdison

4:30 pm: **PV Solar Electricity Market and Technology Development (Invited Paper, Presentation Only)**, W. Hoffmann, Applied Materials, Inc.

5:00 pm: **The Solar Industry-DOE and NREL Programs to Accelerate Growth (Invited Paper, Presentation Only)**, S. J. Eglash, Consultant to the National Renewable Energy Lab.

See pg. 17-19 for presentation overviews.

Wednesday 29 August

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

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✓ **ZnO based diluted magnetic semiconductor thin films by RF magnetron sputtering for spin photonic devices**, J. Elanchezhian, B. K. Periyasamy, G. Nammalvar, T. Balasubramanian, National Institute of Technology/ Tiruchirappalli (India) [6674-14]

✓ **Effect of hydrogen in aluminum-doped zinc oxide thin films**, W. Liu, O. D. Crisalle, P. Holloway, M. R. Davidson, Univ. of Florida [6674-15]

Thursday 30 August

SESSION 1

Conv. Ctr. 33A Thurs. 8:00 to 9:20 am

Innovative Film Structures and Measurements

Chair: Michael J. Ellison, Alpine Research Optics Corp.

8:00 am: **Simultaneous measurements of thin-film thickness and refractive index by dispersive white-light interferometry**, Y. Ghim, S. Kim, Korea Advanced Institute of Science and Technology (South Korea) [6674-01]

8:20 am: **Conductive distributed Bragg reflector fabricated by oblique angle deposition from a single material**, M. F. Schubert, J. K. Kim, S. Chhajed, E. F. Schubert, Rensselaer Polytechnic Institute [6674-02]

8:40 am: **Aperiodic metal-dielectric optical filters**, C. Fuentes-Hernandez, D. Owens, S. Randhawa, B. Kippelen, Georgia Institute of Technology . . [6674-03]

9:00 am: **Analyses of structural films using effective refractive index model**, T. Chang, Y. Yeh, S. Chen, C. Lee, National Central Univ. (Taiwan) . . [6674-04]

SESSION 2

Conv. Ctr. 33A Thurs. 9:20 to 10:20 am

Novel Deposition Techniques

Chair: Michael J. Ellison, Alpine Research Optics Corp.

9:20 am: **Robust antireflection coatings By UV cross-linking of silica nanoparticles and diazo-resin polycation**, J. Ridley, K. Papavasiliou, A. L. Ritter, J. R. Heflin, Virginia Polytechnic Institute and State Univ. [6674-06]

9:40 am: **Vapor-phase deposited organosilane coatings as hardening agents for high peak power laser optics**, K. L. Marshall, Z. Culakova, B. Ashe, C. Giacofei, A. L. Rigatti, T. J. Kessler, A. W. Schmid, J. B. Oliver, A. Kozlov, Univ. of Rochester [6674-07]

10:00 am: **Fabrication of indium tin oxide (ITO) thin films by spin-coating deposition method**, P. Psuja, W. Strek, Polska Akademia Nauk (Poland) [6674-08]

Coffee Break 10:20 to 10:50 am

SESSION 3

Conv. Ctr. 33A Thurs. 10:50 to 11:50 am

Thin-Films for Solar Applications

Chair: Michael J. Ellison, Alpine Research Optics Corp.

10:50 am: **Single wall carbon nanotube networks as transparent contacts for photovoltaics**, T. M. Barnes, J. van de Lagemaat, M. Contreras, X. Wu, J. Zhou, G. Rumbles, S. E. Shaheen, T. J. Coutts, National Renewable Energy Lab.; C. Weeks, D. Britz, J. A. Peltola, P. J. Glatkowski, Eikos Inc. . . [6674-10]

11:10 am: **Graded silicon based PECVD thin film for solar cell applications**, M. Gharghi, S. Sivoththaman, Univ. of Waterloo (Canada) [6674-11]

11:30 am: **Fabrication of hydrogenated microcrystalline silicon thin films using RF magnetron sputtering**, S. Wang, W. Su, C. Han, S. Chen, C. Lee, National Central Univ. (Taiwan) [6674-12]

Course of Related Interest

See SPIE Cashier for information.

SC321 Thin Film Optical Coatings (Macleod) Tuesday 28, 8:30 am - 5:30 pm

Conference 6675 • Conv. Ctr. 25A

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6675

Optical Modeling and Performance Predictions III

Conference Chair: **Mark A. Kahan**, Optical Research Associates

Program Committee: **James W. Bilbro**, NASA Marshall Space Flight Ctr.; **Robert P. Breault**, Breault Research Organization, Inc.; **Gail J. Brown**, Air Force Research Lab.; **Thomas G. Brown**, Univ. of Rochester; **William J. Cassarly**, Optical Research Associates; **H. John Caulfield**, Diversified Research Corp.; **Helen J. Cole**, NASA Marshall Space Flight Ctr.; **Keith B. Doyle**, Sigmadyne, Inc.; **Peter G. Eliseev**, The Univ. of New Mexico; **G. Groot Gregory**, Optical Research Associates; **James B. Hadaway**, The Univ. of Alabama/Huntsville; **Claus C. Hoff**, Jet Propulsion Lab.; **George N. Lawrence**, Applied Optics Research; **Marie B. Levine**, Jet Propulsion Lab.; **Steven P. Levitan**, Univ. of Pittsburgh; **H. Angus Macleod**, Thin Film Ctr., Inc.; **Jack L. May**, Northrop Grumman Corp.; **Gregory J. Moore**, Jet Propulsion Lab.; **James D. Moore, Jr.**, SRS Technologies; **Steven R. Murrill**, Army Research Lab.; **Sean O'Brien**, Army Research Lab.; **Jefferson E. Odhner**, BAE Systems; **David C. Redding**, Jet Propulsion Lab.; **James C. Wyant**, College of Optical Sciences/The Univ. of Arizona; **Richard N. Youngworth**, Ball Aerospace & Technologies Corp.; **Feng Zhao**, Jet Propulsion Lab.

Wednesday 29 August

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

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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.

- ✓ **Laser line scan performance prediction**, K. L. Mahoney, Naval Oceanographic Office; O. Schofield, J. Kerfoot, Rutgers Univ.; J. Shirron, T. Giddings, Metron, Inc.; M. S. Twardowski, WET Labs., Inc. [6675-24]
- ✓ **Folded holographic imager**, N. Ghanbari, R. K. Kostuk, M. A. Neifeld, M. D. Stenner, The Univ. of Arizona [6675-25]
- ✓ **PROPER: a physical optical propagation library for IDL**, J. E. Krist, Jet Propulsion Lab. [6675-27]
- ✓ **Finite element analysis of the LOLA receiver telescope lens**, E. A. Matzinger, NASA Goddard Space Flight Ctr. [6675-28]
- ✓ **A linear equation system to obtain a quadrature filter for temporal fringe pattern demodulation**, J. C. Estrada Rico, D. A. Arroyo, M. Servin, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6675-31]
- ✓ **Presentation, design and application of a real-time demosaicing generic model based on a multiple channel CMOS image sampling system**, B. Shan, T. Shen, Beijing Institute of Technology (China); D. T. W. Chan, The Hong Kong Polytechnic Univ. (Hong Kong China) [6675-33]

Thursday 30 August

SESSION 1

Conv. Ctr. 25A Thurs. 8:00 to 9:00 am

Optical Modeling on JWST

Chair: **James B. Hadaway**, The Univ. of Alabama/Huntsville

8:00 am: **Optical modeling in support of the JWST test program**, J. Marzouk, Sigma Space Corp. [6675-01]

8:20 am: **Optical modeling activities for NASA's James Webb Space Telescope (JWST): III. wavefront aberrations due to alignment and figure compensation**, J. M. Howard, NASA Goddard Space Flight Ctr. [6675-02]

8:40 am: **Investigating the use of mutually uncorrelated acceleration spectrums to predict line of sight for JWST optical testing**, C. L. Buttaccio, K. M. Patterson, K. A. Sweitzer, ITT Space Systems LLC [6675-03]

SESSION 2

Conv. Ctr. 25A Thurs. 9:00 to 10:20 am

Optical Modeling on SIM

Chair: **Marie B. Levine**, Jet Propulsion Lab.

9:00 am: **Centroiding estimates of SIM angle tracker camera in presence of a crowded field**, N. Fathpour, Jet Propulsion Lab. and California Institute of Technology [6675-04]

9:16 am: **Star confusion effect on SIM PlanetQuest astrometric performance**, C. Zhai, J. W. Yu, M. H. Milman, N. Fathpour, M. J. Morales, B. Nemati, M. W. Regehr, M. Heflin, L. Sievers, Jet Propulsion Lab. [6675-05]

9:32 am: **SIM-PlanetQuest interferometer realtime control system architecture**, B. H. Kang, D. S. Bayard, G. A. Macala, Jet Propulsion Lab. [6675-06]

9:48 am: **A covariance analysis tool for assessing fundamental limits to SIM pointing performance**, D. S. Bayard, B. H. Kang, Jet Propulsion Lab. [6675-07]

10:04 am: **The instrument model: performance prediction simulator for SIM PlanetQuest**, M. J. Morales, N. Fathpour, Jet Propulsion Lab. [6675-08]

Coffee Break 10:20 to 10:50 am

SESSION 3

Conv. Ctr. 25A Thurs. 10:50 to 11:10 am

Models for a Near Earth Object Observatory and for Fabrication and Test of Diamond Turned Aspheres and/or DOEs

Chair: **Richard N. Youngworth**, Ball Aerospace & Technologies Corp.

10:50 am: **System modeling to support a space-based mission for discovery of near-earth objects**, M. D. Lieber, J. Van Cleve, R. Arentz, H. J. Reitsma, J. Pullen, Ball Aerospace & Technologies Corp. [6675-09]

SESSION 4

Conv. Ctr. 25A Thurs. 11:10 to 11:50 am

Modeling Stray Light

Chair: **G. Groot Gregory**, Optical Research Associates

11:10 am: **Stray light computations: Has nothing changed since the 1970's?**, A. W. Greynolds, Ruda and Associates, Inc. [6675-11]

11:30 am: **Stray light design and analysis of the SNAP Observatory**, M. J. Sholl, Univ. of California/Berkeley; J. C. Fleming, Ball Aerospace & Technologies Corp.; P. N. Jelinsky, M. L. Lampton, Univ. of California/Berkeley [6675-12]

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

SESSION 5

Conv. Ctr. 25A Thurs. 1:30 to 2:30 pm

Structural/Thermal/Optical (STOP) Modeling and Models of Electrostatic Stress

Chair: **Claus C. Hoff**, Jet Propulsion Lab.

1:30 pm: **Advancements in integrated structural/thermal/optical (STOP) analysis of optical systems**, G. Stoeckel, D. Crompton, G. Perron, L-3 SSG-Tinsley [6675-13]

1:50 pm: **Random image motion analysis with Ivory 2.0 FE models**, A. E. Hatheway, Alson E. Hatheway, Inc. [6675-14]

2:10 pm: **On the prediction of electrostatic stresses in devices**, G. Kloos, Hella KGaA Hueck & Co. (Germany) [6675-15]

SESSION 6

Conv. Ctr. 25A Thurs. 2:30 to 3:30 pm

Wave-optics and Blaze Profile Models

Chair: **George N. Lawrence**, Applied Optics Research

2:30 pm: **Algorithm for implementing an ABCD ray matrix wave-optics propagator**, J. D. Mansell, R. Praus, L. Xu, A. J. Seward, S. Coy, MZA Associates Corp. [6675-16]

2:50 pm: **Determining wave-optics mesh parameters for complex optical systems**, J. D. Mansell, S. Coy, R. Praus, MZA Associates Corp. ... [6675-17]

3:10 pm: **Rigorous modeling of various blaze-type profiles and incidence geometries in the intermediate structure regime**, O. Sandfuchs, A. Pesch, R. Brunner, Carl Zeiss Jena GmbH (Germany) [6675-18]

Coffee Break 3:30 to 3:50 pm

SESSION 7

Conv. Ctr. 25A Thurs. 3:50 to 4:10 pm

Modeling of Polarization Beamsplitters and a Novel Polarization Detector

Chair: **Thomas G. Brown**, Univ. of Rochester

3:50 pm: **Advances in polymeric Cartesian polarizing beamsplitters and light engines employing them**, S. Magarill, 3M Precision Optics, Inc.; C. L. Bruzzone, 3M Co. [6675-19]

SESSION 8

Conv. Ctr. 25A Thurs. 4:10 to 5:10 pm

Models Used in Fiber Communications and a Fiber Interferometer

Chair: **Feng Zhao**, Jet Propulsion Lab.

4:10 pm: **Design of Tb/s capacity quadruply cladded optical fiber for WDM systems**, A. Goel, Maulana Azad National Institute of Technology (India) [6675-21]

4:30 pm: **Design of wideband erbium doped fiber amplifier for WDM systems**, A. Goel, R. K. Baghel, Maulana Azad National Institute of Technology (India) [6675-22]

4:50 pm: **Processing of the signals of the single-fiber intermode interferometer with a small number of excited modes by using an electronic correlation method**, O. B. Vitrik, Far Eastern State Technical Univ. (Russia); Y. N. Kul'chin, A. D. Lantsov, Institute of Automation and Control Processes (Russia) [6675-23]



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Conference 6676 • Conv. Ctr. 30A

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6676

Optical System Alignment and Tolerancing

Conference Chairs: **José M. Sasian**, The Univ. of Arizona; **Mitchell C. Ruda**, Ruda & Associates

Program Committee: **Sen Han**, Veeco Tucson Inc.; **Chao-Wen Liang**, National Central Univ. (Taiwan); **Robert E. Parks**, Optical Perspective Group, LLC; **David V. Wick**, Sandia National Labs.; **Richard N. Youngworth**, Ball Aerospace & Technologies Corp.

Sunday 26 August

Introduction

Conv. Ctr. 30A Sun. 8:00 to 8:05 am

Chair: **José M. Sasian**, The Univ. of Arizona

SESSION 1

Conv. Ctr. 30A Sun. 8:05 to 10:05 am

Tolerancing and Component Considerations

Chairs: **José M. Sasian**, College of Optical Sciences/The Univ. of Arizona; **Richard N. Youngworth**, Ball Aerospace & Technologies Corp.

- 8:05 am: **Comparison of three methods for tolerancing opto-mechanical systems**, J. Perrin, Consultant (France) [6676-01]
8:25 am: **Precision centering of lenses (Invited Paper)**, R. E. Parks, Optical Perspectives Group, LLC [6676-02]
8:55 am: **Illumination system tolerancing**, R. J. Koschel, Lambda Research Corp. and The Univ. of Arizona [6676-03]
9:15 am: **Random thoughts on Monte Carlo tolerancing (Invited Paper)**, R. C. Juergens, H. J. Wood, Raytheon Missile Systems [6676-04]
9:45 am: **Tolerancing and compensation of microlithographic optics**, D. G. Smith, Nikon Research Corp. of America [6676-05]
Coffee Break 10:05 to 10:35 am

SESSION 2

Conv. Ctr. 30A Sun. 10:35 am to 12:15 pm

Alignment of Laser and Electro-Optical Systems

Chairs: **David V. Wick**, Sandia National Labs.; **Sen Han**, Veeco Instruments, Inc.

- 10:35 am: **Design, construction, alignment, and calibration of a compact velocimetry experiment**, M. I. Kaufman, R. M. Malone, B. C. Frogget, D. L. Esquibel, V. T. Romero, A. J. Iverson, D. K. Frayer, G. A. Lare, B. Briggs, D. DeVore, B. Cata, K. McGillivray, M. J. Palagi, National Security Technologies, LLC; M. E. Briggs, M. R. Furlanetto, D. B. Holtkamp, N. S. P. King, M. D. Wilke, Los Alamos National Lab.; M. D. Furnish, Sandia National Labs. [6676-06]
10:55 am: **Optical alignment techniques for line-imaging velocity interferometry and line-imaging self-emission of targets at the National Ignition Facility (NIF) (Invited Paper)**, R. M. Malone, B. C. Frogget, M. I. Kaufman, T. W. Tunnell, R. L. Guyton, I. P. Reinbachs, P. W. Watts, National Security Technologies, LLC; J. R. Celeste, P. M. Celliers, T. L. Lee, B. J. MacGowan, E. W. Ng, R. B. Robinson, Lawrence Livermore National Lab. [6676-07]
11:25 am: **Nanoalignment (Invited Paper)**, S. Pau, College of Optical Sciences/The Univ. of Arizona [6676-08]
11:55 am: **Tolerance analysis of a phase space beam analyzer**, G. Kloos, Hella KGaA Hueck & Co. (Germany) [6676-09]
Lunch Break 12:15 to 1:15 pm

SESSION 3

Conv. Ctr. 30A Sun. 1:15 to 3:05 pm

Alignment in Optical Metrology

Chair: **Mitchell C. Ruda**, Ruda and Associates, Inc.

- 1:15 pm: **Interferometer alignment**, S. Han, Veeco Instruments Inc. [6676-10]
1:35 pm: **Optical alignment with computer-generated holograms (Invited Paper)**, J. H. Burge, R. Zehnder, College of Optical Sciences/The Univ. of Arizona [6676-11]
2:05 pm: **A snapshot distortion test using Moire fringes**, E. M. E. Sabatke, Ball Aerospace & Technologies Corp.; L. R. Dettmann, The Univ. of Arizona/Steward Observatory; A. Pierce, D. S. Sabatke, Ball Aerospace & Technologies Corp. [6676-12]

2:25 pm: **Use of a commercial laser tracker for optical alignment**, J. H. Burge, The Univ. of Arizona/Steward Observatory; C. Zhao, P. Su, College of Optical Sciences/The Univ. of Arizona [6676-13]

2:45 pm: **A simple tool for alignment and wavefront testing**, W. P. Kuhn, William P. Kuhn, Ph.D., LLC [6676-14]

Coffee Break 3:05 to 3:25 pm

SESSION 4

Conv. Ctr. 30A Sun. 3:25 to 5:15 pm

Alignment in High Performance Optical Systems

Chair: **Robert E. Parks**, Optical Perspectives Group, LLC

- 3:25 pm: **A scanning Hartmann focus test for the EUVI telescopes aboard STEREO**, R. G. Ohl IV, S. R. Antonille, D. L. Aronstein, B. H. Dean, M. Delmont, NASA Goddard Space Flight Ctr.; J. P. d'Entremont, Lenox Laser; W. L. Eichhorn, B. J. Frey, NASA Goddard Space Flight Ctr.; S. J. Hynes, Swales Aerospace; D. Janssen, Lenox Laser; D. A. Kubalak, Orbital Sciences Corp.; K. W. Redman, ManTech International Corp.; S. Shiri, J. S. Smith, NASA Goddard Space Flight Ctr.; P. L. Thompson, The Johns Hopkins Univ. Applied Physics Lab.; M. E. Wilson, NASA Goddard Space Flight Ctr. [6676-15]
3:45 pm: **Minimizing angst during optical alignment (Invited Paper)**, M. C. Ruda, Ruda and Associates, Inc. [6676-16]
4:15 pm: **Alignment of a three-mirror off-axis telescope**, A. Mahler, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6676-17]
4:35 pm: **JWST-MIRI spectrometer main optics alignment and tolerancing philosophy**, M. Meijers, G. Kroes, ASTRON (Netherlands) [6676-18]
4:55 pm: **Design, tolerancing, and alignment of a dark field condenser**, S. M. Prince, W. G. McGuigan, OPTICS 1, Inc. [6676-20]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

✓ **Using a co-ordinate measuring machine to align multiple element large optical systems**, E. F. Howick, D. Cochran, D. Meier, Industrial Research Ltd. (New Zealand) [6676-22]

✓ **Error analysis and alignment in the optical head of near field recording system**, J. Lee, Korea Institute of Machinery and Materials (South Korea); D. Gweon, Korea Advanced Institute of Science and Technology (South Korea); W. Kim, Korea Institute of Machinery and Materials (South Korea) [6676-23]

Conference 6677 • Conv. Ctr. 28D

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6677

Earth Observing Systems XII

Conference Chairs: **James J. Butler**, NASA Goddard Space Flight Ctr.; **Jack Xiong**, NASA Goddard Space Flight Ctr.

Program Committee: **Philip E. Ardanuy**, Raytheon Co.; **Robert A. Barnes**, Science Applications International Corp.; **Stuart F. Biggar**, Optical Sciences Ctr./The Univ. of Arizona; **Armin W. Doerry**, Sandia National Labs.; **Thomas S. Pagano**, Jet Propulsion Lab.; **Carl F. Schueler**, Consultant

Sunday 26 August

SESSION 1

Conv. Ctr. 28D Sun. 8:30 to 10:10 am

Prelaunch Calibration I

Chair: **Thomas S. Pagano**, Jet Propulsion Lab.

8:30 am: **Application of SSULI ground calibration methods to retrieval of spectral emissions on flight instruments**, P. W. Walker II, Computational Physics, Inc.; S. A. Budzien, S. E. Thonnard, A. C. Nicholas, K. F. Dymond, Naval Research Lab. [6677-01]

8:50 am: **Spectral features, effects and cures**, H. H. van Brug, G. Bazalgette Courrèges-Lacoste, TNO TPD (Netherlands) [6677-02]

9:10 am: **System level pre-launch calibration of onboard solar diffusers**, R. A. Barnes, Science Applications International Corp.; S. W. Brown, National Institute of Standards and Technology; J. J. Butler, NASA Goddard Space Flight Ctr. [6677-03]

9:30 am: **Characterization of Earth-observing satellite instruments for response to spectrally and spatially variable scenes**, S. W. Brown, J. P. Rice, National Institute of Standards and Technology; R. A. Barnes, NASA Goddard Space Flight Ctr. [6677-04]

9:50 am: **Design and characterization of a large area uniform radiance source for calibration of a remote sensing imaging system**, G. A. McKee, Labsphere, Inc. and Indian Space Research Organization (India); S. Pal, H. Seth, A. Bhardwaj, H. S. Sahoo, Indian Space Research Organisation (India) [6677-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 28D Sun. 10:40 am to 12:40 pm

Prelaunch Calibration II

Chair: **Stuart F. Biggar**, College of Optical Sciences/The Univ. of Arizona

10:40 am: **Validation of radiometric standards for the laboratory calibration of reflected-solar Earth-observing satellite instruments**, J. J. Butler, NASA Goddard Space Flight Ctr.; S. W. Brown, National Institute of Standards and Technology; R. A. Barnes, NASA Goddard Space Flight Ctr. [6677-06]

11:00 am: **Comparison of area measurements of apertures for exo-atmospheric solar irradiance between NIST and JPL**, M. Litorja, J. B. Fowler, B. C. Johnson, National Institute of Standards and Technology [6677-07]

11:20 am: **The TSI radiometer facility: absolute calibrations for total solar irradiance instruments**, G. A. Kopp, V. A. Drake, N. Farber, D. M. Harber, K. F. Heurman, Univ. of Colorado/Boulder [6677-08]

11:40 am: **VIIRS ZEMAX and FORTRAN polarization models**, E. Waluschka, NASA Goddard Space Flight Ctr.; G. Meister, FutureTech Corp.; D. Moyer, Science Systems and Applications, Inc.; K. J. Voss, Univ. of Miami [6677-09]

12:00 pm: **Vacuum focus testing of large telescopes**, J. J. Lumia, Ball Aerospace & Technologies Corp. [6677-10]

12:20 pm: **Linearity improvement in a high dark-current near-infrared array spectrometer**, D. P. D'Amato, D. Griffiths, J. E. Leland, Labsphere, Inc. [6677-11]

Lunch Break 12:40 to 1:40 pm

SESSION 3

Conv. Ctr. 28D Sun. 1:40 to 3:00 pm

On-orbit Calibration I

Chair: **Jack Xiong**, NASA Goddard Space Flight Ctr.

1:40 pm: **Absolute ultraviolet irradiance of the moon from SORCE SOLSTICE**, M. Snow, G. Holsclaw, W. E. McClintock, T. N. Woods, Univ. of Colorado/Boulder [6677-12]

2:00 pm: **The on-orbit calibration of SeaWiFS: revised temperature and gain corrections**, R. E. Eplee, Science Applications International Corp.; F. S. Patt, NASA Goddard Space Flight Ctr.; G. Meister, FutureTech Corp.; B. A. Franz, S. W. Bailey, C. R. McClain, NASA Goddard Space Flight Ctr. [6677-13]

2:20 pm: **Consistency of L4™ absolute calibration with respect to the L5 TM sensor based on near simultaneous image acquisition**, G. Chander, U.S. Geological Survey; D. L. Helder, South Dakota State Univ.; E. Micijevic, U.S. Geological Survey; C. J. Mettler, R. Malla, South Dakota State Univ. [6677-14]

2:40 pm: **Comparison of the outgassing models for the Landsat thematic mapper sensors**, E. Micijevic, G. Chander, U.S. Geological Survey . [6677-15]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 28D Sun. 3:30 to 4:50 pm

On-orbit Calibration II

Chair: **Carl F. Schueler**, Consultant

3:30 pm: **Radiometric performance of the CERES Earth radiation budget climate record sensors on the EOS Aqua and Terra spacecraft: launch through 2006**, K. J. Priestley, NASA Langley Research Ctr.; G. M. Matthews, Analytical Services and Materials, Inc.; S. Thomas, Science Applications International Corp. [6677-17]

3:50 pm: **Transfer of radiometric standards between multiple LEO Earth-observing broadband radiometers: application to CERES**, G. M. Matthews, Analytical Services and Materials, Inc.; K. J. Priestley, NASA Langley Research Ctr.; S. Thomas, Science Applications International Corp. [6677-18]

4:10 pm: **A method for jointly estimating the noise and bias of AIRS and TES over ocean scenes**, L. J. Scharenbroich, H. H. G. Aumann, Jet Propulsion Lab. [6677-19]

4:30 pm: **RADARSAT ScanSAR wind retrieval under hurricane conditions**, C. Nie, D. G. Long, Brigham Young Univ. [6677-20]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6677 • Conv. Ctr. 28D

Monday 27 August

SESSION 5

Conv. Ctr. 28D Mon. 8:30 to 11:20 am

MODIS

Chair: Robert A. Barnes, NASA Goddard Space Flight Ctr.

8:30 am: **Detector noise characterization and performance of MODIS thermal emissive bands**, J. Xiong, NASA Goddard Space Flight Ctr.; A. Wu, Science Systems and Applications, Inc.; W. L. Barnes, Univ. of Maryland/Baltimore County [6677-21]

8:50 am: **Monitoring MODIS thermal emissive band stability through brightness temperature trending of a ground target**, B. N. Wenny, Science Systems and Applications, Inc.; J. Xiong, NASA Goddard Space Flight Ctr. [6677-22]

9:10 am: **Aqua MODIS L1B radiometric accuracy update for TIR bands: Tahoe 2006 field data from the NASA ER-2**, C. C. Moeller, Univ. of Wisconsin/Madison; S. J. Hook, Jet Propulsion Lab.; R. O. Knuteson, D. C. Tobin, Univ. of Wisconsin/Madison [6677-23]

9:30 am: **Characterization of MODIS solar diffuser on-orbit degradation**, J. Xiong, NASA Goddard Space Flight Ctr.; X. Xie, Science Systems and Applications, Inc. [6677-24]

9:50 am: **Correction of subframe striping in high-resolution MODIS ocean color products**, G. Meister, FutureTech Corp.; C. Pan, Science Systems and Applications, Inc.; F. S. Patt, B. A. Franz, J. Xiong, C. R. McClain, NASA Goddard Space Flight Ctr. [6677-25]

Coffee Break 10:10 to 10:40 am

10:40 am: **Utility of MODIS-Terra for ocean color applications**, B. A. Franz, E. J. Kwiatkowska, Science Applications International Corp.; G. Meister, FutureTech Corp.; C. R. McClain, NASA Goddard Space Flight Ctr. . [6677-26]

11:00 am: **MODIS pre-launch characterization of reflective solar band response vs. scan angle**, C. Pan, Science Systems and Applications, Inc.; J. Xiong, NASA Goddard Space Flight Ctr.; N. Che, Science Systems and Applications, Inc. [6677-27]

SESSION 6

Conv. Ctr. 28D Mon. 11:20 am to 12:40 pm

Vicarious Calibration I

Chair: James J. Butler, NASA Goddard Space Flight Ctr.

11:20 am: **Prime candidate Earth targets for the post-launch radiometric calibration of space-based optical imaging instruments**, P. M. Teillet, Univ. of Lethbridge (Canada); J. A. Barsi, NASA Goddard Space Flight Ctr.; G. Chander, U.S. Geological Survey; K. J. Thome, College of Optical Sciences/The Univ. of Arizona [6677-28]

11:40 am: **Retrieval of surface BRDF for reflectance-based calibration**, K. J. Thome, J. S. Czaplá-Myers, College of Optical Sciences/The Univ. of Arizona [6677-29]

12:00 pm: **Implication of spatial uniformity on vicarious calibration using automated test sites**, J. S. Czaplá-Myers, K. J. Thome, N. P. Leisso, College of Optical Sciences/The Univ. of Arizona [6677-30]

12:20 pm: **LSpec at Frenchman Flat, Nevada test site: an automatic VNIR vicarious calibration facility**, M. C. Helmlinger, Northrop Grumman Space Technology; C. J. Bruegge, Jet Propulsion Lab.; H. N. Gross, Integrity Applications, Inc. [6677-31]

Lunch Break 12:40 to 2:00 pm

SESSION 7

Conv. Ctr. 28D Mon. 2:00 to 3:20 pm

Vicarious Calibration II

Chair: Armin W. Doerry, Sandia National Labs.

2:00 pm: **VNIR transfer radiometer for validation of calibration sources for hyperspectral sensors**, S. F. Biggar, K. J. Thome, College of Optical Sciences/The Univ. of Arizona; R. B. Lockwood, S. M. Miller, Air Force Research Lab. [6677-32]

2:20 pm: **Solar radiation-based calibration of laboratory grade radiometers**, N. J. Anderson, S. F. Biggar, K. J. Thome, N. P. Leisso, College of Optical Sciences/The Univ. of Arizona [6677-33]

2:40 pm: **Cross-calibration of the Terra MODIS, Landsat-7 ETM+ and EO-1 ALI sensors using near simultaneous surface observation over Railroad Valley Playa, Nevada test site**, G. Chander, U.S. Geological Survey; A. Angal, T. Choi, Science Systems and Applications, Inc.; D. J. Meyer, U.S. Geological Survey; X. Xiong, NASA Goddard Space Flight Ctr.; P. M. Teillet, Univ. of Lethbridge (Canada) [6677-34]

3:00 pm: **Operational calibration of Metop AVHRR solar reflectance channels using the desert target**, F. Yu, Earth Resources Technology, Inc.; X. F. Wu, National Oceanic and Atmospheric Administration [6677-35]

Coffee Break 3:20 to 3:50 pm

SESSION 8

Conv. Ctr. 28D Mon. 3:50 to 4:50 pm

Vicarious Calibration III

Chair: Jack Xiong, NASA Goddard Space Flight Ctr.

3:50 pm: **Airborne prototype instrument suite test flight of a low light-high dynamic range imager and visible spectrometer over the Great Salt Lake region**, M. A. Kuester, B. R. Johnson, W. S. Good, P. B. Johnson, P. Kaptchen, J. Lasnik, T. Lin, T. Ramond, Ball Aerospace & Technologies Corp. . [6677-36]

4:10 pm: **Seasonal and interannual variations in Antarctic backscatter signature from 1999 to 2006 as observed by QuikSCAT**, B. R. Lambert, D. G. Long, Brigham Young Univ. [6677-38]

4:30 pm: **Accuracy assessment of satellite DEM mosaic**, C. V. Rao, S. Saiveena, D. S. Jain, A. S. Manjunath, K. M. M. Rao, National Remote Sensing Agency (India) [6677-39]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

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- ✓ **Improvement of low-temperature estimation in MODIS thermal bands by adjusting calibration offset and non-linear terms**, A. Wu, Science Systems and Applications, Inc.; J. Xiong, NASA Goddard Space Flight Ctr.; B. N. Wenny, N. Chen, K. Chiang, Science Systems and Applications, Inc. [6677-55]
- ✓ **WindSat passive microwave polarimetric observations of soil moisture and land variables**, T. J. Jackson, R. Bindlish, U.S. Dept. of Agriculture; L. Li, Naval Research Lab.; J. Du, Institute of Remote Sensing Applications (China) [6677-56]
- ✓ **Pre-launch characterization of aqua MODIS scan mirror response versus scan angle for thermal emissive bands**, K. Chiang, Science Systems and Applications, Inc.; J. Xiong, NASA Goddard Space Flight Ctr. [6677-57]
- ✓ **MODIS reflective solar bands unscheduled lunar observations**, J. Sun, Science Systems and Applications, Inc.; J. Xiong, NASA Goddard Space Flight Ctr. [6677-58]
- ✓ **The simulator of the photon counting planetary altimeter**, J. Blazej, I. Prochazka, Czech Technical Univ. in Prague (Czech Republic) ... [6677-59]
- ✓ **The design of integrated aerial camera system with convertible film and CCD image sensor**, S. Zhao, Peking Univ. (China) [6677-60]
- ✓ **Scene identification and clear-sky compositing algorithms for generating North America coverage at 250m spatial resolution from MODIS land channels for landcover and change detection applications**, Y. Luo, A. P. Trishchenko, K. V. Khlopenkov, B. Park, Canada Ctr. for Remote Sensing (Canada) [6677-61]
- ✓ **Low uncertainty measurements of bidirectional reflectance factor on the NPOESS/VIIRS solar diffuser**, K. Lessel, Raytheon Santa Barbara Remote Sensing; S. C. McClain, The Univ. of Arizona [6677-62]

Tuesday 28 August

SESSION 9

Conv. Ctr. 28D Tues. 8:30 to 10:30 am

On-orbit Data Analysis

Chair: **James J. Butler**, NASA Goddard Space Flight Ctr.

- 8:30 am: **Distributed database schema**, A. Mousessian, J. Burke, J. Ericson, Jet Propulsion Lab. [6677-41]
- 8:50 am: **Contributions to climate studies from four years of hyperspectral data from the atmospheric infrared sounder (AIRS)**, D. A. Elliott, H. H. G. Aumann, Jet Propulsion Lab.; L. L. Strow, Univ. of Maryland/Baltimore County; D. T. Gregorich, Jet Propulsion Lab. [6677-42]
- 9:10 am: **Analysis of clouds and the Earth's radiant energy system (CERES) lunar measurements**, S. Thomas, Science Applications International Corp.; K. J. Priestley, NASA Langley Research Ctr.; G. M. Matthews, Analytical Services and Materials, Inc. [6677-43]
- 9:30 am: **ENVISAT-ASAR single polarized SLC data analysis for the study of snow pack characteristics**, G. Singh, V. Kumar, G. Venkataraman, Y. S. Rao II, Indian Institute of Technology Bombay (India) [6677-44]
- 9:50 am: **Investigating snow wetness using dual polarization advanced synthetic aperture radar imagery**, G. Venkataraman, G. Singh, V. Kumar, Y. S. Rao II, Indian Institute of Technology Bombay (India) [6677-45]
- 10:10 am: **Snow grain size estimation in Himalayan snow-covered region using ASAR data**, G. Venkataraman, G. Singh, V. Kumar, Indian Institute of Technology Bombay (India) [6677-46]
- Coffee Break 10:30 to 11:00 am

SESSION 10

Conv. Ctr. 28D Tues. 11:00 am to 12:20 pm

Future Instruments and Developments I

Chair: **Philip E. Ardanuy**, Raytheon Co.

- 11:00 am: **Development of dual imaging optical sensor (DIOS) for small satellites**, Y. Choi, M. Kang, S. Jeong, J. Yun, S. Yang, J. Kim, E. Kim, Satrec Initiative Co., Ltd. (South Korea) [6677-47]
- 11:20 am: **Development of high-performance optical system for small satellite**, Y. Choi, S. Yang, M. Kang, E. Kim, Satrec Initiative Co., Ltd. (South Korea) [6677-48]
- 11:40 am: **GeoSTAR: a geostationary microwave sounder for the future**, B. H. Lambrigtsen, T. C. Gaier, P. P. Kangaslahti, A. B. Tanner, Jet Propulsion Lab. [6677-49]
- 12:00 pm: **Passive A-band Wind Sounder (PAWS) for measurement of tropospheric wind velocity profile**, G. Miecznik, R. Pierce, P. Huang, P. A. Slaymaker, P. Kaptchen, S. Roark, B. R. Johnson, D. F. Heath, Ball Aerospace & Technologies Corp. [6677-50]
- Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 11

Conv. Ctr. 28D Tues. 1:50 to 3:10 pm

Future Instruments and Developments II

Chair: **Jack Xiong**, NASA Goddard Space Flight Ctr.

- 1:50 pm: **VEN μ S (vegetation and environment monitoring on a new micro satellite) image quality**, A. Meygret, O. Hagolle, Ctr. National d'Études Spatiales (France); E. Hillairet, Magellium (France); G. Dedieu, P. Crebassol, Ctr. National d'Études Spatiales (France) [6677-51]
- 2:10 pm: **ASSIST - Atmospheric Sounder Spectrometer for Infrared Spectral Technology: latest development and improvement in the atmospheric sounding technology**, L. Rochette, LR Tech (Canada); M. E. Howard, National Security Technologies, LLC; M. Wang, Institut National d'Optique (Canada); T. Bratcher, Ionetrics, Inc. [6677-52]
- 2:30 pm: **Improving GLM design capabilities with high-fidelity analytical and simulation tools**, D. M. Down, S. P. Hagerty, T. F. Updike, Ball Aerospace & Technologies Corp. [6677-53]
- 2:50 pm: **Modeling and optimal design of optical remote sensing payloads**, R. W. Tarde, E. M. Donley, Ball Aerospace & Technologies Corp.; J. L. Carr, Carr Astronautics, Inc. [6677-54]

Course of Related Interest

See SPIE Cashier for information.

SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm

Conference 6678 • Conv. Ctr. 28C

Monday-Thursday 27-30 August 2007 • Proceedings of SPIE Vol. 6678

Infrared Spaceborne Remote Sensing and Instrumentation XV

Conference Chair: **Marija Strojnik**, Ctr. de Investigaciones en Óptica, A.C. (Mexico)

Program Committee: **John A. Antoniadis**, BAE Systems North America; **Gail E. Bingham**, Utah State Univ.; **David A. Cardimona**, Air Force Research Lab.; **Catherine J. Cesarsky**, European Southern Observatory (Germany); **Jam Farhoomand**, TechnoScience Corp.; **Gerald T. Fraser**, National Institute of Standards and Technology; **John C. Gille**, National Ctr. for Atmospheric Research; **Dietrich Lemke**, Max-Planck-Institut für Astronomie (Germany); **Jan L. Williams**, e-Systems Management Consultants; **Juergen Wolf**, NASA Ames Research Ctr.

Monday 27 August

SESSION 1

Conv. Ctr. 28C Mon. 1:00 to 4:50 pm

Far Infrared and Submillimeter Technology

Chairs: **Jam Farhoomand**, TechnoScience Corp.; **Juergen Wolf**, NASA Ames Research Ctr.

1:00 pm: **Hot-electron direct detectors for THz astronomy**, B. S. Karasik, J. H. Kawamura, W. R. McGrath, Jet Propulsion Lab.; M. E. Gershenson, D. Olaya, Rutgers Univ. [6678-30]

1:20 pm: **Sensitivity of hot electron bolometer heterodyne receiver at 4.3 THz**, P. Khosropanah, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); J. Gao, M. Hajenius, J. N. Hovenier, T. M. Klapwijk, Technische Univ. Delft (Netherlands) [6678-31]

1:40 pm: **Tunable far-IR detectors/filters based on surface plasmon polaritons in two dimensional electron gases**, W. R. Buchwald, Air Force Research Lab.; R. E. Peale, Univ. of Central Florida [6678-32]

2:00 pm: **Technologies for cooling of large, distributed and deployable loads**, A. Kashani, J. Maddocks, Atlas Scientific Technologies Inc.; G. F. Nellis, Univ. of Wisconsin/Madison; Y. B. Gianchandani, Univ. of Michigan . [6678-33]

2:20 pm: **The first look at SB349, a 32x32 CTIA readout multiplexer for far IR focal-plane arrays**, J. Farhoomand, TechnoScience Corp.; D. T. Hoang, NASA Ames Research Ctr.; B. Y. Shiroyama, TechnoScience Corp. . [6678-34]

Coffee Break 2:40 to 3:10 pm

3:10 pm: **A microshutter-based field selector for JWST's near infrared spectrograph**, R. F. Silverberg, R. G. Arendt, D. E. Franz, M. D. Jhabvala, G. Kletetschka, A. S. Kuttyrev, M. J. Li, S. H. Moseley, D. A. Rapchun, S. J. Snodgrass, D. W. Sohl, L. M. Sparr, NASA Goddard Space Flight Ctr. [6678-35]

3:30 pm: **Backshort-under-grid bolometer arrays for far-infrared airborne and spaceborne instrumentation**, C. A. Allen, D. J. Benford, D. T. Chuss, T. M. Miller, S. H. Moseley, J. G. Staguhn, E. J. Wollack, NASA Goddard Space Flight Ctr. [6678-36]

3:50 pm: **Sensitive detectors of terahertz radiation based on Pb1-xSnxTe(In)**, D. R. Khokhlov, M.V. Lomonosov Moscow State Univ. (Russia) [6678-37]

4:10 pm: **Transients in stressed Ge:Ga photoconductors**, J. M. Stegmaier, U. Grözinger, Max-Planck-Institut für Astronomie (Germany); N. M. Haegel, Naval Postgraduate School; S. M. Birkmann, D. Lemke, O. Krause, Max-Planck-Institut für Astronomie (Germany) [6678-38]

4:30 pm: **Germanium far-IR detector development**, H. H. Hogue, M. L. Guptill, J. C. Monson, J. Stewart, DRS Sensors & Targeting Systems, Inc. [6678-39]

Tuesday 28 August

SESSION 2

Conv. Ctr. 28C Tues. 8:30 am to 12:20 pm

SOFIA Instrumentation

Chairs: **Jam Farhoomand**, TechnoScience Corp.; **Juergen Wolf**, NASA Ames Research Ctr.

8:30 am: **SOFIA: stratospheric observatory for infrared astronomy**, E. E. Becklin, NASA Ames Research Ctr. [6678-46]

8:50 am: **SOFIA science instrument development**, S. C. Casey, M. L. Savage, Universities Space Research Association [6678-45]

9:10 am: **A polarimetric upgrade for the far-infrared camera HAWC on SOFIA**, J. E. Vaillancourt, California Institute of Technology; D. T. Chuss, NASA Goddard Space Flight Ctr.; J. L. Dotson, NASA Ames Research Ctr.; C. D. Dowell, Jet Propulsion Lab.; D. A. Harper, R. H. Hildebrand, The Univ. of Chicago; T. J. Jones, Univ. of Minnesota/Twin Cities; G. Novak, Northwestern Univ.; M. W. Werner, Jet Propulsion Lab. [6678-48]

9:30 am: **THIS: a tuneable heterodyne infrared spectrometer for SOFIA**, R. T. Schieder, G. Sonnabend, M. Sornig, P. J. Kroetz, D. Stupar, Univ. zu Köln (Germany) [6678-49]

9:50 am: **Mid-IR polarimetry: new vistas for SOFIA**, C. C. Packham, Univ. of Florida; D. Axon, Rochester Institute of Technology; J. H. Hough, Univ. of Hertfordshire (United Kingdom); T. J. Jones, Univ. of Minnesota/Twin Cities; P. F. Roche, Univ. of Oxford (United Kingdom); C. M. Telesco, Univ. of Florida; M. Tamura, National Astronomical Observatory of Japan (Japan) [6678-50]

Coffee Break 10:10 to 10:40 am

10:40 am: **Development of sensitive SIS mixers for terahertz spectroscopy at SOFIA**, A. Karpov, D. A. Miller, California Institute of Technology; J. A. Stern, H. G. LeDuc, Jet Propulsion Lab.; J. Zmuidzinas, California Institute of Technology [6678-51]

11:00 am: **A far-IR/submillimeter integral field spectrograph for SOFIA**, T. Nikola, G. J. Stacey, Cornell Univ. [6678-52]

11:20 am: **SPICA: a concept for a second generation SOFIA instrument**, J. Wolf, Univ. Stuttgart (Germany); A. Krabbe, Univ. zu Köln (Germany) [6678-53]

11:40 am: **AIRES, an airborne infrared Echelle spectrometer for SOFIA**, E. F. Erickson, M. R. Haas, NASA Ames Research Ctr. [6678-13]

12:00 pm: **GREAT: the German first light heterodyne instrument for SOFIA**, U. U. Graf, Univ. zu Köln (Germany); S. Heyminck, R. Güsten, Max-Planck-Institut für Radioastronomie (Germany); P. Hartogh, Max-Planck-Institut für Sonnensystemforschung (Germany); H. Huebers, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); K. Jacobs, M. Philipp, D. Rabanus, J. Stutzki, Univ. zu Köln (Germany); P. van der Wal, Max-Planck-Institut für Radioastronomie (Germany); C. Walther, Univ. de Neuchâtel (Switzerland); A. Wagner-Gentner, Univ. zu Köln (Germany) [6678 65]

Lunch/Exhibition Break 12:20 to 2:00 pm

SESSION 3

Conv. Ctr. 28C **Tues. 2:00 to 3:30 pm**

Image Processing and Technologies

Chairs: **John A. Antoniadis**, BAE Systems North America; **Gonzalo Paez**, Ctr. de Investigaciones en Óptica, A.C. (Mexico)

2:00 pm: **Detection of shadowed objects in hyperspectral imagery (*Invited Paper*)**, R. R. Mayer, J. A. Antoniadis, M. M. Baumbach, D. Chester, J. Edwards, A. Goldstein, D. Haas, S. Henderson, BAE Systems Advanced Information Technologies [6678-40]

2:30 pm: **Pyroelectric linear arrays and their applications**, V. Norkus, G. Gerlach, Technische Univ. Dresden (Germany); R. Köhler, G. Hofmann, DIAS Infrared GmbH (Germany) [6678-41]

2:50 pm: **Multi-channel LWIR acousto-optic tunable devices**, N. B. Singh, M. S. Gottlieb, D. R. Suhre, D. J. Knuteson, D. A. Kahler, A. Berghmans, B. Wagner, S. McLaughlin, J. J. Hawkins, Northrop Grumman Corp. [6678-42]

3:10 pm: **Optomechanical design and analysis considerations on the lunar orbiter laser altimeter**, S. M. Schmidt, W. Mamakos, E. A. Matzinger, S. M. Wall, NASA Goddard Space Flight Ctr. [6678-43]

Wednesday 29 August

SESSION 4

Conv. Ctr. 28C **Wed. 8:30 to 11:20 am**

Advanced Detectors and Technologies

Chairs: **Paul M. Alsing**; **David A. Cardimona**, Air Force Research Lab.

8:30 am: **Quantum well and quantum dot based detector arrays for infrared imaging applications (*Invited Paper*)**, S. D. Gunapala, Jet Propulsion Lab. [6678-24]

9:00 am: **Dual band HEIWIIP detectors with nitride materials**, A. G. Unil-Perera, G. Ariyawansa, M. Alevli, N. Dietz, S. G. Matsik, Georgia State Univ.; I. T. Ferguson, Georgia Institute of Technology; H. Luo, A. Bezinger, H. C. Liu, National Research Council Canada (Canada) [6678-25]

9:20 am: **Demonstration of a two-color 320 x 256 quantum dots-in-a-well focal plane array**, E. S. Varley, S. Krishna, D. A. Ramirez, J. S. Brown, S. J. Lee, A. Stintz, M. C. Lenz, The Univ. of New Mexico; A. Riesinger, M. Sundaram, QmagIQ, LLC [6678-26]

9:40 am: **Current status of type II InAs/GaSb superlattices MWIR-LWIR photodiodes and FPA at the Center for Quantum Devices (*Invited Paper*)**, M. Razeghi, M. B. Nguyen, P. Delaunay, D. M. Hoffman, A. D. Hood, Y. Wei, J. Nguyen, Northwestern Univ. [6678-27]

Coffee Break 10:10 to 10:40 am

10:40 am: **New materials and advanced detectors technologies**, A. M. Fatihmulla, H. S. Hier, L. A. Aina, D. Johnson, M. Lecates, Epitaxial Technologies, LLC [6678-28]

11:00 am: **Characterization of very large format 1Kx1K LWIR QWIP focal plane array**, S. B. Rafol, E. Cho, W. Lim, QWIP Technologies, Inc. ... [6678-29]

SESSION 5

Conv. Ctr. 28C **Wed. 11:20 am to 12:30 pm**

SOFIE Global Warming and Climate Change Instrument

Chair: **Jan L. Williams**, e-Systems Management Consultants

11:20 am: **Sounding the upper mesosphere using broadband solar occultation: initial results from the SOFIE experiment (*Invited Paper*)**, L. L. Gordley, M. E. Hervig, GATS, Inc.; J. M. Russell III, Hampton Univ.; G. J. Paxton, L. E. Deaver, J. C. Burton, R. E. Thompson, C. W. Brown, B. E. Magill, M. J. McHugh, GATS, Inc. [6678-11]

11:50 am: **SOFIE jitter analysis**, S. R. Wassom, C. Fish, Utah State Univ.; L. L. Gordley, J. C. Burton, GATS, Inc. [6678-12]

12:10 pm: **SOFIE instrument ground calibration update**, S. M. Hansen, C. Fish, A. L. Shumway, Utah State Univ.; L. L. Gordley, M. E. Hervig, GATS, Inc. [6678-14]

Lunch/Exhibition Break 12:30 to 1:40 pm

SESSION 6

Conv. Ctr. 28C **Wed. 1:40 to 3:10 pm**

Global Warming and Climate Change Instruments

Chair: **Jan L. Williams**, e-Systems Management Consultants

1:40 pm: **HIRDLS complete correction algorithm for optical train blockage and resulting data (*Invited Paper*)**, J. C. Gille, C. Hartsough, B. Nardi, H. Lee, National Ctr. for Atmospheric Research [6678-15]

2:10 pm: **ACE-FTS instrument: after four years on-orbit**, M. A. Soucy, H. L. Buijs, S. Y. Fortin, C. J. Deutsch, ABB Inc. (Canada) [6678-16]

2:30 pm: **Lessons learned: fabrication and assembly integration of the orbiting carbon observatory instrument**, R. E. Haring, R. Pollock, B. M. Sutin, R. D. Blakley, Hamilton Sundstrand; L. M. Scherr, D. Crisp, Jet Propulsion Lab. [6678-17]

2:50 pm: **Design of the SAC-D/NIRST camera module**, J. Gauvin, F. J. Chateaufneuf, Institut National d'Optique (Canada); H. G. Marraco, Comisión Nacional de Actividades Espaciales (Argentina); L. Ngo-Phong, Canadian Space Agency (Canada) [6678-18]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Conv. Ctr. 28C **Wed. 3:40 to 4:40 pm**

GOSAT Global Warming & Climate Change Payload Development

Chair: **Jan L. Williams**, e-Systems Management Consultants

3:40 pm: **The performance test results for engineering model (EM) of thermal and near infrared sensor for carbon observation (TANSO) on GOSAT**, H. Suto, Japan Aerospace Exploration Agency (Japan); T. Kawashima, NEC TOSHIBA Space Systems, Ltd. (Japan); K. Shiomi, T. Kina, A. Kuze, T. Urabe, S. Kawakami, Y. Kaneko, T. Hamazaki, Japan Aerospace Exploration Agency (Japan) [6678-19]

4:00 pm: **Development of airborne SWIR FTS for GOSAT validation and calibration**, H. Suto, A. Kuze, Y. Kaneko, T. Hamazaki, Japan Aerospace Exploration Agency (Japan); I. Morino, H. Oguma, T. Yokota, National Institute for Environmental Studies (Japan); G. Inoue, Nagoya Univ. (Japan) . [6678-20]

4:20 pm: **The test results from contamination control activity for GOSAT**, T. Urabe, A. Kuze, H. Suto, T. Hamazaki, Japan Aerospace Exploration Agency (Japan) [6678-21]

SESSION 8

Conv. Ctr. 28C **Wed. 4:40 to 5:30 pm**

Weather and Climate Change Instruments

Chair: **Jan L. Williams**, e-Systems Management Consultants

4:40 pm: **The performance of the AVHRR, HIRS and AMSU-A instruments on board Metop-A (*Invited Paper*)**, A. Perez-Albifiana, EUMETSAT (Germany); D. Battles, QSS Group, Inc. (Germany); D. Monteiro, R. W. Lambeck, QSS Group, Inc.; R. M. Aleman, NASA Goddard Space Flight Ctr.; C. Jackson, National Oceanic and Atmospheric Administration [6678-22]

5:10 pm: **In orbit checkout feedback from the infrared imaging radiometer for the CALIPSO mission**, F. Tinto, T. Tremas, Ctr. National d'Études Spatiales (France) [6678-23]

OPTICS

Conference 6678 • Conv. Ctr. 28C

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Feasibility study of IR-to-visible converter based on EuTTA's fluorescence**, M. Alfaro Gómez, G. Paez, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-54]
- ✓ **Development of misalignment conditions of a rotational shearing interferometer to detect extra-solar planets**, M. Galan, M. Strojnik-Scholl, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-56]
- ✓ **Misalignment study for a Dove prism employing exact ray trace**, E. Gutierrez-Herrera, M. Strojnik, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-57]
- ✓ **Wide-field OCT using micro lens arrays**, A. Ortega, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-58]
- ✓ **Noise-immune oximetry employing logarithmic filtering**, G. Paez, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-59]
- ✓ **Determination of the degree of asphericity of a transparent reference sphere with a vectorial shearing interferometer**, C. N. Ramirez, M. Strojnik, G. Paez, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-60]
- ✓ **Mathematical model to enhance the spatial resolution of the pulsed phase thermography technique**, J. Ramirez-Granados, G. Paez, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-61]
- ✓ **Scaling thermal, temporal and geometrical tooth response to laser pulse irradiation**, M. Strojnik, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-62]
- ✓ **Optimal source bandwidth for transillumination interferometry**, P. Vacas-Jacques, M. Strojnik, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [6678-63]
- ✓ **Prediction of cryogenic temperature impact on the performance of space-borne IR sensors**, X. Xu, X. Shi, Beihang Univ. (China) .. [6678-64]

Thursday 30 August

SESSION 9

Conv. Ctr. 28C Thurs. 9:00 to 11:50 am

Calibration of Infrared Instruments

Chairs: **Gerald T. Fraser, Sergey N. Mekhontsev**, National Institute of Standards and Technology

9:00 am: **MWIR imaging spectrometer with digital time delay integration for remote sensing and characterization of planetary satellites**, S. E. Kendrick, A. Harwit, M. L. Kaplan, Ball Aerospace & Technologies Corp.; W. D. Smythe, Jet Propulsion Lab. [6678-01]

9:20 am: **Infrared standards in space**, J. A. Dykema, Harvard Univ. [6678-02]

9:40 am: **Navy primary standards capability for spectral radiometric calibration of blackbodies**, T. H. Uzzell, W. S. Schlotte, Navy Primary Standards Lab.; S. N. Mekhontsev, V. B. Khromchenko, L. M. Hanssen, National Institute of Standards and Technology [6678-03]

Coffee Break 10:00 to 10:30 am

10:30 am: **NIST-calibrated SI-traceable stars**, G. T. Fraser, S. W. Brown, B. C. Johnson, K. R. Lykke, H. W. Yoon, National Institute of Standards and Technology; R. W. Russell, The Aerospace Corp. [6678-04]

10:50 am: **Direct measurements of angle and temperature-dependent IR emissivity of targets**, S. N. Mekhontsev, V. B. Khromchenko, L. M. Hanssen, G. T. Fraser, National Institute of Standards and Technology [6678-05]

11:10 am: **Tunable filter comparator for spectral calibration of near-ambient temperature blackbodies**, V. B. Khromchenko, S. N. Mekhontsev, L. M. Hanssen, National Institute of Standards and Technology [6678-06]

11:30 am: **Cs and Na heat pipe blackbodies as standards of infrared spectral radiance and radiance temperature in the temperature range 300 to 1100 degrees C**, J. Envall, S. N. Mekhontsev, V. B. Khromchenko, L. M. Hanssen, National Institute of Standards and Technology [6678-07]

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

SESSION 10

Conv. Ctr. 28C Thurs. 1:30 to 2:30 pm

Infrared Instruments

Chair: **Marija Strojnik**, Ctr. de Investigaciones en Óptica, A.C.

1:30 pm: **Interferometry on stars at mid-infrared wavelengths**, K. Tatebe, C. H. Townes, Univ. of California/Berkeley [6678-08]

1:50 pm: **Spectral balancing of a broadband Earth-observing radiometer with co-aligned SW channel to ensure accuracy and stability of broadband daytime OLR measurements: application to CERES**, G. M. Matthews, Analytical Services and Materials, Inc.; K. J. Priestley, NASA Langley Research Ctr.; S. Thomas, Science Applications International Corp. [6678-09]

2:10 pm: **A comprehensive radiometric validation protocol for the CERES Earth radiation budget climate record sensors**, K. J. Priestley, NASA Langley Research Ctr.; G. M. Matthews, Analytical Services and Materials, Inc.; S. Thomas, Science Systems and Applications, Inc. [6678-10]

Courses of Related Interest

See SPIE Cashier for information.

SC134 Optical Design Fundamentals for Infrared Systems (Riedl)
Sunday 26, 8:30 am - 5:30 pm

SC152 Infrared Focal Plane Arrays (Dereniak, Hubbs) Sunday 26,
1:30 - 5:30 pm

SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/
Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

Conference 6679 • Conv. Ctr. 28B

Tuesday-Wednesday 28-29 August 2007 • Proceedings of SPIE Vol. 6679

Remote Sensing and Modeling of Ecosystems for Sustainability IV

Conference Chairs: **Wei Gao**, Colorado State Univ.; **Susan L. Ustin**, Univ. of California/Davis

Program Committee: **Gregory P. Asner**, Stanford Univ.; **Xiuwan Chen**, Peking Univ. (China); **Wenjie Dong**, Chinese Meteorological Administration (China); **John A. Gamon**, California State Univ./Los Angeles; **E. Raymond Hunt, Jr.**, USDA Agricultural Research Service; **Xin-Zhong Liang**, Univ. of Illinois at Urbana-Champaign and Illinois State Water Survey; **John M. Melack**, Univ. of California/Santa Barbara; **Dennis Ojima**, Colorado State Univ.; **Jeffrey L. Privette**, NASA Goddard Space Flight Ctr.; **Jianguo Qi**, Michigan State Univ.; **John J. Qu**, George Mason Univ.; **Dar A. Roberts**, Univ. of California/Santa Barbara; **Daniel L. Schmoldt**, U.S. Dept. of Agriculture; **James R. Slusser**, Colorado State Univ.; **Yegang Wu**, E2 Consulting Engineers, Inc.; **Jack Xiong**, NASA Goddard Space Flight Ctr.; **Xiusheng H. Yang**, Univ. of Connecticut; **Hamid Yimit**, Xinjiang Univ. (China); **Hua Zhang**, National Climate Ctr. (China)

Tuesday 28 August

Welcome and Opening Remarks

Conv. Ctr. 28B Tues. 8:00 to 8:10 am

SESSION 1

Conv. Ctr. 28B Tues. 8:10 to 10:00 am

Remote Sensing and Modeling Theory, Techniques, and Applications I

Chairs: **E. Raymond Hunt, Jr.**, USDA Agricultural Research Service; **Susan L. Ustin**, Univ. of California/Davis

8:10 am: **Remote sensing of vegetation water content using shortwave infrared reflectances (Invited Paper)**, E. R. Hunt, Jr., M. T. Yilmaz, USDA Agricultural Research Service [6679-01]

8:40 am: **Spatial distribution and seasonal variation of UV-B radiation in the United States**, X. Wang, W. Gao, B. Olson, J. M. Davis, J. R. Slusser, Colorado State Univ. [6679-02]

9:00 am: **Characterization of land cover change by multi-temporal biophysical variables in fused images**, A. A. López-Caloca, F. Mora, Ctr. de Investigación en Geografía y Geomática (Mexico); B. Escalante-Ramírez, Univ. Nacional Autónoma de México (Mexico) [6679-03]

9:20 am: **Two-band enhanced vegetation index without a blue band and its conversion from AVHRR to MODIS sensors**, Z. Jiang, A. R. Huete, Y. Kim, K. Didan, The Univ. of Arizona [6679-04]

9:40 am: **Multisensor reflectance and vegetation index comparisons of Amazon tropical forest phenology with hyperspectral Hyperion data**, Y. Kim, A. R. Huete, Z. Jiang, The Univ. of Arizona; T. Miura, Univ. of Hawaii at Manoa [6679-05]

Coffee Break 10:00 to 10:20 am

SESSION 2

Conv. Ctr. 28B Tues. 10:20 am to 12:10 pm

Remote Sensing and Modeling Theory, Techniques, and Applications II

Chairs: **John J. Qu**, George Mason Univ.; **Xinli Wang**, Colorado State Univ.

10:20 am: **Comparison of the NASA EOS AIRS and NOAA SBUV2 ozone measurements (Invited Paper)**, J. J. Qu, George Mason Univ. [6679-06]

10:50 am: **Sensitivity analysis of MODIS band-to-band registration characterization and its impact on science data products**, Y. Xie, George Mason Univ.; X. Xiong, NASA Goddard Space Flight Ctr.; J. J. Qu, George Mason Univ.; N. Che, Science Systems and Applications, Inc.; L. Wang, George Mason Univ. [6679-07]

11:10 am: **Vine variety discrimination with airborne imaging spectroscopy**, J. Martín-Herrero, M. Ferreira-Armán, J. L. Alba Castro, Univ. de Vigo (Spain); S. Homayouni, J. Da Costa, Univ. Bordeaux I (France) [6679-08]

11:30 am: **High-performance spectroradiograph for 250-400 solar UV band**, C. Rafanelli, I. Di Menno, S. De Simone, M. Di Menno, Istituto di Scienze dell'Atmosfera e del Clima (Italy) [6679-09]

11:50 am: **Monitoring the intensity of locust damage to vegetation using hyper-spectra data obtained at ground surface**, S. Ni, T. Wu, Nanjing Normal Univ. (China) [6679-10]

Lunch/Exhibition Break 12:10 to 1:30 pm

SESSION 3

Conv. Ctr. 28B Tues. 1:30 to 4:40 pm

Ecological Remote Sensing and Modeling in China

Chairs: **Hanjie Wang**, Regional Climate-Environment Research for Temperate East Asia (China); **Runping Shen**, Nanjing Univ. of Information Science & Technology (China); **Huailiang Chen**, Henan Institute of Meteorological Science (China)

1:30 pm: **A regional climate simulation study with land cover dynamics in northern China (Invited Paper)**, H. Wang, Y. Ju, Regional Ctr. for Temperate East Asia (China) [6679-11]

2:00 pm: **Vegetation cover change in semi-arid northeast China using SPOT VEGETATION data**, X. Liu, China Univ. of Geosciences (China); F. Huang, P. Wang, Northeast Normal Univ. (China) [6679-13]

2:20 pm: **Wetlands dynamic in West Songnen plain, China, since the 1950s**, F. Huang, P. Wang, Northeast Normal Univ. (China); Y. Zhang, Northeast Institute of Geography and Agricultural Ecology (China) [6679-14]

2:40 pm: **A comprehensive method based on Dempster-Shafer theory to extract the land use/land cover information from digital remotely sensed images: a case study of Poyang Lake region in Jiangxi Province**, R. Shen, Nanjing Univ. of Information Science & Technology (China); R. Wang, Zhejiang Univ. (China); X. Zhao, Jiangxi Agricultural Univ. (China); X. Li, Nanjing Univ. of Information Science & Technology (China) [6679-15]

Coffee Break 3:00 to 3:20 pm

3:20 pm: **Characteristics of spatial distribution and temporal variation of ultraviolet radiation and their affecting factors in Henan Province of China**, R. Liu, H. Tian, Z. Du, Henan Institute of Meteorological Science (China) [6679-16]

3:40 pm: **Temporal comparison of land surface albedo for three different land use cover types in the Beijing area**, W. Liu, Institute of Urban Meteorology (China) [6679-17]

4:00 pm: **Response characteristic analysis of climate change of vegetation activity in Huang-Huai-Hai area based on NOAA NDVI data set**, H. Chen, Z. Du, Henan Institute of Meteorological Science (China) [6679-18]

4:20 pm: **Spatiotemporal change of ecological capital and the effects from the climate change and land use/cover change in the northern slope of the Tianshan Mountains, China**, Z. Qing, X. Chen, X. Zhang, Peking Univ. (China) [6679-20]

Conference 6679 • Conv. Ctr. 28B

Wednesday 29 August

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

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- ✓ **Study on the process of snowmelt based on the 3S technology**, S. Fang, Z. Liu, Xinjiang Univ. (China) [6679-21]
- ✓ **Variation of solar radiation and simulation of its effect on crop growth**, X. Zhang, Henan Institute of Meteorological Science (China); C. Wang, W. Zhai, D. Chen, Chinese Meteorological Society (China); X. Fu, Henan Institute of Meteorological Science (China); L. Bai, Mengjin Meteorological Bureau (China) [6679-22]
- ✓ **Spatial and temporal distributions of lightning activities in northeast China from satellite observation**, J. Zhao, L. Sun, Beijing Forestry Univ. (China); Y. Hao, Forest Management (China); D. Zhang, Forest Bureaus in Daxinganling (China); G. Guo, Nan yang Normal Univ. (China); Z. Niu, Institute of Remote Sensing Applications (China) [6679-23]
- ✓ **Influence of land use/cover change on land surface temperature of Laizhou Bay plain**, J. Ning, Shandong Normal Univ. (China) [6679-24]
- ✓ **A remote sensing-based integrated approach for monitoring of grassland degradation: case study on the representative grassland near the middle and upper reaches of Heihe River basin, western China**, Z. Du, Cold and Arid Regions Environmental and Engineering Research Institute (China); Y. Shen, Huazhong Univ. of Science and Technology (China); J. Wang, X. Shen, Cold and Arid Regions Environmental and Engineering Research Institute (China) [6679-25]
- ✓ **Investigation of soil organic carbon and nitrogen spatial distribution in Huolin River wetland with MODIS satellite data**, M. Zhou, Inner Mongolia Normal Univ. (China); G. Guo, Institute of Geographical Sciences and Natural Resources Research (China); L. Sun, Beijing Forestry Univ. (China); G. Z. Wang, U.S.D.A. Forest Service [6679-26]
- ✓ **Cultivated land changes and driving force analysis by satellite remote sensing in the Yellow River delta of China**, X. Zhang, P. Wang, Nanjing Univ. of Information Science & Technology (China); G. Zhao, Shandong Agricultural Univ. (China) [6679-27]
- ✓ **A method to compute solar radiation at surface in any time interval based on NCEP reanalysis**, L. Zou, Nanjing Univ. of Information Science & Technology (China); T. Wu, X. Xu, Chinese Meteorological Administration (China); W. Gao, Colorado State Univ. [6679-28]
- ✓ **A three-dimensional variational data assimilation system for a climate model: basic scheme and idea experiments**, Y. Guan, Nanjing Univ. of Science & Technology (China); G. Zhou II, Institute of Atmospheric Physics (China); W. Lu, Nanjing Univ. of Information Science & Technology (China) [6679-29]
- ✓ **Spatial heterogeneity analysis for the remote sensing of regional water and heat fluxes of land surface**, W. Zhang, Institute of Geographical Sciences and Natural Resources Research (China) [6679-30]
- ✓ **Propagation characters of baroclinic waves in the upper troposphere during the period of rainstorm in Yangtze and Huaihe Valley**, M. Shilong, Z. Guan, Nanjing Univ. of Information Science & Technology (China)[6679-31]
- ✓ **The relationship between the intensity of east Asian summer monsoon in Yangtze and sea surface temperature anomalies in pre-winter**, X. Lu, X. Zhang, Beijing Climate Ctr. (China); J. Chen, Institute of Oceanology (China) [6679-32]
- ✓ **Relations between albedos and emissivities from MODIS and ASTER data over China**, W. Gao, Colorado State Univ.; Q. Lu, Institute of Geographical Sciences and Natural Resources Research (China); W. Wu, National Ctr. for Atmospheric Research; Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-33]
- ✓ **Preliminary study on the evolution features of historical floods/droughts for the northeast of China**, N. Xu, Heilongjiang Provincial Meteorological Bureau (China); M. Yuan, Nanjing Univ. of Information Science & Technology (China) [6679-34]
- ✓ **Study on an abrupt rainstorm in northeast China from remote sensings**, M. Yuan, Nanjing Univ. of Information Science & Technology (China)[6679-35]
- ✓ **Assessing the impact of climate change on the crop potential productivity in Huang-Huai-Hai Plain in China based on crop model and GIS technique**, Z. Tian, X. T. Lei, Shanghai Meteorological Bureau (China); Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-36]
- ✓ **Impacts of climate change and urbanization on carbon cycle in the Yangtze River delta, China**, J. Shi, Shanghai Meteorological Bureau (China); Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-37]
- ✓ **The dynamic of terrestrial carbon storage in eastern China**, L. Cui, Shanghai Meteorological Bureau (China); Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-38]
- ✓ **Construction of land data assimilation system based on ENKF technology and community land model**, Q. Lu, Institute of Geographical Sciences and Natural Resources Research (China); W. Gao, Colorado State Univ.; Z. Gao, Institute of Geographical Sciences and Natural Resources Research; W. Wu, National Ctr. for Atmospheric Research [6679-39]
- ✓ **Seasonal relationship between temperature and precipitation with snow retrieved from SSM/I over China**, Q. Lu, Institute of Geographical Sciences and Natural Resources Research (China); W. Gao, Colorado State Univ.; W. Wu, National Ctr. for Atmospheric Research; Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-41]
- ✓ **Research on Cleistogenes squarrosa's histocytic changing and determine method in the course of restoring succession in degradation community of the typical steppe**, Z. Tao, Inner Mongolia Agricultural Univ. (China); W. Wang, Inner Mongolia Univ. (Mongolia); L. Sun, Beijing Forestry Univ. (China); Z. Zhang, C. Liang, Inner Mongolia Agricultural Univ. (China); L. Wang, B. Ren tuo ya, Inner Mongolia Univ. (Mongolia) [6679-42]
- ✓ **Comparison of seasonal and spatial variations of albedos from moderate-resolution imaging spectroradiometer (MODIS) and common land model**, Q. Lu, Institute of Geographical Sciences and Natural Resources Research (China); W. Gao, Colorado State Univ.; Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China); W. Wu, National Ctr. for Atmospheric Research [6679-43]
- ✓ **Impact assessment on ecosystem to climate change in Heihe River basin in northwest China**, S. Landong, Cold and Arid Regions Environmental and Engineering Research Institute (China) and Lanzhou Regional Climate Ctr. Gansu Province (China) [6679-44]
- ✓ **Water quality analysis of Aksu-Tarim River based on remote sensing data**, J. Ding, T. Tiyip, F. Zhang, Xinjiang Univ. (China) [6679-45]
- ✓ **Retrieving land surface temperature and land use/cover change**, F. Zhang, Institute of Geographical Sciences and Natural Resources Research (China) [6679-46]
- ✓ **Technique comparisons of land cover classifications based on RS images**, X. Zhou, Institute of Geographical Sciences and Natural Resources Research (China) [6679-47]
- ✓ **The study trend of UVB coupling TOMS data and USDA stations**, Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-48]
- ✓ **Analysis of temporal variation regulation and source of urban aerosol in middle China**, D. Chen, Chinese Academy of Meteorological Sciences (China); W. Deng, Z. Du, Henan Institute of Meteorological Science (China) [6679-49]
- ✓ **EOS/MODIS data-based estimation of the daily snowmelt in Juntanghu Watershed, northern slope of Tianshan Mountain**, Q. Zhao, Z. Liu, S. Fang, Z. Lu, Xinjiang Univ. (China) [6679-51]
- ✓ **Landscape ecological risk assessment study in Bosten Lake**, L. Gong, A. Amut, G. Lu, Xinjiang Univ. (China); X. Liang, Univ. of Illinois at Urbana-Champaign [6679-52]
- ✓ **Research on spatial differentiation of landscape and ecological construction in arid land oasis**, H. Wang, L. Gong, J. Ding, Z. Liu, Xinjiang Univ. (China) [6679-53]

- ✓ **A study of retrieval land surface temperature and evapotranspiration in response to LUCG based on remote sensing data**, C. Liu, Institute of Geographical Sciences and Natural Resources Research (China); W. Gao, Colorado State Univ.; Z. Gao, Institute of Geographical Sciences and Natural Resources Research (China) [6679-54]
- ✓ **The inter-decadal correlation between summer arctic oscillation and summer drought and moist characteristic of northwest China**, P. Wang, Nanjing Univ. of Information Science & Technology (China) and Lanzhou Institute of Arid Meteorology (China); Y. Zheng, Nanjing Univ. of Information Science & Technology (China); B. Wang, Lanzhou Institute of Arid Meteorology (China); J. He, Nanjing Univ. of Information Science & Technology (China) [6679-56]
- ✓ **The response of water resources to climate change and its influence on ecological environment in Shiyang River basin**, B. Wang, Lanzhou Institute of Arid Meteorology (China) [6679-57]
- ✓ **Land use/land cover change in Yellow River Delta, China during fast development period**, W. Zhou, Y. Tian, Southwest China Normal Univ. (China) [6679-59]
- ✓ **On the study of water vapor transport in the Yangtze River basin under global warming background**, Z. Zhang, Nanjing Forestry Univ. (China); L. Zou, Nanjing Univ. of Information Science & Technology (China); X. Liang, Beijing Normal Univ. (China) [6679-60]
- ✓ **Mapping wetlands cover types with directional polarization signatures**, V. C. Vanderbilt, NASA Ames Research Ctr.; J. Greenberg, Univ. of California/Davis; G. P. Livingston, Altos Imaging; S. Khanna, S. L. Ustin, Univ. of California/Davis; U. Boettger, DLR Berlin-Adlershof (Germany) .. [6679-61]
- ✓ **Monitoring and trend simulation of sediment yield of Jialingjiang River**, Y. Tian, Southwest China Normal Univ. (China); Y. Gao, Institute of Meteorological Science (China); L. Zhu, Chongqing Technology and Business Univ. (China) [6679-62]
- ✓ **Land cover dynamic monitoring and assessment of Three-gorge areas**, Y. Gao, Institute of Meteorological Science (China); Y. Tian, J. Yi, R. Wang, Southwest China Normal Univ. (China) [6679-63]
- ✓ **Validate classification precision of low spatial resolution data by using high spatial resolution data**, S. Qingdong, I. Guanghui, Xinjiang Univ. (China); J. Qi, Michigan State Univ. [6679-64]
- ✓ **The spatial-temporal distribution characteristic of convective cloud merger in Yangtze and Huaihe river basin in summer season**, W. Hu, Anhui Meteorological Institute (China); X. Wang, Colorado State Univ. [6679-66]
- ✓ **Relationship between interdecadal variability of north China summer rainfall, east Asia summer monsoon, and atmospheric circulation anomaly**, Q. Gao, Nanjing Univ. of Science & Technology (China); L. Hao, Meteorological Institute of Hebei Province (China); J. Min, Nanjing Univ. of Information Science and Technology (China) [6679-67]
- ✓ **Distribution of soil dryness indices of fields as ecoregions during winter wheat growth in the Huang-Huai plains**, Z. Ren, Chinese Meteorological Administration (China); Z. Sun, Nanjing Univ. of Information Science & Technology (China) [6679-68]
- ✓ **The regional climate effects of large-scale agricultural irrigation related to south-to-north water transfer engineering in China**, H. Wang, J. Li, Y. Ju, Regional Ctr. for Temperate East Asia (China) [6679-40]
- ✓ **Study on the regional difference of built up area expansion and its determinants in China**, L. Zhu, Chongqing Technology and Business Univ. (China) [6679-12]
- ✓ **A comparative study on black carbon aerosol observations in regions of Beijing and Lhasa in 2006**, R. Gao, Nanjing Univ. of Information Science & Technology (China) and Tianjin Meteorological Bureau (China); S. Niu, Nanjing Univ. of Information Science & Technology (China); H. Zhang, Chinese Meteorological Administration (China); J. Guo, D. Meng, Tianjin Meteorological Bureau (China); J. Ma, Pudong New Area Weather Office (China); J. Feng, Tianjin Meteorological Bureau (China); Y. Zhang, Shandong Meteorological Bureau (China) [6679-69]
- ✓ **Warning and controlling of ecological security in Xinjiang, China**, G. Lu, Q. Shi, J. Yang, Y. Ma, J. Meng, Z. Gao, Xinjiang Univ. (China) . . . [6679-70]
- ✓ **Analysis on spatial differences of surface albedo using remote sensing technique in arid oasis**, A. Amut, L. Gong, Z. Yuan, Xinjiang Univ. (China) [6679-65]



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OPTICS

Courses of Related Interest

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SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm

Conference 6680 • Conv. Ctr. 28C

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6680

Coastal Ocean Remote Sensing

Conference Chair: **Robert J. Frouin**, Scripps Institution of Oceanography

Cochair: **ZhongPing Lee**, Naval Research Lab.

Program Committee: **Robert A. Arnone**, Naval Research Lab.; **Ichio Asanuma**, Tokyo Univ. of Information Sciences (Japan); **Christopher W. Brown**, CICS ESSIC - NOAA; **Curtiss O. Davis**, Oregon State Univ.; **Arnold G. Dekker**, Commonwealth Scientific and Industrial Research Organisation (Australia); **Roland Doerffer**, GKSS-Research Ctr/ Institute for Coastal Research (Germany); **Milton Kampel**, Instituto Nacional de Pesquisas Espaciais (Brazil); **Samantha Lavender**, Univ. of Plymouth (United Kingdom); **Mervyn J. Lynch**, Curtin Univ. of Technology (Australia); **Richard L. Miller**, NASA Stennis Space Ctr.; **Frank E. Muller-Karger**, Univ. of South Florida; **Richard P. Santer**, Univ. du Littoral Côte d'Opale (France)

Sunday 26 August

SESSION 1

Conv. Ctr. 28C Sun. 8:30 to 10:10 am

Inversion of the Electromagnetic Signal: Atmospheric Correction Schemes

Chair: **Robert J. Frouin**, Scripps Institution of Oceanography

8:30 am: **A general ocean color atmospheric correction scheme based on principal components analysis: part I, performance on Case 1 and Case 2 waters**, L. S. Gross, Capgemini (France); S. Colzy, Magellium (France); R. J. Frouin, Scripps Institution of Oceanography; P. J. Henry, Ctr. National d'Études Spatiales (France) [6680-01]

8:50 am: **A general ocean color atmospheric correction scheme based on principal components analysis: part II, level 4 merging capabilities**, L. S. Gross, Capgemini (France); S. Colzy, Magellium (France); R. J. Frouin, Scripps Institution of Oceanography; P. J. Henry, Ctr. National d'Études Spatiales (France) [6680-02]

9:10 am: **Constrained linear inversion of satellite ocean-color data**, R. J. Frouin, Scripps Institution of Oceanography; B. Pelletier, Univ. Montpellier II (France) [6680-03]

9:30 am: **Regularization strategies for inferring aerosol vertical distribution from light scattering measurements**, B. Pelletier, Univ. Montpellier II (France); R. J. Frouin, Scripps Institution of Oceanography; P. Dubuisson, Univ. du Littoral Côte d'Opale (France) [6680-04]

9:50 am: **Optimization of Cox and Munk sun-glint model using ADEOS/II GLI data and SeaWinds data**, L. Li, H. Fukushima, K. Suzuki, Tokai Univ. (Japan); N. Suzuki, Kyoto Univ. (Japan) [6680-05]

Coffee Break 10:10 to 10:30 am

SESSION 2

Conv. Ctr. 28C Sun. 10:30 am to 12:50 pm

Inversion of the Electromagnetic Signal: Retrieval of Water Properties

Chair: **ZhongPing Lee**, Naval Research Lab.

10:30 am: **Spectral separation of photosynthetic pigments in coastal waters with hyperspectral reflectance data**, K. H. Szekiolda, The City Univ. of New York [6680-06]

10:50 am: **Improving the accuracy of water and bottom properties derived from remote sensing reflectance via artificial neural network**, M. Zhang, Winona State Univ.; Z. Lee, Naval Research Lab.; J. Guan, Winona State Univ. [6680-07]

11:10 am: **Backscattering coefficient model of bio-optical in the coastal ocean**, Z. Mao, Second Institute of Oceanography (China) [6680-08]

11:30 am: **Utility of hyperspectral imagery for seagrass mapping in Tampa Bay, Florida (US)**, P. R. Carlson, Fish and Wildlife Research Institute [6680-09]

11:50 am: **Reconstruction of vertical profiles of chlorophyll concentration**, R. P. Souto, Univ. Federal do Rio Grande do Sul (Brazil); M. Kampel, H. F. Campos Velho, S. Stephany, Instituto Nacional de Pesquisas Espaciais (Brazil) [6680-10]

12:10 pm: **Fluorescence contribution to reflectance spectra for a variety of coastal waters**, A. Gilerson, J. Zhou, S. Hlaing, I. Ioannou, B. M. Gross, F. Moshary, S. A. Ahmed, City College/CUNY [6680-11]

12:30 pm: **Determination of primary bands for global ocean-color remote sensing**, Z. Lee, R. A. Arnone, Naval Research Lab.; K. L. Carder, Univ. of South Florida; M. He, Ocean Univ. of China (China) [6680-12]

Lunch Break 12:50 to 1:50 pm

SESSION 3

Conv. Ctr. 28C Sun. 1:50 to 4:10 pm

Evaluation of Algorithms and Products

Chair: **Milton Kampel**, Instituto Nacional de Pesquisas Espaciais (Brazil)

1:50 pm: **Automated validation of satellite derived coastal optical products**, P. E. Lyon, R. A. Arnone, R. W. Gould, Jr., Z. Lee, P. M. Martinolich, S. D. Ladner, B. Casey, Naval Research Lab.; H. M. Sosik, Woods Hole Oceanographic Institution; D. Vandemark, Univ. of New Hampshire [6680-13]

2:10 pm: **Atmospheric correction for MERIS over coastal waters: validation of the MERIS standard aerosol models**, O. Aznay, R. P. Santer, F. Zagolski, Univ. du Littoral Côte d'Opale (France) [6680-14]

2:30 pm: **Approach for the long-term spatial and temporal evaluation of ocean color satellite data products in a coastal environment**, P. J. Werdell, Science Systems and Applications, Inc.; B. A. Franz, NASA Goddard Space Flight Ctr.; S. W. Bailey, FutureTech Corp.; L. W. Harding, Jr., Univ. of Maryland Ctr. for Environmental Science; G. C. Feldman, NASA Goddard Space Flight Ctr. [6680-15]

2:50 pm: **Measurement of oceanic chlorophyll by LIDAR, MODIS, fluorometry and above-water radiometry**, M. Kampel, J. A. Lorenzetti, Instituto Nacional de Pesquisas Espaciais (Brazil); C. M. Bentz, Petrobras-Petróleo Brasileiro (Brazil); R. A. Nunes, Pontificia Univ. Católica do Rio de Janeiro (Brazil); R. Paranhos, Univ. Federal do Rio de Janeiro (Brazil); F. d. M. Rudorff, Instituto Nacional de Pesquisas Espaciais (Brazil); A. T. Politano, Petrobras-Petróleo Brasileiro (Brazil) [6680-16]

Coffee Break 3:10 to 3:30 pm

3:30 pm: **Results in coastal waters with high-resolution in-situ spectral radiometry: the MOS ROV**, M. Yarbrough, M. Feinholz, S. Flora, T. Houlihan, Moss Landing Marine Labs.; B. C. Johnson, National Institute of Standards and Technology; Y. S. Kim, National Oceanic and Atmospheric Administration; D. K. Clark, Marine Optical Consulting [6680-17]

3:50 pm: **Simultaneous measurement of up-welling spectral radiance using a fiber-coupled CCD spectrograph**, M. Yarbrough, Moss Landing Marine Labs.; S. W. Brown, National Institute of Standards and Technology; M. Feinholz, S. Flora, T. Houlihan, Moss Landing Marine Labs.; B. C. Johnson, National Institute of Standards and Technology; Y. S. Kim, National Oceanic and Atmospheric Administration; K. J. Voss, Univ. of Miami; D. K. Clark, Marine Optical Consulting [6680-18]

Conference 6680 • Conv. Ctr. 28C

SESSION 4

Conv. Ctr. 28C Sun. 4:10 to 5:50 pm

Characterization and Variability of the Coastal Ocean: Composition and Bio-Optical Properties I

Chair: **Arnold G. Dekker**, Commonwealth Scientific and Industrial Research Organisation (Australia)

4:10 pm: **Satellite-based water quality (compliance) monitoring in the Great Barrier Reef world heritage area coastal and reef waters**, V. E. Brando, A. G. Dekker, D. Blondeau-Patissier, T. Schroeder, L. Clementson, Commonwealth Scientific and Industrial Research Organisation (Australia) [6680-19]

4:30 pm: **Optical characterization and age estimates of river plumes on the US west coast**, R. M. Kudela, S. L. Palacios, Univ. of California/Santa Cruz [6680-20]

4:50 pm: **Phytoplankton distribution on the east China Sea determined by the interaction between the Yangtze River runoff and the Kuroshio**, M. Fukuda, I. Asanuma, Tokyo Univ. of Information Sciences (Japan) .. [6680-21]

5:10 pm: **Particulate beam attenuation coefficient, bacteria abundance and production in marine waters**, M. A. Montes-Hugo, M. Vernet, R. Reynolds, D. Stramski, V. M. Wright, Univ. of California/San Diego [6680-22]

5:30 pm: **Bio-optical variability in coastal waters of southeast Brazil**, M. Kampel, Instituto Nacional de Pesquisas Espaciais (Brazil); S. A. Gaeta, M. Pompeu, Univ. de São Paulo (Brazil); J. A. Lorenzetti, F. d. M. Rudorff, Instituto Nacional de Pesquisas Espaciais (Brazil); R. J. Frouin, Scripps Institution of Oceanography [6680-23]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 5

Conv. Ctr. 28C Mon. 8:50 to 9:30 am

Characterization and Variability of the Coastal Ocean: Composition and Bio-Optical Properties II

Chair: **Arnold G. Dekker**, Commonwealth Scientific and Industrial Research Organisation (Australia)

8:50 am: **Spatial and spectral resolution considerations for imaging coastal waters**, C. O. Davis, M. Kavanaugh, R. M. Letelier, Oregon State Univ.; W. P. Bissett, Florida Environmental Research Institute [6680-25]

9:10 am: **Possible satellite oceanography on the coastal water in NPP stage**, J. Zhu, I. Asanuma, Tokyo Univ. of Information Sciences (Japan) [6680-26]

SESSION 6

Conv. Ctr. 28C Mon. 9:30 am to 12:30 pm

Characterization and Variability of the Coastal Ocean: Processes, Interactions, and Modeling

Chair: **Ichio Asanuma**, Tokyo Univ. of Information Sciences (Japan)

9:30 am: **Influence of improved underwater optical climate on biogeochemical models: a case study in tropical coastal environment, Fitzroy Estuary and Keppel Bay, Australia**, N. R. C. Cherukuru, V. E. Brando, B. Robson, A. G. Dekker, Commonwealth Scientific and Industrial Research Organisation (Australia) [6680-27]

9:50 am: **Forecasting coastal optical properties using ocean color and coastal circulation models**, R. A. Arnone, B. Casey, D. S. Ko, P. Flynn, Naval Research Lab. [6680-28]

Coffee Break 10:10 to 10:30 am

10:30 am: **MODIS imagery as a tool for water quality assessments in southern California coastal ocean**, N. P. Nezlin, Southern California Coastal Water Research Project [6680-29]

10:50 am: **Ocean color remote sensing of turbid plumes in the southern California coastal waters during storm events**, F. C. Lahet, D. Stramski, Univ. of California/San Diego [6680-30]

11:10 am: **Multiparametric observation of biological contribution to surface structure of the water in archipelago**, I. Asanuma, Tokyo Univ. of Information Sciences (Japan); Y. Arvelyna, Tokyo Univ. of Marine Science and Technology (Japan); D. Hasegawa, Tokyo Univ. of Information Sciences (Japan) . [6680-31]

11:30 am: **Investigation on ballast water exchangeable area in the Bay of Bengal using MODIS/Aqua**, K. Kozai, H. Ishida, Kobe Univ. (Japan); K. Okamoto, Y. Fukuyo, The Univ. of Tokyo (Japan) [6680-32]

11:50 am: **Submerged turbulence detection from optical satellites**, R. N. Keeler, Directed Technologies, Inc.; V. Bondur, Aerocosmos Scientific Ctr. of Aerospace Monitoring (Russia); C. Gibson, The Scripps Research Institute; P. Leung, Texas A&M Univ.; H. Prandke, ISW Wassermesstechnik (Germany); D. Vithanage, Oceanit Labs., Inc. [6680-33]

12:10 pm: **Evaluation of offshore wind energy potential using SAR and MMS**, K. Kozai, T. Ohsawa, Kobe Univ. (Japan) [6680-34]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

✓ **Optical characterization of runoff in the Chesapeake Bay**, M. E. Ondrusek, C. Kinkade, E. Stengel, National Oceanic and Atmospheric Administration [6680-35]

✓ **Assessing dynamics micro-regions in the Great Islands of the Gulf of California based on MODIS aqua imagery products**, F. J. Flores de Santiago, E. Santamaria del Angel, A. Gonzalez-Silvera, A. Martinez Diaz de Leon, R. Millan Nuñez, Univ. Nacional Autónoma de México (Mexico) [6680-36]

✓ **Ultra-high-resolution near coastal wind retrieval for QuikSCAT**, M. P. Owen, K. Stuart, D. G. Long, Brigham Young Univ. [6680-37]

✓ **Satellite estimates of chlorophyll-a concentration in the Brazilian southeastern continental shelf and slope, southwestern Atlantic**, M. Kampel, Instituto Nacional de Pesquisas Espaciais (Brazil); S. A. Gaeta, M. Pompeu, Univ. de São Paulo (Brazil); J. A. Lorenzetti, Instituto Nacional de Pesquisas Espaciais (Brazil) [6680-41]

✓ **Development of finer spatial resolution optical properties from MODIS**, S. D. Ladner, R. A. Arnone, R. W. Gould, Jr., Z. Lee, P. E. Lyon, P. M. Martinolich, J. C. Sandidge, Naval Research Lab. [6680-42]

✓ **Simple and efficient technique for spatial/temporal composite imagery**, B. Casey, Planning Systems, Inc.; R. A. Arnone, Naval Research Lab. [6680-43]

✓ **Influence of solar radiation absorbed by phytoplankton on the thermal structure and circulation of the tropical Atlantic Ocean**, R. J. Frouin, K. Ueyoshi, Scripps Institution of Oceanography; M. Kampel, Instituto Nacional de Pesquisas Espaciais (Brazil) [6680-44]

✓ **Analysis of SeaWiFS imagery over the southwestern Atlantic Ocean during the March 2002 R/V IOFFE cruise**, F. d. M. Rudorff, Instituto Nacional de Pesquisas Espaciais (Brazil); R. J. Frouin, Scripps Institution of Oceanography; M. Kampel, Instituto Nacional de Pesquisas Espaciais (Brazil); O. V. Kopelevich, P.P. Shirshov Institute of Oceanology (Russia); V. Lutz, Instituto Nacional de Investigación y Desarrollo Pesquero (Argentina) [6680-45]

✓ **A test of a semi-analytical algorithm for euphotic zone depth in the China Sea**, S. Shang, J. Chen, Xiamen Univ. (China); Z. Lee, Naval Research Lab. [6680-47]

Course of Related Interest

See SPIE Cashier for information.

SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm

Conference 6681 • Conv. Ctr. 28D

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6681

Lidar Remote Sensing for Environmental Monitoring VIII

Conference Chair: **Upendra N. Singh**, NASA Langley Research Ctr.

Program Committee: **Kazuhiro Asai**, Tohoku Institute of Technology (Japan); **Andreas Behrendt**, Univ. Hohenheim (Germany); **Edwin W. Eloranta**, Univ. of Wisconsin/Madison; **Tetsuo Fukuchi**, Central Research Institute of Electric Power Industry (Japan); **Bruce M. Gentry**, NASA Goddard Space Flight Ctr.; **Robert M. Hardesty**, National Oceanic and Atmospheric Administration; **Floyd E. Hovis**, Fibertek, Inc.; **Syed Ismail**, NASA Langley Research Ctr.; **Toshikazu Itabe**, National Institute of Information and Communications Technology (Japan); **Gary W. Kamerman**, FastMetrix, Inc.; **Philippe L. Keckhut**, Service d'aeronomie (France); **Kohei Mizutani**, National Institute of Information and Communications Technology (Japan); **D. Narayana Rao**, National Atmospheric Research Lab. (India); **Shiv K. Sharma**, Univ. of Hawaii at Manoa; **Randhir K. Sinha**, LS College (India); **William R. Stabnow**, NASA Headquarters; **David M. Tratt**, The Aerospace Corp.; **Jinxue Wang**, Raytheon Santa Barbara Remote Sensing; **Jirong Yu**, NASA Langley Research Ctr.; **Jun Zhou**, Anhui Institute of Optics and Fine Mechanics (China)

Wednesday 29 August

Welcome and Introductions

Conv. Ctr. 28D Wed. 8:30 to 8:40 am

Chair: **Upendra N. Singh**, NASA Langley Research Ctr.

SESSION 2

Conv. Ctr. 28D Wed. 8:40 to 10:10 am

Aerosol and Cloud Measurements I

Chairs: **Upendra N. Singh**, NASA Langley Research Ctr.; **William R. Stabnow**, NASA Headquarters

8:40 am: **Eye-safe aerosol lidar at 1.5 microns (Invited Paper)**, S. M. Spuler, National Ctr. for Atmospheric Research [6681-01]

9:10 am: **Ultraviolet high-spectral resolution lidar with polarization detection for accurate measurement of optical properties of aerosol and clouds**, H. Kawai, T. Kobayashi, Univ. of Fukui (Japan) [6681-02]

9:30 am: **Two wavelength (532 nm/1064 nm) depolarization lidar measurements of aerosol and dust at Suwon, Korea**, C. B. Park, C. H. Lee, Kyung Hee Univ. (South Korea); S. Nobuo, National Institute for Environmental Studies (Japan) [6681-04]

9:50 am: **Lidar/photometry studies at Sao Paulo, Brazil**, E. Landulfo, P. Sawamura, S. T. Uehara, W. M. Nakaema, A. S. Torres, F. J. d. S. Lopes, C. A. Matos, W. C. Jesus, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [6681-05]

Coffee Break 10:10 to 10:40 am

SESSION 3

Conv. Ctr. 28D Wed. 10:40 am to 12:10 pm

Wind Lidar I

Chairs: **Bruce M. Gentry**, NASA Goddard Space Flight Ctr.; **Jinxue Wang**, Raytheon Santa Barbara Remote Sensing

10:40 am: **Requirements and technology advances for global wind measurement with a coherent lidar: a shrinking gap (Invited Paper)**, M. J. Kavaya, J. Yu, G. J. Koch, F. Amzajerjian, U. N. Singh, NASA Langley Research Ctr.; G. D. Emmitt, Simpson Weather Associates, Inc. [6681-06]

11:10 am: **Development and testing of a risk reduction high-energy laser transmitter for spaceborne high-spectral resolution lidar and Doppler winds lidar**, J. Wang, Raytheon Santa Barbara Remote Sensing; F. E. Hovis, Fibertek, Inc. [6681-07]

11:30 am: **A Q-switched Ho:YLF laser pumped by Tm: fiber laser**, J. Yu, NASA Langley Research Ctr.; Y. Bai, Analytical Services and Materials, Inc.; M. Petros, NASA Langley Research Ctr.; P. J. Petzar, Science Applications International Corp.; B. C. Trieu, U. N. Singh, NASA Langley Research Ctr. [6681-08]

11:50 am: **Parameter trade studies for coherent lidar measurement of wind from space**, M. J. Kavaya, NASA Langley Research Ctr.; R. G. Frehlich, Univ. of Colorado/Boulder [6681-09]

Lunch/Exhibition Break 12:10 to 1:50 pm

SESSION 4

Conv. Ctr. 28D Wed. 1:50 to 3:00 pm

Wind Lidar II

Chairs: **Bruce M. Gentry**, NASA Goddard Space Flight Ctr.; **Jinxue Wang**, Raytheon Santa Barbara Remote Sensing

1:50 pm: **Airborne wind lidar for atmospheric boundary layer research (Invited Paper)**, G. D. Emmitt, Simpson Weather Associates, Inc. ... [6681-10]

2:20 pm: **Development of an airborne molecular direct detection Doppler lidar for tropospheric wind profiling**, B. M. Gentry, M. J. McGill, NASA Goddard Space Flight Ctr.; G. K. Schwemmer, Science and Engineering Services, Inc.; R. M. Hardesty, National Oceanic and Atmospheric Administration; T. D. Wilkerson, Space Dynamics Lab.; M. Sirota, Sigma Space Corp.; S. K. Lindemann, Michigan Aerospace Corp.; F. E. Hovis, Fibertek, Inc. [6681-11]

2:40 pm: **Development of single-frequency laser for direct-detection wind lidar**, J. Zhou, H. Zang, T. Yu, J. Liu, W. Chen, Shanghai Institute of Optics and Fine Mechanics (China) [6681-14]

Coffee Break 3:00 to 3:30 pm

SESSION 5

Conv. Ctr. 28D Wed. 3:30 to 4:40 pm

Raman Lidar

Chair: **D. Narayana Rao**, National Atmospheric Research Lab. (India)

3:50 pm: **Daytime rapid detection of minerals and organics from 50m distance using remote Raman system (Invited Paper)**, A. K. Misra, S. K. Sharma, P. G. Lucey, R. C. F. Lentz, C. H. Chio, Univ. of Hawai'i at Manoa [6681-15]

4:20 pm: **An accurate modeling, simulation, and analysis tool for predicting and estimating Raman lidar system performance**, R. J. Grasso, L. E. Russo, J. L. Barrett, J. E. Odhner, P. I. Egbert, BAE Systems [6681-16]

4:40 pm: **Properties of aerosols hygroscopicity using a combined multiwavelength elastic: Raman lidar, GPS and nephelometer**, D. V. Vladutescu, Y. Wu, L. A. M. Charles, B. M. Gross, F. Moshary, S. A. Ahmed, City College/CUNY [6681-17]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

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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.

- ✓ **Remote location of the effects of SHF radiation on the stratosphere via radiation of atomic hydrogen at 1420 MHz**, G. A. Kolotkov, S. T. Penin, Institute of Atmospheric Optics (Russia) [6681-32]
- ✓ **Raman-Mie lidar measurements of low and optically thin cloud**, Y. Wu, S. Chaw, B. M. Gross, D. V. Vladutescu, L. A. M. Charles, F. Moshary, S. A. Ahmed, City College/CUNY [6681-33]
- ✓ **The relationships between the zonal temperature variation and ozone distribution in the northern hemisphere winter stratosphere**, C. Shi, Nanjing Univ. of Information Science & Technology (China) [6681-34]
- ✓ **Automation of a lidar system for high-speed internet operation**, E. Landulfo, N. D. Vieira, Jr., G. E. C. Nogueira, J. T. Vidal, A. M. Carrilo, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [6681-36]
- ✓ **Change of plant's fluorescence signals at nitric and oil pollution of ground**, A. V. Klimkin, Institute of Atmospheric Optics (Russia); L. Fiorani, ENEA (Italy); N. L. Fateyeva, V. M. Klimkin, G. G. Matvienko, Institute of Atmospheric Optics (Russia); A. Palucci, ENEA (Italy) [6681-37]
- ✓ **Rayleigh lidar investigation of stratospheric sudden warming over a low latitude station, Gadanki (13.5°N; 79.2°E): a statistical study**, V. D. Acharyulu, Univ. de La Réunion (France); S. Venkataraman, Council for Scientific and Industrial Research (South Africa); H. Bencherif, Univ. de La Réunion (France); D. N. Rao, National Atmospheric Research Lab. (India) [6681-41]
- ✓ **Short-term predictions of Doppler measurements in planetary boundary layer**, A. P. Shelekhov, Institute of Atmospheric Optics (Russia); A. V. Starchenko, D. A. Belikov, Tomsk State Univ. (Russia) [6681-42]
- ✓ **High-reliability pump module for non-planar ring oscillator laser**, D. T. Liu, Y. Qiu, D. W. Wilson, S. Dubovitsky, S. Forouhar, Jet Propulsion Lab. [6681-43]
- ✓ **Unlensing methods of small angular displacement transformation of a laser beam in circular scanning and reception of radiation by the small-sized receiver within the limits of a spatial hemisphere**, J. Polkanov, B.I. Stepanov Institute of Physics (Belarus) [6681-39]
- ✓ **Sounding of the environment by means of the un-impulse of the low-power continuous source**, J. Polkanov, B.I. Stepanov Institute of Physics (Belarus) [6681-38]

Thursday 30 August

SESSION 6

Conv. Ctr. 28D Thurs. 9:20 to 10:10 am

Space-Borne Lidar

- Chairs: Jirong Yu; Michael J. Kavaya, NASA Langley Research Ctr.*
- 9:20 am: **Development of a validated end-to-end model for space-based lidar systems (Invited Paper)**, M. D. Lieber, C. S. Weimer, M. Stephens, R. R. Demara, Ball Aerospace & Technologies Corp. [6681-18]
- 9:50 am: **Modeling spaceborne lidar returns from vegetation canopies**, B. Hu, York Univ. (Canada); A. E. Dudelzak, A. S. Koujelev, Canadian Space Agency (Canada); J. R. Miller, H. Pan, York Univ. (Canada); I. Tcherniavski, Canadian Space Agency (Canada) [6681-20]
- Coffee Break 10:10 to 10:40 am

SESSION 7

Conv. Ctr. 28D Thurs. 10:40 to 11:50 am

Differential Absorption Lidar

- Chairs: Scott M. Spuler, National Ctr. for Atmospheric Research; Shiv K. Sharma, Univ. of Hawaii at Manoa*
- 10:40 am: **Development of a frequency stabilized seed laser system for the water vapor lidar experiment in space (WALES) (Invited Paper)**, H. H. Schwarzer, A. Boerner, A. Fix, B. Günther, H. Huebers, M. Raugust, F. Schrandt, M. Wirth, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [6681-22]
- 11:10 am: **Initial results from a water vapor differential absorption lidar (DIAL) using a widely tunable amplified diode laser source**, M. D. Obland, K. S. Repasky, A. R. Nehrir, J. A. Shaw, J. L. Carlsten, Montana State Univ./Bozeman [6681-23]
- 11:30 am: **Man-made structures influence on ozone behavior revealed by lidar**, J. M. Moreno, Univ. Politécnic de Cartagena (Spain) [6681-24]
- Lunch/Exhibition Break 11:50 am to 1:10 pm

SESSION 8

Conv. Ctr. 28D Thurs. 1:10 to 3:30 pm

Aerosol and Cloud Measurements II

- Chairs: Jun Zhou, Anhui Institute of Optics and Fine Mechanics (China); Huanling Hu, Anhui Institute of Optics and Fine Mechanics (China)*
- 1:10 pm: **Atmospheric transport of smoke and dust particulates and their interaction with the PBL as observed by multi-wavelength lidar and supporting instrumentation**, L. A. M. Charles, S. Chaw, D. V. Vladutescu, Y. Wu, F. Moshary, B. M. Gross, S. A. Ahmed, City College/CUNY [6681-25]
- 1:30 pm: **Novel applications of an affordable short-range digital lidar**, D. Cantin, F. Babin, Y. Champagne, M. Allard, Institut National d'Optique (Canada) [6681-26]
- 1:50 pm: **Micro lidar studies at IIT Madras**, V. S. Murty, Indian Institute of Technology Madras (India) [6681-27]
- 2:10 pm: **Measurements of PM10 profiles in ABL with lidar and DA-OPC at Beijing**, H. Hu, Anhui Institute of Optics and Fine Mechanics (China) [6681-28]
- 2:30 pm: **De-noising lidar signal using wavelet technique**, V. Sivakumar, Council for Scientific and Industrial Research (South Africa) [6681-29]
- 2:50 pm: **Ground-based lidar combined with CALIPSO for aerosol optical depth retrieval**, W. Gong, Z. Zhu, P. Li, L. Zhang, Q. Qin, Y. Ma, S. Song, M. Liu, Z. Hao, J. Li, Wuhan Univ. (China) [6681-30]
- 3:10 pm: **Performance tests of polarization-Mie scattering lidar**, J. Zhou, Anhui Institute of Optics and Fine Mechanics (China) [6681-31]

Course of Related Interest

See SPIE Cashier for information.

SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm



Conference 6682 • Conv. Ctr. 28B

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6682

Polarization Science and Remote Sensing III

Conference Chairs: **Joseph A. Shaw**, Montana State Univ./Bozeman; **J. Scott Tyo**, The Univ. of Arizona

Program Committee: **Alan J. Ames**, Ball Aerospace & Technologies Corp.; **David B. Chenault**, Polaris Sensor Technologies, Inc.; **Russell A. Chipman**, College of Optical Sciences/The Univ. of Arizona; **Aristide C. Dogariu**, College of Optics & Photonics/Univ. of Central Florida; **Michael J. Duggin**, Air Force Research Lab.; **Dennis H. Goldstein**, Air Force Research Lab.; **Brian G. Hoover**, Advanced Optical Technologies; **Yoav Y. Schechner**, Technion-Israel Institute of Technology (Israel)

Wednesday 29 August

Welcome and Introduction

Conv. Ctr. 28B Wed. 8:00 to 8:10 am

Chairs: **Joseph A. Shaw**, Montana State Univ./Bozeman; **J. Scott Tyo**, College of Optical Sciences/The Univ. of Arizona

SESSION 1

Conv. Ctr. 28B Wed. 8:10 to 9:50 am

Polarimetric and Spectropolarimetric Imaging I

Chair: **Michael J. Duggin**, Air Force Research Lab.

8:10 am: **Polarization: nomenclature and background (Keynote)**, D. B. Chenault, Polaris Sensor Technologies, Inc. [6682-01]

8:40 am: **Channeled spectroscopic polarization state generator (CSPSG) and its application to spectroscopic measurement of Mueller matrix (Invited Paper)**, K. Oka, S. Endo, A. Taniguchi, Hokkaido Univ. (Japan); H. Okabe, Omron Corp. (Japan) [6682-02]

9:10 am: **All-sky polarization imaging**, N. J. Pust, J. A. Shaw, Montana State Univ./Bozeman [6682-03]

9:30 am: **High-speed portable polarimeter using a ferroelectric liquid crystal modulator**, L. Bigué, N. Cheney, Univ. de Haute Alsace (France) [6682-04]

Coffee Break 9:50 to 10:20 am

SESSION 2

Conv. Ctr. 28B Wed. 10:20 to 11:50 am

Polarimetric and Spectropolarimetric Imaging II

Chair: **David B. Chenault**, Polaris Sensor Technologies, Inc.

10:20 am: **Image segmentation from multi-look passive polarimetric imagery (Invited Paper)**, V. Thilak, D. G. Voelz, C. D. Creusere, New Mexico State Univ. [6682-05]

10:50 am: **Snapshot Mueller matrix spectropolarimetry**, N. A. Hagen, E. L. Dereniak, College of Optical Sciences/The Univ. of Arizona [6682-06]

11:10 am: **Performance predictions for imaging polarimeters**, M. W. Jones, C. M. Persons, Digital Fusion Inc. [6682-07]

11:30 am: **Mitigation of image artifacts in LWIR microgrid polarimeter images**, B. M. Ratliff, Applied Technology Associates; J. S. Tyo, College of Optical Sciences/The Univ. of Arizona; J. K. Boger, W. T. Black, D. L. Bowers, Applied Technology Associates; R. Kumar, College of Optical Sciences/The Univ. of Arizona [6682-08]

Polarization Technical Event

(No-Host Lunch)

Wednesday 29 August 11:50 am to 1:20 pm

Chair: **Art Lompadó**, Polaris Sensor Technologies, Inc.

Cochair: **Derek Sabatke**, Ball Aerospace & Technologies Corp.

This event is focused on research, development, engineering, and applications in fields of optics where polarization and its measurement are key issues.

SESSION 3

Conv. Ctr. 28B Wed. 1:20 to 2:30 pm

Polarimetric and Spectropolarimetric Imaging III

Chair: **Yoav Y. Schechner**, Technion-Israel Institute of Technology (Israel)

1:20 pm: **Information enhancement in polarimetric images of natural scenes (Invited Paper)**, M. J. Duggin, E. R. Cabot, W. R. Glass, Air Force Research Lab. [6682-09]

1:50 pm: **Design of a dual use imager incorporating polarimetric capabilities**, S. Moultrie, M. Roche, A. Lompadó, D. B. Chenault, Polaris Sensor Technologies, Inc. [6682-10]

2:10 pm: **Polarimetric scene modeling in the thermal infrared**, M. G. Gartley, S. D. Brown, A. A. Goodenough, N. J. Sanders, J. R. Schott, Rochester Institute of Technology [6682-11]

SESSION 4

Conv. Ctr. 28B Wed. 2:30 to 5:20 pm

Scattering: Coherence and Polarization

Chair: **Brian G. Hoover**, Advanced Optical Technologies

2:30 pm: **Non-goniometric scatterometry: a review (Invited Paper)**, C. F. Hahlweg, H. Rothe, Helmut-Schmidt Univ. (Germany) [6682-12]

3:00 pm: **Measurements of the coherent backscatter BRDF peak exhibited by surfaces relevant to lidar applications (Invited Paper)**, T. J. Papetti, W. E. Walker, C. E. Keffer, CAS, Inc.; B. E. Johnson, U.S. Army Space and Missile Defense Command [6682-13]

Coffee Break 3:30 to 4:00 pm

4:00 pm: **Using polarized variable coherence tomography to estimate polarimetric BRDF from monostatic data**, J. S. Tyo, T. S. Turner, College of Optical Sciences/The Univ. of Arizona [6682-14]

4:20 pm: **Vector electromagnetic scattering from random surfaces with infinite slopes using the Kirchhoff approximation (Invited Paper)**, N. C. Bruce, Univ. Nacional Autónoma de México (Mexico) [6682-15]

4:50 pm: **Coherence versus radiance formulations of surface scattering (Invited Paper)**, B. G. Hoover, Advanced Optical Technologies; V. L. Gamiz, Air Force Research Lab. [6682-16]

Courses of Related Interest

See SPIE Cashier for information.

SC194 Multispectral and Hyperspectral Image Sensors (Lomheim)
Wednesday 29, 1:30 - 5:30 pm

SC206 Polarized Light: A Practical Hands-on Introduction (Fisher)
Tuesday 28, 8:30 am - 5:30 pm

SC792 Polarization in Optical Design (Chipman) Sunday 26, 8:30 am - 12:30 pm

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Methods and means of polarization parameter control in biotissue imaging polarimetry**, S. Y. Tuzhansky, Vinnitsa State Technical Univ. (Ukraine) [6682-38]
- ✓ **Design of a hybrid division of aperture/division of focal plane polarimeter**, H. Wei, T. S. Turner, J. S. Tyo, College of Optical Sciences/The Univ. of Arizona [6682-39]
- ✓ **Analysis of generalized polarimetric measurement equation**, S. N. Savenkov, National Taras Shevchenko Univ. of Kyiv (Ukraine) ... [6682-41]
- ✓ **Initial results of a simultaneous Stokes imaging polarimeter**, E. E. de Leon, R. K. Brandt, A. M. Phenis, M. Virgen, Lockheed Martin Advanced Technology Ctr. [6682-42]
- ✓ **Hyperspectral polarized light remote sensing and its application on artificial target detection**, L. Zhang, L. Yan, Y. Xiang, T. Wu, Peking Univ. (China) [6682-43]
- ✓ **Design of optical threshold gates using the polarization optical processor architecture**, Y. A. Zaghoul, A. R. M. Zaghoul, ITR Technologies Inc. [6682-44]
- ✓ **Motion-based superresolution in DoFP polarimeters**, R. Kumar, J. S. Tyo, College of Optical Sciences/The Univ. of Arizona; B. M. Ratliff, Applied Technology Associates [6682-45]
- ✓ **Polarization scattering from a spectralon calibration sample**, H. Noble, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6682-46]

Thursday 30 August

SESSION 5

Conv. Ctr. 28B Thurs. 8:00 to 9:50 am

Polarimetric Calibration and Mathematics

- 8:00 am: **Degrees of freedom in depolarizing Mueller matrices (Invited Paper)**, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6682-17]
- 8:30 am: **Transmission ellipsometry on unsupported film/pellicle: closed-form inversion**, A. R. M. Zaghoul, Georgia Institute of Technology and ITR Technologies Inc.; M. Elshazly-Zaghoul, Y. A. Zaghoul, ITR Technologies Inc. [6682-18]
- 8:50 am: **A proposed standard method for polarimetric calibration and calibration verification**, C. M. Persons, M. W. Jones, C. A. Farlow, L. D. Morell, M. G. Gulley, K. D. Spradley, Digital Fusion Inc. [6682-19]
- 9:10 am: **Demonstrations of noise and error-reduction algorithms in a rotating-quartz laser polarimeter**, I. J. Vaughn, B. G. Hoover, Advanced Optical Technologies [6682-20]
- 9:30 am: **Out-of-plane spectro-polarimetric imaging system: calibration and applications in dermatology**, B. B. Boulbry, T. A. Germer, National Institute of Standards and Technology; J. C. Ramella-Roman, The Catholic Univ. of America [6682-21]
- Coffee Break 9:50 to 10:20 am

SESSION 6

Conv. Ctr. 28B Thurs. 10:20 am to 11:40 pm

Polarimetric Interaction with Media, Materials, and Surfaces

Chair: Alan J. Ames, Ball Aerospace & Technologies Corp.

- 10:20 am: **Characterizing dielectric tensor from angle-of-incidence Mueller matrix images**, P. K. Smith, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6682-22]
- 10:40 am: **Estimation of index of refraction and surface orientation from multi-look passive polarimetric imagery: extension to out-of-plane scattering**, A. Pamba, V. Thilak, D. G. Voelz, C. D. Creusere, New Mexico State Univ. [6682-23]
- 11:00 am: **Polarization-dependent light flow in diffraction grating based on thin opal film**, A. V. Baryshev, A. Khanikaev, R. Fujikawa, H. Uchida, M. Inoue, Toyohashi Univ. of Technology (Japan) [6682-24]
- 11:20 am: **Characterization of thermobonded nonwovens by polarimetric imaging**, M. Tourlonias, L. Bigué, M. Bueno, Univ. de Haute Alsace (France) [6682-25]
- Lunch/Exhibition Break 11:40 am to 1:00 pm

SESSION 7

Conv. Ctr. 28B Thurs. 1:00 to 2:30 pm

Active Polarimetry

Chair: Dennis H. Goldstein, Air Force Research Lab.

- 1:00 pm: **Polarimetric lidar signatures for remote detection of biological warfare agents (Invited Paper)**, J. M. Richardson, J. C. Aldridge, MIT Lincoln Lab. [6682-29]
- 1:30 pm: **Laser polarimeter as an invariant monitor (Invited Paper)**, B. G. Hoover, Advanced Optical Technologies; J. S. Tyo, College of Optical Sciences/The Univ. of Arizona [6682-27]
- 1:50 pm: **Development of a pulse laser source-operated achromatic dual-rotating-retarder polarimeter designed for Hyper-Rayleigh scattering measurements**, P. Lemaillet, S. Rivet, F. Pellen, B. Le Jeune, J. Cariou, Univ. de Bretagne Occidentale (France) [6682-28]
- 2:10 pm: **Polarization imaging light scattering facility**, H. Noble, G. A. Smith, T. Lam, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6682-30]

SESSION 8

Conv. Ctr. 28B Thurs. 2:30 to 5:20 pm

Polarization-Sensitive Optical Components and Systems

Chair: Russell A. Chipman, College of Optical Sciences/The Univ. of Arizona

- 2:30 pm: **Low-polarization optical system design**, A. Mahler, P. K. Smith, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6682-31]
- 2:50 pm: **Polarization measurements on SUMI's TVLS gratings**, K. Kobayashi, E. A. West, J. M. Davis, A. Gary, NASA Marshall Space Flight Ctr. [6682-32]
- 3:10 pm: **A polarization modulator for the far infrared (terahertz waves)**, T. C. Oakberg, Hinds Instruments, Inc.; T. Akiyama, National Institute for Fusion Science (Japan); K. Nakayama, Chubu Univ. (Japan) [6682-33]
- Coffee Break 3:30 to 4:00 pm
- 4:00 pm: **Spatially inhomogeneous polarization in laser beam shaping**, B. Hao, J. R. Leger, Univ. of Minnesota/Twin Cities [6682-34]
- 4:20 pm: **Properties of the polarization ray tracing matrix**, G. Yun, K. Crabtree, R. A. Chipman, College of Optical Sciences/The Univ. of Arizona [6682-35]
- 4:40 pm: **Study of CaF₂ samples using DUV birefringence and x-ray diffraction techniques**, B. B. Wang, Hinds Instruments, Inc. [6682-36]
- 5:00 pm: **Achromatic polarization gratings as highly efficient thin-film polarizing beamsplitters for broadband light**, C. Oh, M. J. Escuti, North Carolina State Univ. [6682-37]

Conference 6683 • Conv. Ctr. 28A

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6683

Satellite Data Compression, Communications, and Archiving III

Conference Chairs: **Roger W. Heymann**, NOAA NESDIS Office of Systems Development; **Bormin Huang**, CIMSS, Univ. of Wisconsin/Madison; **Irina Gladkova**, CREST, City College/CUNY

Program Committee: **Faliang Ao**, Guilin Univ. of Electronic Technology (China); **John J. Bates**, NOAA NESDIS NCDC; **Richard Fulton**, NOAA NESDIS Office of Systems Development; **Xinbo Gao**, Xidian Univ. (China); **Shila Ghosh**, B.P. Poddar Institute of Management & Technology (India); **Shuxu Guo**, Jilin Univ. (China); **Allen H. Huang**, CIMSS, Univ. of Wisconsin/Madison; **Valliappa Lakshmanan**, Univ. of Oklahoma; **Qiwei Lin**, Hua Qiao Univ. (China); **Daniel J. Mandl**, NASA Goddard Space Flight Ctr.; **Donald P. Olsen**, The Aerospace Corp.; **Jeffery J. Puschell**, Raytheon Space and Airborne Systems; **Shen-En Qian**, Canadian Space Agency (Canada); **Ana M. C. Ruedin**, Univ. de Buenos Aires (Argentina); **Timothy J. Schmit**, NOAA NESDIS ORA; **Michael S. Seablom**, NASA Goddard Space Flight Ctr.; **Joan Serra-Sagristà**, Univ. Autònoma de Barcelona (Spain); **Carole Thiebaut**, Ctr. National d'Études Spatiales (France); **Charles C. Wang**, The Aerospace Corp.; **Shih-Chieh Wei**, Tamkang Univ. (Taiwan)

Wednesday 29 August

Opening Remarks

Conv. Ctr. 28AWed. 8:30 to 8:50 am

Chairs: **Roger W. Heymann**, National Oceanic and Atmospheric Administration; **Bormin Huang**, Univ. of Wisconsin/Madison; **Irina Gladkova**, City College/CUNY

SESSION 1

Conv. Ctr. 28AWed. 8:50 to 10:30 am

Data Compression I

8:50 am: **Prediction over wavelet transform coefficients using neural networks applied to lossless compression of multispectral images**, D. G. Acevedo, A. M. C. Ruedin, Univ. de Buenos Aires (Argentina) [6683-01]

9:10 am: **Modifying file syntax for interactive decoding the recommendation (CCSDS-122-B-1)**, F. Garcia-Vilchez, F. Aulí Llinàs, J. Serra-Sagristà, Univ. Autònoma de Barcelona (Spain) [6683-02]

9:30 am: **Current status of satellite data compression in Canadian Space Agency (Invited Paper)**, S. Qian, A. B. Hollinger, Canadian Space Agency (Canada) [6683-03]

10:00 am: **CNES studies of on-board compression for multispectral and hyperspectral images (Invited Paper)**, C. Thiebaut, E. Christophe, Ctr. National d'Études Spatiales (France); D. Lebedeff, Alcatel Alenia Space (France); C. Latry, Ctr. National d'Études Spatiales (France) [6683-04]

Coffee Break 10:30 to 11:00 am

SESSION 2

Conv. Ctr. 28AWed. 11:00 am to 12:20 pm

Data Compression II

Chair: **Jeffery J. Puschell**, Raytheon Space and Airborne Systems

11:00 am: **Lossless data compression studies for the geostationary imaging Fourier transform spectrometer (GIFTS) with the bias-adjusted reordering (BAR) preprocessing**, B. Huang, A. H. Huang, R. O. Knuteson, M. Smuga-Otto, W. L. Smith, Sr., Univ. of Wisconsin/Madison [6683-05]

11:20 am: **A new lossless compression algorithm for satellite earth science multispectral imagers**, I. Gladkova, S. Gottipati, M. D. Grossberg, City College/CUNY [6683-06]

11:40 am: **An overview of radar data compression**, V. Lakshmanan, Univ. of Oklahoma [6683-07]

12:00 pm: **Use of independent component analysis for lossless compression of ultraspectral sounder data**, S. Wei, Tamkang Univ. (Taiwan); B. Huang, Univ. of Wisconsin/Madison [6683-08]

Lunch/Exhibition Break 12:20 to 2:00 pm

SESSION 3

Conv. Ctr. 28AWed. 2:00 to 3:20 pm

Communications Engineering

Chairs: **Shen-En Qian**, Canadian Space Agency (Canada); **Joan Serra-Sagristà**, Univ. Autònoma de Barcelona (Spain)

2:00 pm: **GEONETCast Americas: vision and plans**, R. Fulton, H. Wood, National Oceanic and Atmospheric Administration [6683-09]

2:20 pm: **Controlling satellite communication system unwanted emissions in congested RF spectrum**, R. W. Heymann, National Oceanic and Atmospheric Administration; D. P. Olsen, The Aerospace Corp. [6683-10]

2:40 pm: **Concatenated space-time block coding with asymmetric MPSK TCM for fading channels**, J. Ao, G. Liao, Xidian Univ. (China); F. Ao, Guilin Univ. of Electronic Technology (China) [6683-12]

3:00 pm: **Theoretical study of use of optical orthogonal codes for compressed video transmission in optical code division multiple access (OCDMA) system**, S. Ghosh, B. N. Chatterji, B.P. Poddar Institute of Management & Technology (India) [6683-13]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Conv. Ctr. 28AWed. 3:50 to 5:10 pm

Data Compression III

Chair: **Carole Thiebaut**, Ctr. National de la Recherche Scientifique (France)

3:50 pm: **Lossless compression of the geostationary imaging Fourier transform spectrometer (GIFTS) data via adaptive vector quantization with linear prediction**, B. Huang, A. H. Huang, W. L. Smith, Sr., Univ. of Wisconsin/Madison [6683-14]

4:10 pm: **A comparative study of lossless compression algorithms on MODIS data**, S. Gottipati, J. Goddard, M. D. Grossberg, I. Gladkova, L. M. Roytman, City College/CUNY [6683-15]

4:30 pm: **Ultraspectral sounder data compression using the Tungstall coding**, S. Wei, Tamkang Univ. (Taiwan); B. Huang, Univ. of Wisconsin/Madison [6683-16]

4:50 pm: **Fast minimum-redundancy prefix coding for real-time space data compression**, B. Huang, Univ. of Wisconsin/Madison [6683-17]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

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- ✓ **An SWS-based remote sensing information and knowledge sharing system**, C. Wang, Institute of Remote Sensing Applications (China)[6683-19]
- ✓ **Fast inter-frames pattern chosen algorithm based on H.264**, Q. Lin, Hua Qiao Univ. (China) [6683-20]
- ✓ **A fast pattern chosen algorithm for intra-frames prediction**, Q. Lin, Hua Qiao Univ. (China) [6683-23]

Thursday 30 August

SESSION 5-A

Conv. Ctr. 28A Thurs. 8:40 to 10:00 am

Remote Sensing Data Archiving, Management, and Distribution

Joint Session with Conference 6684: Atmospheric and Environmental Remote Sensing Data Processing and Utilization: Readiness for GEOSS

Chairs: **Philip E. Ardanuy**, Raytheon Co.; **Valliappa Lakshmanan**, Univ. of Oklahoma

8:40 am: **Operational environmental satellite archives in the 21st century (Invited Paper)**, J. J. Bates, B. Barkstrom, J. L. Privette, National Climatic Data Ctr.; R. Vizbulis, National Environmental Satellite, Data, and Information Service [6683-18]

9:10 am: **The telesupervised adaptive ocean sensor fleet**, A. Elfes, Jet Propulsion Lab.; G. W. Podnar, J. M. Dolan, S. B. Stancliff, E. Lin, Carnegie Mellon Univ.; J. C. Hosler, T. J. Ames, J. Moisan, T. A. Moisan, NASA Goddard Space Flight Ctr.; J. Higinbotham, Emergent Space Technologies .. [6684-37]

9:30 am: **Sensor networks and netcentric operations perspectives of civil government (Invited Paper)**, G. Mandt, National Oceanic and Atmospheric Administration; T. L. Howard, The Boeing Co. [6684-38]

Coffee Break 10:00 to 10:30 am

SESSION 5-B

Conv. Ctr. 28A Thurs. 10:30 to 11:50 am

Remote Sensing Data Archiving, Management, and Distribution II

Joint Session with Conference 6684: Atmospheric and Environmental Remote Sensing Data Processing and Utilization: Readiness for GEOSS

10:30 am: **Simulation for the design of next-generation global earth observing systems (Invited Paper)**, M. S. Seabloom, S. Talabac, NASA Goddard Space Flight Ctr. [6684-39]

11:00 am: **Sensor webs with a service oriented architecture for on-demand science (Invited Paper)**, D. J. Mandl, NASA Goddard Space Flight Ctr. [6684-40]

11:30 am: **A prototype land information sensor web (LISW)**, H. Su, P. Houser, Institute of Global Environment and Society; Y. Tian, S. Kuma, Univ. of Maryland/Baltimore County; J. Geiger, NASA Goddard Space Flight Ctr.; D. Belvedere, Institute of Global Environment and Society [6684-41]

Lunch/Exhibition Break 11:50 pm to 2:00 am

SESSION 6

Conv. Ctr. 28A Thurs. 2:00 to 3:00 pm

Data Compression IV

Chairs: **Shila Ghosh**, B.P. Poddar Institute of Management & Technology (India); **Shih-Chieh Wei**, Tamkang Univ. (Taiwan)

2:00 pm: **A novel framework of FGS video coding**, Z. J. Long, X. Gao, Xidian Univ. (China) [6683-21]

2:20 pm: **The impact of striping artifacts on compression**, M. D. Grossberg, S. Gottipati, I. Gladkova, City College/CUNY; T. J. Schmit, National Oceanic and Atmospheric Administration [6683-22]

2:40 pm: **The compression algorithm of target image based on ROI**, L. Gu, S. Guo, Jilin Univ. (China) [6683-24]

Panel Discussion

Conv. Ctr. 28A Thurs. 3:00 to 3:30 pm

Panelists: **Jeffery J. Puschell**, Raytheon Space and Airborne Systems; **Shen-En Qian**, Canadian Space Agency (Canada); **Carole Thiebaut**, Ctr. National de la Recherche Scientifique (France); **Valliappa Lakshmanan**, Univ. of Oklahoma



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Conference 6684 • Conv. Ctr. 28A

Monday-Tuesday 27-28 August 2007 • Proceedings of SPIE Vol. 6684

Atmospheric and Environmental Remote Sensing Data Processing and Utilization III: Readiness for GEOSS

Conference Chairs: **Mitchell D. Goldberg**, NOAA, Office of Research and Applications; **Hal J. Bloom**, NOAA, NPOESS Integrated Program Office

Cochairs: **Allen H. Huang**, Univ. of Wisconsin/Madison; **Philip E. Ardanuy**, Raytheon Information Solutions

Program Committee: **John J. Bates**, National Oceanic and Atmospheric Administration; **James J. Butler**, NASA Goddard Space Flight Ctr.; **Changyong Cao**, National Oceanic and Atmospheric Administration; **Gerald J. Dittberner**, National Oceanic and Atmospheric Administration; **Wei Gao**, Colorado State Univ.; **John F. Le Marshall**, Bureau of Meteorology; **Stephen A. Mango**, NPOESS Integrated Program Office; **Johannes Schmetz**, EUMETSAT (Germany); **William L. Smith, Jr.**, NASA Langley Research Ctr.

Monday 27 August

SESSION 1

Conv. Ctr. 28A Mon. 8:30 to 10:10 am

Preparing for GEOSS I

Chair: **Thomas H. Achtor**, Univ. of Wisconsin/Madison

8:30 am: **The global space-based inter-calibration system (GSICS) program (Invited Paper)**, M. D. Goldberg, National Oceanic and Atmospheric Administration [6684-01]

9:00 am: **Inter-calibration and reprocessing of MSU/AMSU measurements in support of GEOSS**, C. Zou, National Oceanic and Atmospheric Administration [6684-02]

9:20 am: **Validation of the on-board radiometric calibration of the GOES I-M visible channel by reflectance-based vicarious methods**, N. P. Leisso, K. J. Thome, J. S. Czaplá-Myers, College of Optical Sciences/The Univ. of Arizona [6684-03]

9:40 am: **Developing a solar channel calibration algorithm for the Korean geostationary satellite (Invited Paper)**, B. Sohn, H. Chun, J. Kim, Seoul National Univ. of Technology (South Korea) [6684-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 28A Mon. 10:40 am to 12:40 pm

Preparing for GEOSS II

Chair: **Xiangqian Wu**, NOAA

10:40 am: **Back to the future: transition from operations to research (Invited Paper)**, P. E. Ardanuy, Raytheon Co.; D. Santek, Univ. of Wisconsin/Madison; A. Tarro, J. Wegiel, Raytheon Co. [6684-05]

11:10 am: **Calibration of AVHRR sensors using the reflectance-based method**, J. S. Czaplá-Myers, K. J. Thome, N. P. Leisso, College of Optical Sciences/The Univ. of Arizona [6684-06]

11:30 am: **Improving the SNO accuracy for the inter-calibration of the reflective solar bands of MetOP/AVHRR and Aqua/MODIS**, C. Cao, X. F. Wu, National Oceanic and Atmospheric Administration; A. Wu, Science Systems and Applications, Inc.; X. Xiong, NASA Goddard Space Flight Ctr. . . [6684-07]

11:50 am: **The calibration of AVHRR visible dual gain using Meteosat-8 for NOAA-16 to 18**, D. R. Doelling, Analytical Services and Materials, Inc.; P. Minnis, L. Nguyen, NASA Langley Research Ctr.; V. Chakrapani, D. Spangenberg, Analytical Services and Materials, Inc. [6684-08]

12:10 pm: **Report on the first meeting of global space-based inter-calibration system (GSICS) research working group (Invited Paper)**, X. F. Wu, National Oceanic and Atmospheric Administration [6684-09]

Lunch Break 12:40 to 1:40 pm

SESSION 3

Conv. Ctr. 28A Mon. 1:40 to 3:00 pm

Remote Sensing Program, System and Sensor I

Chair: **Thierry Phulpin**, Ctr. National d'Études Spatiales (France)

1:40 pm: **A geostationary microwave sounder mission: science and applications**, B. H. Lambrigtsen, Jet Propulsion Lab. [6684-10]

2:00 pm: **Overview of NOAA next generation geostationary operational environmental system (Invited Paper)**, T. Walsh, Swales Aerospace [6684-11]

2:30 pm: **The national polar-orbiting operational environmental satellite system (NPOESS) sensor suite (Invited Paper)**, H. J. Bloom, NPOESS Integrated Program Office [6684-12]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 28A Mon. 3:30 to 5:20 pm

Remote Sensing Program, System and Sensor II

Chair: **Dieter Klaes**, EUMETSAT (Germany)

3:30 pm: **The EUMETSAT polar system: status and first results (Invited Paper)**, D. Klaes, J. Schmetz, EUMETSAT (Germany) [6684-14]

4:00 pm: **Applications of IASI on MetOp A: first results and illustration of potential use for meteorology, climate monitoring and atmospheric chemistry (Invited Paper)**, T. Phulpin, Ctr. National d'Études Spatiales (France) [6684-15]

4:30 pm: **An end-to-end processing package for polar orbiting satellite direct broadcast users (Invited Paper)**, A. H. Huang, Univ. of Wisconsin/Madison [6684-16]

5:00 pm: **In-flight performance of the infrared atmospheric sounding interferometer (IASI) on METOP-A**, D. Blumstein, Ctr. National d'Études Spatiales (France); B. Tournier, Noveltis SA (France); F. R. Cayla, SISCLE (France); T. Phulpin, R. Fjortoft, C. Buil, G. Ponce, Ctr. National d'Études Spatiales (France) [6684-17]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Relationships between SSTA in Kurishio region and windfield in the equatorial mid-Pacific as well as ENSO**, M. Shilong, J. Min, Z. Guan, Nanjing Univ. of Information Science & Technology (China) [6684-42]
- ✓ **Radiance comparison of Metop-A AVHRR with AIRS and IASI**, L. Wang, C. Cao, National Oceanic and Atmospheric Administration [6684-43]
- ✓ **Active-passive optical remote sensing for weather and climate research**, Z. Zhu, W. Gong, L. Zhang, P. Li, Q. Qin, Y. Ma, S. Song, M. Liu, Z. Hao, Wuhan Univ. (China) [6684-44]
- ✓ **Study on effects of the intensity of east Asian monsoon trough upon the genesis of tropical cyclones in the western North Pacific**, J. Gao, Fujian Specialized Meteorological Observatory (China) [6684-46]
- ✓ **Study on impacts of an exceptionally intense sandstorm upon Gansu Region in summer**, X. Wang, Lanzhou Institute of Arid Meteorology (China) [6684-47]
- ✓ **Characteristic of surface water resources and response to climate change in northwest China**, J. Feng, N. Guo, X. Wang, Lanzhou Institute of Arid Meteorology (China) [6684-49]
- ✓ **The trends of water vapor and methane in the stratosphere in China**, C. Shi, Y. Chen, Univ. of Science and Technology of China (China) .. [6684-51]
- ✓ **Hyperspectral data research application (HYDRA)**, T. D. Rink, T. H. Achtor, T. M. Whittaker, Univ. of Wisconsin/Madison; W. P. Menzel, National Oceanic and Atmospheric Administration [6684-52]
- ✓ **Improved processing of multifilter rotating shadowband radiometer network for distributed monitoring of atmospheric aerosols**, B. M. Gross, M. Bustamante, F. Moshary, R. Aspey, S. A. Ahmed, City College/CUNY [6684-53]
- ✓ **A new concept: double ridges process of West Pacific subtropical high**, J. He, L. Qi, Nanjing Univ. of Information Science & Technology (China); Z. Zhang, Beijing Climate Ctr. (China) [6684-54]
- ✓ **A robotic airship for atmospheric and environmental research and monitoring**, A. Elfes, Jet Propulsion Lab.; M. Bergerman, G. W. Podnar, Carnegie Mellon Univ.; J. L. Hall, Jet Propulsion Lab. [6684-55]
- ✓ **Intercalibrating geostationary imagers via polar orbiting high spectral resolution data**, M. M. Gunshor, Univ. of Wisconsin/Madison; T. J. Schmit, National Oceanic and Atmospheric Administration; D. C. Tobin, Univ. of Wisconsin/Madison; W. P. Menzel, National Oceanic and Atmospheric Administration [6684-56]
- ✓ **Lidar measurements**, J. Polkanov, B.I. Stepanov Institute of Physics (Russia) [6684-57]

Tuesday 28 August

SESSION 5

Conv. Ctr. 28A Tues. 8:30 to 10:20 am

Remote Sensing Algorithm and Data Analysis I

Chair: Jun Li, Univ. of Wisconsin/Madison

- 8:30 am: **Simulation of atmospheric profile retrieval from hyperspectral infrared data under cloudy condition**, L. Guan, Nanjing Univ. of Information Science & Technology (China); A. H. Huang, Univ. of Wisconsin/Madison [6684-18]
- 8:50 am: **A study on the accuracies of ozone data observed with ground-based and satellite-borne instruments (Invited Paper)**, Z. Wang, J. Zhang, Nanjing Univ. of Information Science & Technology (China); H. Chen, Institute of Atmospheric Physics (China); Z. Zhang, Z. He, Nanjing Univ. of Information Science & Technology (China) [6684-19]
- 9:20 am: **An improved atmospheric profile retrieval system for GOES sounder and SEVIRI data**, X. Jin, J. Li, J. P. Nelson III, C. C. Schmidt, Z. Li, Univ. of Wisconsin/Madison; T. J. Schmit, M. D. Goldberg, National Oceanic and Atmospheric Administration [6684-20]
- 9:40 am: **Simultaneous retrieval of hyperspectral IR emissivity spectrum along with temperature and moisture profiles from AIRS**, J. Li, J. Li, E. Weisz, Univ. of Wisconsin/Madison; T. J. Schmit, M. D. Goldberg, National Oceanic and Atmospheric Administration; D. K. Zhou, NASA Langley Research Ctr. [6684-21]
- 10:00 am: **Improved atmospheric soundings and error estimates from analysis of AIRS/AMSU data**, J. Susskind, NASA Goddard Space Flight Ctr. [6684-22]
- Coffee Break 10:20 to 10:40 am

SESSION 6

Conv. Ctr. 28A Tues. 10:40 am to 12:20 pm

Remote Sensing Algorithm and Data Analysis II

Chair: Fuzhong Weng, National Oceanic and Atmospheric Administration

- 10:40 am: **Interactive processing of multi- and hyper-spectral environmental satellite data: the next generation of McIDAS (Invited Paper)**, T. H. Achtor, T. D. Rink, T. M. Whittaker, Univ. of Wisconsin/Madison [6684-23]
- 11:10 am: **All sky sounding retrievals from hyperspectral infrared radiances alone (Invited Paper)**, J. Li, J. Li, E. Weisz, X. Jin, C. Liu, Univ. of Wisconsin/Madison; T. J. Schmit, National Oceanic and Atmospheric Administration; A. H. Huang, Univ. of Wisconsin/Madison; M. D. Goldberg, National Oceanic and Atmospheric Administration [6684-24]
- 11:40 am: **Evaluation of data thinning strategies for climate applications using the first four years of AIRS hyperspectral data**, H. H. G. Aumann, Jet Propulsion Lab. [6684-25]
- 12:00 pm: **Improved MODIS aerosol retrieval over urban areas**, B. M. Gross, M. M. Oo, E. Hernandez, F. Moshary, S. A. Ahmed, City College/CUNY [6684-26]
- Lunch/Exhibition Break 12:20 to 1:40 pm

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SESSION 7

Conv. Ctr. 28A Tues. 1:40 to 3:30 pm

Remote Sensing Weather: Climate and Environmental Applications I

Chair: Zhenhui Wang, Nanjing Univ. of Information Science and Technology (China)

1:40 pm: **The interdecadal variations of the onset and advance of the east Asian summer monsoon**, X. Lu, Beijing Climate Ctr. (China) and Graduate School of the Chinese Academy of Sciences (China); X. Zhang, Beijing Climate Ctr. (China) [6684-27]

2:00 pm: **JCSDA progress in satellite data assimilation (Invited Paper)**, F. Weng, National Oceanic and Atmospheric Administration [6684-28]

2:30 pm: **The moisture structure of ISO in western North Pacific revealed by AIRS**, L. Tao, Nanjing Univ. of Information Science & Technology (China); X. Fu, B. Wang, Univ. of Hawai'i at Manoa [6684-29]

2:50 pm: **Characteristics of Tibetan Plateau topographic trough and Bay of Bengal trough and their relationship with the South China Sea summer monsoon onset**, J. Wei, J. He, S. Zhong, X. Zhu, Nanjing Univ. of Information Science & Technology (China) [6684-30]

3:10 pm: **Possible mechanism of the south-born-south-persisting West Pacific subtropical high double ridges process**, L. Qi, J. He, Nanjing Univ. of Information Science & Technology (China); Z. Zhang, Beijing Climate Ctr. (China) [6684-31]

Coffee Break 3:30 to 3:50 pm

SESSION 8

Conv. Ctr. 28A Tues. 3:50 to 5:30 pm

Remote Sensing Weather: Climate and Environmental Applications II

Chair: Byung-Ju Sohn, Seoul National Univ. of Technology (South Korea)

3:50 pm: **Zonal thermal difference between East-Asia and West Pacific and its relationship with East Asian subtropical southerly onset**, J. He, L. Qi, Nanjing Univ. of Information Science & Technology (China); Z. Zhang, Beijing Climate Ctr. (China); Z. Guan, Nanjing Univ. of Information Science & Technology (China) [6684-32]

4:10 pm: **Techniques for assessing risks of droughts in winter wheat production**, R. Liu, Z. Zhu, W. Fang, Y. Wang, Henan Institute of Meteorological Science (China) [6684-33]

4:30 pm: **Climatic mechanisms of droughts and their patterns during winter wheat growing season in Henan Province of China**, L. Chen, S. Shen, Nanjing Univ. of Information Science & Technology (China); R. Liu, Henan Institute of Meteorological Science (China) [6684-34]

4:50 pm: **Climatic characteristics of atmospheric heat source in Qinghai-Tibetan Plateau over the last 44 years**, S. Zhong, J. He, Nanjing Univ. of Information Science & Technology (China) [6684-35]

5:10 pm: **Observations of deep convective clouds as stable reflected light standard for climate research: AIRS evaluation**, H. H. G. Aumann, T. S. Pagano, D. A. Elliott, M. D. Hofstadter, S. Licata, Jet Propulsion Lab. [6684-36]

Thursday 30 August

SESSION 9

Conv. Ctr. 28A Thurs. 8:40 to 11:50 am

Remote Sensing Data Archiving, Management and Distribution

Joint Session with Conference 6683: Satellite Data Compression, Communications, and Archiving III

Chairs: Philip E. Ardanuy, Raytheon Co.; *Valliappa Lakshmanan*, Univ. of Oklahoma

8:40 am: **Operational environmental satellite archives in the 21st century (Invited Paper)**, J. J. Bates, B. Barkstrom, J. L. Privette, National Climatic Data Ctr.; R. Vizbulis, National Environmental Satellite, Data, and Information Service [6683-18]

9:10 am: **The telesupervised adaptive ocean sensor fleet**, A. Elfes, Jet Propulsion Lab.; G. W. Podnar, J. M. Dolan, S. B. Stancliff, E. Lin, Carnegie Mellon Univ.; J. C. Hosler, T. J. Ames, J. Moisan, T. A. Moisan, NASA Goddard Space Flight Ctr.; J. Higinbotham, Emergent Space Technologies .. [6684-37]

9:30 am: **Sensor networks and netcentric operations perspectives of civil government (Invited Paper)**, G. Mandl, National Oceanic and Atmospheric Administration; T. L. Howard, The Boeing Co. [6684-38]

Coffee Break 10:00 to 10:30 am

10:30 am: **Simulation for the design of next-generation global earth observing systems (Invited Paper)**, M. S. Seablom, S. Talabac, NASA Goddard Space Flight Ctr. [6684-39]

11:00 am: **Sensor webs with a service oriented architecture for on-demand science (Invited Paper)**, D. J. Mandl, NASA Goddard Space Flight Ctr. [6684-40]

11:30 am: **A prototype land information sensor web (LISW)**, H. Su, P. Houser, Institute of Global Environment and Society; Y. Tian, S. Kuma, Univ. of Maryland/Baltimore County; J. Geiger, NASA Goddard Space Flight Ctr.; D. Belvedere, Institute of Global Environment and Society [6684-41]

Assimilation of Remote Sensing and In Situ Data in Modern Numerical Weather and Environmental Prediction Models

Conference Chair: Xiaolei Zou, Florida State Univ.

Cochairs: Dale Barker, National Ctr. for Atmospheric Research; Francois-Xavier Le Dimet, Univ. Joseph Fourier (France)

Program Committee: Kayo Ide, Univ. of California/Los Angeles; John R. Mecikalski, The Univ. of Alabama/Huntsville; Michael Navon, Florida State Univ.; Zhaoxia Pu, The Univ. of Utah; Qingnong Xiao, National Ctr. for Atmospheric Research

Sunday 26 August

SESSION 1

Conv. Ctr. 28A Sun. 8:30 to 10:20 am

Data Assimilation Systems and New Methodologies

Chair: Zhijin Li, Jet Propulsion Lab.

8:30 am: **Development of a unified community data assimilation for WRF (Invited Paper)**, D. Barker, National Ctr. for Atmospheric Research . [6685-01]

9:00 am: **Image assimilation: a new paradigm**, F. Le Dimet, Univ. Joseph Fourier (France) and INRIA (France) [6685-02]

9:20 am: **Impact of HSV and TESV for adaptive observations targeting in a 4D VAR framework with a finite volume S-W model**, I. M. Navon, Florida State Univ. [6685-03]

9:40 am: **A lower bound for predicting uncertainty in forecasting models**, C. Kerce, Propagation Research Associates, Inc.; F. C. Vandenberghe, National Ctr. for Atmospheric Research [6685-04]

10:00 am: **A satellite-based thermal infrared retrieval of soil moisture: implementation within a numerical mesoscale model**, C. R. Hain, J. R. Mecikalski, The Univ. of Alabama in Huntsville; M. Anderson, U.S. Dept. of Agriculture [6685-05]

Coffee Break 10:20 to 10:50 am

SESSION 2

Conv. Ctr. 28A Sun. 10:50 am to 12:20 pm

Assimilation of Satellite Observations of the Atmosphere

Chair: John R. Mecikalski, The Univ. of Alabama/Huntsville

10:50 am: **What would it take to assimilate full spectrum of satellite observations in all weather conditions? (Invited Paper)**, T. Vukicevic, Colorado State Univ. [6685-06]

11:20 am: **Assimilation of AIRS data using a mesoscale model**, M. J. Carrier, X. Zou, Florida State Univ. [6685-07]

11:40 am: **Impact of COSMIC radio occultation refractivity measurements on analyses and forecasts over the tropical Atlantic Ocean**, H. Liu, J. Anderson, Y. Kuo, Y. Chen, C. Snyder, National Ctr. for Atmospheric Research [6685-08]

12:00 pm: **Assimilation of angle of arrival measurements from an antenna of GPS receivers in the WRF model**, F. C. Vandenberghe, National Ctr. for Atmospheric Research; C. Kerce, R. Bock, Propagation Research Associates, Inc. [6685-09]

Lunch Break 12:20 to 2:00 pm

SESSION 3

Conv. Ctr. 28A Sun. 2:00 to 3:20 pm

Assimilation of Satellite Observations of the Ocean

Chair: Francois C. Vandenberghe, National Ctr. for Atmospheric Research

2:00 pm: **A three-dimensional variational data assimilation in support of coastal ocean observing systems**, Z. Li, Jet Propulsion Lab. [6685-11]

2:20 pm: **Assimilation of the high-frequency radar measurements for coastal currents using ROMS**, K. Park, Z. Li, Jet Propulsion Lab.; J. Farrara, Raytheon Technical Services; Y. Chao, Jet Propulsion Lab. [6685-12]

2:40 pm: **Towards assimilation of ocean color satellite observation into coastal ocean biogeochemical models: the tropical Fitzroy River Estuary case study**, V. E. Brando, N. R. C. Cherukuru, A. G. Dekker, B. Robson, I. Webster, Commonwealth Scientific and Industrial Research Organisation (Australia) [6685-14]

3:00 pm: **Pacific Ocean deep sea surface height fluctuation**, T. Holden, P. J. Marchese, G. Tremberger, Jr., D. Cotten, T. D. Cheung, J. Roman, Queensland Community College/CUNY [6685-15]

Coffee Break 3:20 to 3:50 pm

SESSION 4

Conv. Ctr. 28A Sun. 3:50 to 4:50 pm

Hurricane Data Assimilation

Chair: Tomislava Vukicevic, Colorado State Univ.

3:50 pm: **Diabatic initialization based on radar and satellite data assimilation for short-range QPF**, Q. Xiao, National Ctr. for Atmospheric Research [6685-16]

4:10 pm: **Mesoscale assimilation of rain-affected observations**, C. M. Amerault, Naval Research Lab.; X. Zou, Florida State Univ.; J. Doyle, Naval Research Lab. [6685-17]

4:30 pm: **Study of the tropical cyclone intensity change with assimilation of multisensor remote sensing and in-situ observations in high-resolution numerical simulations**, Z. Pu, X. Li, The Univ. of Utah [6685-18]

SESSION 5

Conv. Ctr. 28A Sun. 4:50 to 5:30 pm

Data Assimilation Research and Education at Universities

Chair: Francois-Xavier Le Dimet, Univ. Joseph Fourier (France)

4:50 pm: **Data assimilation research and education at universities**, X. Zou, Florida State Univ.; F. Le Dimet, Univ. Joseph Fourier (France) [6685-20]

5:10 pm: **Promises and challenges of ensemble Kalman filter in research and operational applications**, K. Ide, Univ. of California/Los Angeles [6685-21]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.



Conference 6685 • Conv. Ctr. 28A

Monday 27 August

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

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- ✓ **Orographic effects on South China Sea summer climate**, H. Xu, Nanjing Univ. of Information Science & Technology (China); S. Xie, Y. Wang, Univ. of Hawaii at Manoa; W. Zhuang, D. Wang, South China Sea Institute of Oceanology (China) [6685-22]
- ✓ **Relationship between the intensity and SW stream of the sub-tropical high over West Pacific Ocean and Fujian May-June rainfall**, Y. Zou, J. He, Z. Qiu, Fujian Meteorological Observatory (China) [6685-23]
- ✓ **Assimilation and simulation of typhoon Bilis (2006) using global and regional assimilation prediction system (GRAPES)**, Y. Liu, National Ctr. for Atmospheric Research; J. Xue, Chinese Academy of Meteorological Sciences (China) [6685-24]
- ✓ **The delimitation and forecasting technique study of Meiyu season in Chinese Yangtze-Huaihe river basin**, G. H. Han, Nanjing Institute of Meteorology (China) [6685-25]
- ✓ **Comparing in-cloud vertical profiles of the atmospheric state determined from GPS RO data with dropsondes and large-scale analysis**, X. Zou, L. Lin, J. O'Connor, Florida State Univ.; J. Chang, L. Chu, Chinese Culture Univ. (Taiwan) [6685-27]

Conference 6686 • Conv. Ctr. 29C

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6686

UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XV

Conference Chair: **Oswald H. W. Siegmund**, Univ. of California/Berkeley

Program Committee: **James C. Green**, Univ. of Colorado/Boulder; **Michael P. Kowalski**, Naval Research Lab.; **Barry Y. Welsh**, Univ. of California/Berkeley

Sunday 26 August

SESSION 1

Conv. Ctr. 29C Sun. 8:30 to 10:10 am

Novel Detectors and Techniques I

Chair: **Melville P. Ulmer**, Northwestern Univ.

8:30 am: **Hybrid CMOS x-ray detectors: the next generation for focused x-ray telescopes**, A. D. Falcone, D. N. Burrows, The Pennsylvania State Univ.; Y. Bai, M. C. Farris, Teledyne Imaging Sensors; R. Cook, The Pennsylvania State Univ. [6686-01]

8:50 am: **Managing radiation degradation of CCDs on the Chandra X-ray Observatory III**, S. L. O'Dell, NASA Marshall Space Flight Ctr.; T. L. Aldcroft, Harvard-Smithsonian Ctr. for Astrophysics; W. C. Blackwell, Jacobs Sverdrup; S. L. Bucher, J. H. Chappell, J. M. DePasquale, Harvard-Smithsonian Ctr. for Astrophysics; C. E. Grant, Massachusetts Institute of Technology; M. Juda, Harvard-Smithsonian Ctr. for Astrophysics; E. R. Martin, Northrop Grumman Space Technology; J. I. Minow, NASA Marshall Space Flight Ctr.; S. S. Murray, P. P. Plucinsky, D. A. Schwartz, Harvard-Smithsonian Ctr. for Astrophysics; D. P. Shropshire, Northrop Grumman Space Technology; B. D. Spitzbart, Harvard-Smithsonian Ctr. for Astrophysics; P. R. Viens, Northrop Grumman Space Technology; S. J. Wolk, Harvard-Smithsonian Ctr. for Astrophysics . [6686-02]

9:10 am: **Radiation-hard charge-coupled devices for the Extreme-Ultraviolet Variability experiment**, R. C. Westhoff, M. K. Rose, J. A. Gregory, G. D. Berthiaume, MIT Lincoln Lab.; J. F. Seely, Naval Research Lab.; T. N. Woods, G. J. Ucker, Univ. of Colorado/Boulder [6686-03]

9:30 am: **Advances in APDs for UV astronomy**, M. P. Ulmer, M. Razeghi, Northwestern Univ. [6686-04]

9:50 am: **Uniform high-spectral resolution demonstrated in arrays of TES x-ray microcalorimeters**, S. R. Bandler, A. D. Brown, J. A. Chervenak, F. M. Finkbeiner, N. Iyomoto, R. L. Kelley, C. A. Kilbourne, F. S. Porter, S. J. Smith, NASA Goddard Space Flight Ctr. [6686-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 29C Sun. 10:40 am to 12:00 pm

SWIFT Mission

10:40 am: **Swift XRT status and performance**, D. N. Burrows, The Pennsylvania State Univ. [6686-06]

11:00 am: **The operation and evolution of the Swift X-ray Telescope**, J. A. Kennea, The Pennsylvania State Univ. [6686-07]

11:20 am: **Characterization of the Swift X-ray Telescope instrumental background**, C. Pagani, The Pennsylvania State Univ. [6686-08]

11:40 am: **The in-flight spectroscopic performance of the Swift XRT CCD camera**, O. Godet, Univ. of Leicester (United Kingdom) [6686-09]

Lunch Break 12:00 to 1:10 pm

SESSION 3

Conv. Ctr. 29C Sun. 1:10 to 3:10 pm

Current and Future Missions

Chair: **Oswald H. W. Siegmund**, Univ. of California/Berkeley

1:10 pm: **Status of the Constellation-X Mission**, R. Petre, N. E. White, NASA Goddard Space Flight Ctr.; H. D. Tananbaum, Harvard-Smithsonian Ctr. for Astrophysics; A. E. Hornschemeier, NASA Goddard Space Flight Ctr.; J. A. Bookbinder, M. R. Garcia, Harvard-Smithsonian Ctr. for Astrophysics; J. Grady, NASA Goddard Space Flight Ctr. [6686-10]

1:30 pm: **Pharos: GRB/WHIM science to mission design flowdown**, M. Elvis, Harvard-Smithsonian Ctr. for Astrophysics; F. Nicastro, F. Fiore, Osservatorio Astronomico di Roma (Italy); L. A. Phillips, Amherst College; S. S. Murray, Harvard-Smithsonian Ctr. for Astrophysics; K. A. Flanagan, Massachusetts Institute of Technology; B. D. Ramsey, NASA Marshall Space Flight Ctr. [6686-11]

1:50 pm: **The Lunar Occultation Observer (LOCO) mission concept**, R. S. Miller, The Univ. of Alabama in Huntsville [6686-12]

2:10 pm: **SIMBOL-X: extending the field of x-rays astrophysics with the help of the formation flight concept**, O. La Marle, Ctr. National d'Études Spatiales (France) [6686-13]

2:30 pm: **Simbol-X: a formation flying mission for hard x-ray astrophysics**, F. Fiore, Osservatorio Astronomico di Roma (Italy); P. R. Ferrando, Commissariat à l'Énergie Atomique (France); P. Giommi, Agenzia Spaziale Italiana (Italy); G. Pareschi, Osservatorio Astronomico di Brera (Italy); P. Laurent, Commissariat à l'Énergie Atomique (France); P. Malaguti, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy) [6686-14]

2:50 pm: **HXMT: the hard x-ray modulation telescope mission**, T. Li, Institute of High Energy Physics (China) and Tsinghua Univ. (China) [6686-15]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Conv. Ctr. 29C Sun. 3:40 to 5:20 pm

Novel Detectors and Techniques II

Chair: **Richard S. Miller**, The Univ. of Alabama/Huntsville

3:40 pm: **Fast large-area spectroscopic and imaging CCD detectors for x-ray astronomy with eROSITA and for exploration of the nanocosmos**, N. Meidinger, R. Andritschke, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Hartmann, PNSensor GmbH (Germany); G. Hasinger, S. Herrmann, Max-Planck-Institut für extraterrestrische Physik (Germany); P. Holl, PNSensor GmbH (Germany); P. Predehl, Max-Planck-Institut für extraterrestrische Physik (Germany); H. Soltau, PNSensor GmbH (Germany); L. W. Strueder, Max-Planck-Institut für extraterrestrische Physik (Germany) [6686-16]

4:00 pm: **Characterization of swept-charge devices for the Chandrayaan-1 x-ray spectrometer (C1XS) instrument**, J. P. Gow, D. R. Smith, A. D. Holland, Brunel Univ. (United Kingdom); B. Maddison, C. Howe, Rutherford Appleton Lab. (United Kingdom) [6686-17]

4:20 pm: **Modeling instrument background for CCD x-ray spectrometers in Space**, D. J. Hall, A. D. Holland, Brunel Univ. (United Kingdom); M. J. L. Turner, Univ. of Leicester (United Kingdom) [6686-18]

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4:40 pm: **Development of a gamma-ray burst detector based on silicon drift detector and scintillator**, K. Yamaoka, S. Asano, K. Yoshida, Y. Arai, Aoyama Gakuin Univ. (Japan); A. Pahlke, KETEK GmbH (Germany); H. Ikeda, Japan Aerospace Exploration Agency (Japan); K. Mori, Clear Pulse Ltd. (Japan); A. Tsutsui, T. Doshida, A. Yoshida, Aoyama Gakuin Univ. (Japan); T. Takahashi, Japan Aerospace Exploration Agency (Japan); H. Kato, The Institute of Physical and Chemical Research (RIKEN) (Japan) [6686-19]

5:00 pm: **Development of an ASIC employing delta-sigma digitization for readout of x-ray CCDs**, D. Matsuura, H. Ozawa, E. Miyata, H. Tsunemi, Osaka Univ. (Japan); J. P. Doty, Noqsi Aerospace, Ltd.; H. Ikeda, Japan Aerospace Exploration Agency (Japan) [6686-20]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 5

Conv. Ctr. 29C Mon. 8:30 to 9:30 am

Suzaku Instruments

8:30 am: **Ground bakeout experiment of the optical blocking filter (OBF) for the Suzaku XIS**, H. Mori, T. G. Tsuru, H. Matsumoto, H. Uchiyama, M. Ozawa, Y. Takikawa, M. Nobukawa, K. Koyama, Kyoto Univ. (Japan); K. Torii, N. Tawa, Osaka Univ. (Japan); S. Kitamoto, K. Sudoh, Rikkyo Univ. (Japan); T. Kohmura, Kogakuin Univ. (Japan) [6686-21]

8:50 am: **The onboard calibration for the spaced-rare charge injection of Suzaku XIS**, H. Uchiyama, Y. Hyodo, H. Yamaguchi, H. Nakajima, H. Mori, H. Matsumoto, T. G. Tsuru, K. Koyama, Kyoto Univ. (Japan); K. Torii, K. Hasuie, S. Katsuda, K. Hayashida, H. Tsunemi, Osaka Univ. (Japan); T. Dotani, H. Murakami, Japan Aerospace Exploration Agency (Japan); G. Y. Prigozhin, S. E. Kissel, E. Miller, B. J. LaMarr, M. W. Bautz, Massachusetts Institute of Technology [6686-22]

9:10 am: **Mitigating CCD radiation damage with charge injection: first flight results from Suzaku**, M. W. Bautz, S. E. Kissel, G. Y. Prigozhin, B. J. LaMarr, E. Miller, B. Burke, J. A. Gregory, Massachusetts Institute of Technology; H. Uchiyama, Y. Hyodo, H. Yamaguchi, H. Nakajima, H. Mori, T. G. Tsuru, H. Matsumoto, K. Koyama, Kyoto Univ. (Japan); K. Torii, S. Katsuda, K. Hasuie, K. Hayashida, H. Tsunemi, Osaka Univ. (Japan); H. Murakami, T. Dotani, Japan Aerospace Exploration Agency (Japan) [6686-23]

SESSION 6

Conv. Ctr. 29C Mon. 9:30 to 10:30 am

CZT Instruments

9:30 am: **Spectroscopic CZT detectors development for x and gamma-ray imaging instruments**, E. M. Quadri, M. C. A. Uslenghi, M. Alderighi, P. Ubertini, L. Natalucci, E. Caroli, N. Auricchio, G. La Rosa, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); A. Zappettini, Consiglio Nazionale delle Ricerche (Italy); G. M. Guadalupe, Venezia Tecnologie S.p.A (Italy) .. [6686-24]

9:50 am: **Numerical study of the response of a CZT stack detector used as Laue lens focal plane**, E. Caroli, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); R. M. Curado da Silva, Univ. de Coimbra (Portugal) and Univ. de Louvain (Belgium); A. Pisa, Univ. degli Studi di Ferrara (Italy); J. B. Stephen, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); A. J. Bird, A. J. Dean, Univ. of Southampton (United Kingdom); L. Natalucci, S. Del Sordo, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy) [6686-25]

10:10 am: **Design of a wide-field CZT gamma-camera for gamma-ray burst and fast transient detection with narrow-field instrument follow-up**, L. Natalucci, E. M. Quadri, P. Ubertini, L. Amati, E. Caroli, M. Feroci, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); J. A. den Herder, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); L. Piro, M. Frutti, G. La Rosa, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy) [6686-26]

Coffee Break 10:30 to 11:00 am

SESSION 7

Conv. Ctr. 29C Mon. 11:00 am to 12:00 pm

Microchannel Plate Detectors

Chair: Melville P. Ulmer, Northwestern Univ.

11:00 am: **Very-high-resolution microchannel plates at Lyman-alpha wavelength**, J. Mutz, R. Fairbend, J. Seguy, Photonis S.A.S. (France); A. Penquer, Ctr. National d'Études Spatiales (France) [6686-27]

11:20 am: **HRC-I gain correction**, J. Posson-Brown, V. L. Kashyap, Harvard-Smithsonian Ctr. for Astrophysics [6686-28]

11:40 am: **Microchannel plates: recent advances in performance**, O. H. W. Siegmund, Univ. of California/Berkeley [6686-29]

Lunch Break 12:00 to 1:10 pm

SESSION 8

Conv. Ctr. 29C Mon. 1:30 to 2:50 pm

Polarimetry

1:30 pm: **Narrow-band x-ray polarizing filters**, A. Martindale, N. P. Bannister, Univ. of Leicester (United Kingdom); S. P. Collins, Diamond Light Source Ltd. (United Kingdom); K. D. Harris, Cardiff Univ. (United Kingdom); G. A. Solan, Univ. of Leicester (United Kingdom); V. K. Muppidi, Cardiff Univ. (United Kingdom); Y. Champouret, G. W. Fraser, S. J. Gurman, M. Roy, P. S. Monks, Univ. of Leicester (United Kingdom) [6686-30]

1:50 pm: **A burst chasing x-ray polarimeter**, J. E. Hill, R. G. Baker, NASA Goddard Space Flight Ctr.; J. K. Black, Forbin Scientific; P. Deines-Jones, K. Jahoda, NASA Goddard Space Flight Ctr. [6686-31]

2:10 pm: **An x-ray polarimeter for HXMT mission**, E. Costa, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); R. Bellazzini, Istituto Nazionale di Fisica Nucleare (Italy); G. Tagliaferri, Osservatorio Astronomico di Brera (Italy) [6686-32]

2:30 pm: **A very compact polarizer for an x-ray polarimeter calibration**, F. Muleri, P. Soffitta, E. Costa, M. Frutti, A. Rubini, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); R. Bellazzini, M. Minuti, G. Spandre, Istituto Nazionale di Fisica Nucleare (Italy) [6686-33]

Coffee Break 2:50 pm

SESSION 9

Conv. Ctr. 29C Mon. 3:20 to 4:20 pm

Current and Future Instruments I

3:20 pm: **An overview of MAXI onboard Kibo of ISS**, M. Matsuoka, K. Kawasaki, S. Ueno, H. Tomida, N. Kuramata, M. Ishikawa, Japan Aerospace Exploration Agency (Japan); M. Suzuki, Tokyo Institute of Technology (Japan); T. Mihara, M. Kohama, N. Isobe, The Institute of Physical and Chemical Research (RIKEN) (Japan); H. Tsunemi, E. Miyata, Osaka Univ. (Japan); H. Negoro, Nihon Univ. (Japan); M. Nakajima, The Institute of Physical and Chemical Research (RIKEN) (Japan); A. Yoshida, T. Miyakawa, Aoyama Gakuin Univ. (Japan); N. Kawai, J. Kataoka, Tokyo Institute of Technology (Japan) [6686-34]

3:40 pm: **High-resolution soft x-ray spectroscopy for Constellation X**, C. F. Lillie, Northrop Grumman Space Technology; W. C. Cash, Jr., Univ. of Colorado/Boulder [6686-35]

4:00 pm: **Integration, testing, and calibration of HST/wide-field camera 3**, J. W. MacKenty, Space Telescope Science Institute; R. A. Kimble, NASA Goddard Space Flight Ctr.; R. W. O'Connell, Univ. of Virginia; J. M. Townsend, NASA Goddard Space Flight Ctr. [6686-37]

SESSION 10

Conv. Ctr. 29C Mon. 4:20 to 5:20 pm

Current and Future Instruments II

Chair: **Oswald H. W. Siegmund**, Univ. of California/Berkeley

4:20 pm: **The ground calibrations of SuperAGILE**, L. Pacciani, E. Costa, E. Del Monte, I. Donnarumma, Y. Evangelista, M. Feroci, F. Lazzarotto, I. Lapshov, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); M. Rapisarda, ENEA (Italy); P. Soffitta, A. Argan, G. Di Persio, M. Mastropietro, E. Morelli, A. Rubini, T. Alessio, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); A. Lo Bue, P. Rossi, L. Semeraro, ENEA (Italy); A. Bulgarelli, G. Fulvio, M. Trifoglio, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy) [6686-39]

4:40 pm: **eROSITA**, P. Predehl, G. Hasinger, H. Böhringer, U. G. Briel, H. Brunner, Max-Planck-Institut für extraterrestrische Physik (Germany); E. Churazov, Max-Planck-Institut für Astrophysik (Germany); M. J. Freyberg, P. Friedrich, Max-Planck-Institut für extraterrestrische Physik (Germany); E. Kendziorra, Univ. Tübingen (Germany); D. Lutz, N. Meidinger, Max-Planck-Institut für extraterrestrische Physik (Germany); M. N. Pavlinsky, Space Research Institute (Russia); E. Pfeffermann, Max-Planck-Institut für extraterrestrische Physik (Germany); A. E. Santangelo, Univ. Tübingen (Germany); J. H. M. M. Schmitt, Univ. Hamburg (Germany); A. Schwope, M. Steinmetz, Astrophysikalisches Institut Potsdam (Germany); L. W. Strueder, Max-Planck-Institut für extraterrestrische Physik (Germany); R. Sunyaev, Max-Planck-Institut für Astrophysik (Germany); J. Wilms, Univ. Erlangen-Nürnberg (Germany) [6686-40]

5:00 pm: **Observation of Crab Nebula with hard x-ray polarimeter: PHENEX**, S. Gunji, H. Sakurai, F. Tokanai, Y. Kishimoto, M. Kanno, Y. Ishikawa, Yamagata Univ. (Japan); K. Hayashida, N. Anabuki, H. Tsunemi, Osaka Univ. (Japan); T. Mihara, M. Kohama, M. Suzuki, The Institute of Physical and Chemical Research (RIKEN) (Japan); Y. Saito, T. Yamagami, Japan Aerospace Exploration Agency (Japan) [6686-41]

✓ Posters-Monday

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **X-ray spectroscopy of the Cygnus Loop**, R. L. McEntaffer, W. C. Cash, Jr., Univ. of Colorado/Boulder [6686-36]
- ✓ **Radiation damage and recovery properties in three kinds of polymer optical fiber exposed x-ray irradiation**, W. Ge, Xinjiang Univ. (China) and Xi'an Institute of Optics and Precision Mechanics (China) [6686-42]
- ✓ **Calibration of the CHANG'E-1 x-ray fluorescence imaging spectrometer at INAF-OAPA**, M. Barbera, Osservatorio Astronomico di Palermo Giuseppe S. Vaiana (Italy) and Univ. degli Studi di Palermo (Italy); R. Candia, A. Collura, G. Di Cicca, S. Varisco, Osservatorio Astronomico di Palermo Giuseppe S. Vaiana (Italy); C. Zhang, H. Wang, J. Yang, W. Peng, X. Cui, X. Cao, X. Liang, Institute of High Energy Physics (China) [6686-43]
- ✓ **High-throughput CDS ASICs for x-ray CCDs**, N. Murray, A. D. Holland, G. Jeyesundra, Brunel Univ. (United Kingdom) [6686-44]

Tuesday 28 August

X-Ray/UV Optics Technical Event
Marriott Mission Hills 8:00 to 10:00 pm

Chair: **Forbes R. Powell**, Luxel Corp.

Please see page 23 for details.



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Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6687

UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III

Conference Chairs: **Howard A. MacEwen**, SRS Technologies; **James B. Breckinridge**, Jet Propulsion Lab.

Program Committee: **Webster C. Cash, Jr.**, Univ. of Colorado/Boulder; **Alan L. Duncan**, Lockheed Martin Advanced Technology Ctr.; **Lee D. Feinberg**, NASA Goddard Space Flight Ctr.; **David T. Leisawitz**, NASA Goddard Space Flight Ctr.; **Daniel F. Lester**, The Univ. of Texas/Austin; **Gary Matthews**, ITT Industries, Inc.; **David W. Miller**, Massachusetts Institute of Technology; **Ronald S. Polidan**, Northrop Grumman Space Technology; **Wesley A. Traub**, Jet Propulsion Lab.; **Simon P. Worden**, NASA Ames Research Ctr.

Sunday 26 August

SESSION 1

Conv. Ctr. 29B Sun. 9:00 am to 12:10 pm

JWST

Chair: **Lee D. Feinberg**, NASA Goddard Space Flight Ctr.

9:00 am: **Architecture and design of the James Webb Space Telescope**, J. W. Arenberg, Northrop Grumman Space Technology [6687-01]

9:20 am: **Technology demonstration of large stable cryogenic composite structures for JWST**, C. B. Atkinson, J. W. Arenberg, L. Gilman, Northrop Grumman Space Technology; T. Messer, P. May, D. Moon, K. Patton, J. York, S. Backovsky, J. Tucker, M. Bluth, Alliant Techsystems Inc.; B. Eegholm, B. H. Eegholm, Swales Aerospace; B. N. Saif, Space Telescope Science Institute; R. A. M. Keski-Kuha, Goddard Space Flight Ctr.; J. R. Kegley, Marshall Space Flight Ctr. [6687-02]

9:40 am: **Development of electronic speckle pattern interferometry for testing JWST composite structures**, R. A. M. Keski-Kuha, NASA Goddard Space Flight Ctr.; B. N. Saif, Space Telescope Science Institute; M. Bluth, Alliant Techsystems Inc.; B. H. Eegholm, Swales Aerospace; P. N. Blake, NASA Goddard Space Flight Ctr. [6687-03]

Coffee Break 10:00 to 10:30 am

10:30 am: **Testing the James Webb Space Telescope's backplane stability article: lessons learned and relearned**, J. W. Arenberg, Northrop Grumman Space Technology [6687-04]

10:50 am: **End-to-end commissioning demonstration of the James Webb Space Telescope on the JWST testbed telescope**, D. S. Acton, T. C. Towell, J. P. Schwenker, D. M. Shields, Ball Aerospace & Technologies Corp. [6687-05]

11:10 am: **Using multifield measurements to eliminate alignment degeneracies in the JWST testbed telescope**, E. M. E. Sabatke, D. S. Acton, J. P. Schwenker, T. C. Towell, L. B. Carey, Ball Aerospace & Technologies Corp. [6687-06]

11:30 am: **TRL-6 for JWST wavefront sensing and control**, B. H. Dean, L. D. Feinberg, D. L. Aronstein, C. W. Bowers, W. L. Hayden, R. G. Lyon, S. Shiri, J. S. Smith, NASA Goddard Space Flight Ctr.; D. S. Acton, L. B. Carey, A. R. Contos, E. M. E. Sabatke, J. P. Schwenker, D. M. Shields, T. C. Towell, Ball Aerospace & Technologies Corp.; F. Shi, Jet Propulsion Lab.; L. Meza, Northrop Grumman Space Technology [6687-07]

11:50 am: **Microshutter array system for James Webb Space Telescope**, M. J. Li, NASA Goddard Space Flight Ctr. [6687-08]

Lunch Break 12:10 to 1:40 pm

SESSION 2

Conv. Ctr. 29B Sun. 1:40 to 3:00 pm

Interferometry I

Chair: **Webster C. Cash, Jr.**, Univ. of Colorado/Boulder

1:40 pm: **System engineering the space infrared interferometric telescope (SPIRIT)**, T. T. Hyde, D. T. Leisawitz, S. A. Rinehart, NASA Goddard Space Flight Ctr. [6687-09]

2:00 pm: **The space infrared interferometric telescope (SPIRIT): optical system design considerations**, M. E. Wilson, D. T. Leisawitz, A. J. Martino, S. A. Rinehart, NASA Goddard Space Flight Ctr.; J. A. Croke, NASA Headquarters; J. L. Tveekrem, J. G. Budinoff, M. A. Quijada, T. T. Hyde, NASA Goddard Space Flight Ctr. [6687-10]

2:20 pm: **Mechanical design of the space infrared interferometric telescope (SPIRIT)**, J. G. Budinoff, D. T. Leisawitz, S. A. Rinehart, M. J. DiPirro, D. L. Jones, T. T. Hyde, B. Taylor, NASA Goddard Space Flight Ctr. [6687-11]

2:40 pm: **The SPIRIT thermal system**, M. J. DiPirro, C. Cottingham, R. F. Boyle, S. Ollendorf, D. T. Leisawitz, NASA Goddard Space Flight Ctr. [6687-12]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Conv. Ctr. 29B Sun. 3:30 to 4:50 pm

Interferometry II

Chair: **David T. Leisawitz**, NASA Goddard Space Flight Ctr.

3:30 pm: **Wide-field imaging interferometry: an enabling technique for high-angular-resolution astronomy**, S. A. Rinehart, NASA Goddard Space Flight Ctr.; T. Armstrong, Naval Research Lab.; B. J. Frey, J. Jung, NASA Goddard Space Flight Ctr.; J. Kirk, Orbital Sciences Corp.; D. T. Leisawitz, D. B. Leviton, R. G. Lyon, A. J. Martino, NASA Goddard Space Flight Ctr.; L. G. Mundy, Univ. of Maryland/College Park; T. A. Pauls, Naval Research Lab.; S. Schurr, Univ. of Waterloo (Canada) [6687-13]

3:50 pm: **Direct UV/optical imaging of stellar surfaces: the Stellar Imager Vision Mission**, K. G. Carpenter, R. G. Lyon, NASA Goddard Space Flight Ctr.; C. J. Schrijver, Lockheed Martin Advanced Technology Ctr.; M. Karovska Neily, Harvard-Smithsonian Ctr. for Astrophysics; D. Mozurkewich, Seabrook Engineering [6687-14]

4:10 pm: **Wavefront sensing and closed-loop control for the Fizeau interferometry testbed**, R. G. Lyon, K. G. Carpenter, A. Liu, NASA Goddard Space Flight Ctr.; P. Petrone III, P. Dogoda, D. Reed, Sigma Space Corp.; D. Mozurkewich, Seabrook Engineering [6687-15]

4:30 pm: **Fresnel interferometric arrays for space imaging: testbed results**, D. Serre, L. Koehlin, P. Deba, Observatoire Midi-Pyrénées (France) [6687-16]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

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Monday 27 August

SESSION 4

Conv. Ctr. 29B Mon. 8:30 to 10:30 am

Systems and Concepts

Chair: James B. Breckinridge, Jet Propulsion Lab.

8:30 am: **Ares V launch capability enables future space telescopes**, H. P. Stahl, NASA Marshall Space Flight Ctr. [6687-17]

8:50 am: **Large infrared telescopes in the exploration era: SAFIR**, D. F. Lester, The Univ. of Texas at Austin; C. F. Lillie, Northrop Grumman Space Technology [6687-18]

9:10 am: **Decision making framework to determine the value of servicing space telescopes**, M. Baldesarra, D. W. Miller, Massachusetts Institute of Technology [6687-19]

9:30 am: **Instrumentation for the next-generation cryogenic spaceborne far-IR observatories**, C. M. Bradford, M. E. Kenyon, W. A. Holmes, C. G. Paine, P. F. Goldsmith, H. W. Yorke, M. W. Dragovan, Jet Propulsion Lab. [6687-20]

9:50 am: **CALISTO: a cryogenic far-infrared/submillimeter observatory**, P. F. Goldsmith, C. M. Bradford, M. W. Dragovan, B. Khayatian, H. W. Yorke, Jet Propulsion Lab.; J. Zmuidzinas, California Institute of Technology; C. G. Paine, C. M. Satter, R. A. Lee, Jet Propulsion Lab. [6687-21]

10:10 am: **DESTINY: the dark energy space telescope**, B. A. Pasquale, NASA Goddard Space Flight Ctr.; R. A. Woodruff, Lockheed Martin Space Co.; T. R. Lauer, National Optical Astronomy Observatory; D. J. Benford, NASA Goddard Space Flight Ctr. [6687-22]

Coffee Break 10:30 to 11:00 am

SESSION 5

Conv. Ctr. 29B Mon. 11:00 am to 12:00 pm

Telescopes and Mirrors I

Chair: Alan L. Duncan, Lockheed Martin Advanced Technology Ctr.

11:00 am: **Comparison of on-axis three-mirror-anastigmat telescopes**, M. L. Lampton, M. J. Sholl, Univ. of California/Berkeley [6687-23]

11:20 am: **Manufacturing and control of the aspherical mirrors for the Korsch telescope of the French satellite Pleiades**, D. Fappani, H. Ducollet, Société Européenne de Systèmes Optiques (France) [6687-24]

11:40 am: **Unique space telescope concepts using CFRP composite thin-shelled mirrors and structures**, R. C. Romeo, R. N. Martin, Composite Mirror Applications, Inc. [6687-25]

Lunch Break 12:00 to 1:30 pm

SESSION 6

Conv. Ctr. 29B Mon. 1:30 to 2:30 pm

Telescopes and Mirrors II

Chair: Alan L. Duncan, Lockheed Martin Advanced Technology Ctr.

1:30 pm: **Novel concept deformable membrane mirror to correct large amplitude aberrations**, J. D. Moore, Jr., SRS Technologies, Inc. [6687-26]

1:50 pm: **Primary mirror shape control for athermalization using embedded sensors**, E. O. Jordan, D. W. Miller, Massachusetts Institute of Technology [6687-27]

2:10 pm: **Integrated modeling of point-spread function stability of the SNAP telescope**, R. Besuner, Lawrence Berkeley National Lab.; M. J. Sholl, Univ. of California/Berkeley; M. D. Lieber, M. L. Kaplan, Ball Aerospace & Technologies Corp. [6687-28]

SESSION 7

Conv. Ctr. 29B Mon. 2:30 to 3:10 pm

Wavefront Sensing and Control (WFSC)

Chair: Alan L. Duncan, Lockheed Martin Advanced Technology Ctr.

2:30 pm: **Dynamic wavefront control for lightweight mirrors in space telescopes**, L. E. Cohan, D. W. Miller, Massachusetts Institute of Technology [6687-29]

2:50 pm: **Adaptive cross-correlation algorithm and experiment of extended scene Shack-Hartmann wavefront sensing**, E. Sidick, R. M. Morgan, J. J. Green, C. M. Ohara, D. C. Redding, Jet Propulsion Lab. [6687-30]

Tuesday 28 August

SESSION 8

Joint Session with Conference 6693: Techniques and Instrumentation for Detection of Exoplanets III

Conv. Ctr. 29B Tues. 8:00 to 9:50 am

TPF-External Occulter I

Chair: Wesley A. Traub, Jet Propulsion Lab.

8:00 am: **External occulter for direct observation of exoplanets: an overview (Invited Paper)**, W. C. Cash, Jr., E. R. Schindhelm, Univ. of Colorado/Boulder; J. W. Arenberg, A. S. Lo, R. S. Polidan, Northrop Grumman Space Technology; N. J. Kasdin, R. J. Vanderbei, Princeton Univ.; S. R. Heap, M. J. Kuchner, NASA Goddard Space Flight Ctr.; S. Kilston, M. C. Noecker, Ball Aerospace & Technologies Corp.; S. Seager, Massachusetts Institute of Technology [6687-31]

8:30 am: **The TPF-O science program (Invited Paper)**, S. R. Heap, NASA Goddard Space Flight Ctr. [6687-32]

9:00 am: **New Worlds Observer: system and mission architecture (Invited Paper)**, J. W. Arenberg, Northrop Grumman Space Technology [6693-01]

9:30 am: **TPF-O design reference mission**, D. J. Lindler, Sigma Space Corp. [6687-33]

Coffee Break 9:50 to 10:20 am

SESSION 9

Joint Session with Conference 6693: Techniques and Instrumentation for Detection of Exoplanets III

Conv. Ctr. 29B Tues. 10:20 am to 12:00 pm

TPF-External Occulter II

Chair: Wesley A. Traub, Jet Propulsion Lab.

10:20 am: **New Worlds Observer optical performance**, A. S. Lo, T. Glassman, C. F. Lillie, Northrop Grumman Space Technology [6687-34]

10:40 am: **A UV/optical telescope for the New Worlds Observer mission**, C. F. Lillie, D. R. Dailey, A. S. Lo, R. S. Polidan, Northrop Grumman Space Technology [6687-35]

11:00 am: **Conceptual design of the TPF-O SC bus**, L. R. Purves, NASA Goddard Space Flight Ctr. [6687-36]

11:20 am: **Detecting and characterizing extra-solar Earth-like planets with two external occulter**, S. L. Hunyadi, Jet Propulsion Lab.; A. S. Lo, Northrop Grumman Space Technology [6693-02]

11:40 am: **Externally occulted terrestrial planet finder coronagraph: simulations and sensitivities**, R. G. Lyon, S. R. Heap, NASA Goddard Space Flight Ctr.; A. S. Lo, Northrop Grumman Space Technology; W. C. Cash, Jr., Univ. of Colorado/Boulder; G. D. Starkman, Case Western Reserve Univ.; R. J. Vanderbei, N. J. Kasdin, Princeton Univ.; C. J. Copi, Case Western Reserve Univ. [6687-37]

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

OPTICS

Conference 6687 • Conv. Ctr. 29B

SESSION 10

Joint Session with Conference 6693: Techniques and Instrumentation for Detection of Exoplanets III

Conv. Ctr. 29B Tues. 1:30 to 2:50 pm

TPF-External Occulter III

Chair: Daniel R. Coulter, Jet Propulsion Lab.

- 1:30 pm: **Optimal design of petal-shaped occulter for extra-solar planet detection**, E. J. Cady, N. J. Kasdin, R. J. Vanderbei, R. Belikov, Princeton Univ. [6687-03]
- 1:50 pm: **Laboratory studies of petal-shaped occulter**, E. R. Schindhelm, W. C. Cash, Jr., A. F. Shipley, P. Oakley, Univ. of Colorado/Boulder; D. B. Leviton, Ball Aerospace & Technologies Corp. [6693-04]
- 2:10 pm: **Alignment of a terrestrial planet finder occulter at 20-100 megameters**, M. C. Noecker, Ball Aerospace & Technologies Corp. [6693-05]
- 2:30 pm: **Dynamics and control of a space based extra-solar planet imaging mission consisting of a telescope and multiple occulter**, E. Kolemén, N. J. Kasdin, Princeton Univ. [6687-38]
- Coffee Break 2:50 to 3:20 pm

SESSION 11

Joint Session with Conference 6693: Techniques and Instrumentation for Detection of Exoplanets III

Conv. Ctr. 29B Tues. 3:20 to 4:40 pm

Formation Flying

Chair: David W. Miller, Massachusetts Institute of Technology

- 3:20 pm: **Formation flying system design for a planet-finding telescope occulter system**, J. A. Leitner, NASA Goddard Space Flight Ctr. [6687-39]
- 3:40 pm: **Flight-like ground demonstration of precision formation flying spacecraft**, D. P. Scharf, J. A. Keim, F. Y. Hadaegh, E. G. Benowitz, P. R. Lawson, Jet Propulsion Lab. [6693-06]
- 4:00 pm: **Formation control and reconfiguration through synthetic imaging formation flying testbed (SIFFT)**, S. Mohan, H. Sakamoto, D. W. Miller, Massachusetts Institute of Technology [6687-40]
- 4:20 pm: **Satellite formation flight and realignment maneuver demonstration aboard the International Space Station**, C. P. Mandy, A. Saenz-Otero, D. W. Miller, Massachusetts Institute of Technology ... [6687-41]

SESSION 12

Joint Session with Conference 6693: Techniques and Instrumentation for Detection of Exoplanets III

Conv. Ctr. 29B Tues. 4:40 to 5:50 pm

TPF-Interferometer

Chair: Daniel R. Coulter, Jet Propulsion Lab.

- 4:40 pm: **Terrestrial planet finder interferometer: 2006-2007 progress and plans**, P. R. Lawson, O. P. Lay, R. O. Gappinger, A. Ksendzov, S. R. Martin, R. D. Peters, D. P. Scharf, C. A. Beichman, S. C. Unwin, Jet Propulsion Lab. [6693-07]
- 5:10 pm: **TPF-Emma: concept study of a planet finding space interferometer**, S. R. Martin, Jet Propulsion Lab. [6693-08]
- 5:30 pm: **Planet-finding performance of the TPF-I Emma architecture**, O. P. Lay, S. R. Martin, S. L. Hunyadi, Jet Propulsion Lab. [6693-09]

X-Ray/UV Optics Technical Event

Marriott Mission Hills Tues. 8:00 to 10:00 pm

Chair: Forbes R. Powell, Luxel Corp.

Please see page 23 for details.

Wednesday 29 August

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **New Worlds Observer: future mission architecture and technology roadmaps**, R. S. Polidan, Northrop Grumman Space Technology; W. C. Cash, Jr., Univ. of Colorado/Boulder; C. F. Lillie, A. S. Lo, J. W. Arenberg, Northrop Grumman Space Technology [6687-42]
- ✓ **An optical model of the wide-field imaging interferometry testbed**, A. J. Martino, D. T. Leisawitz, NASA Goddard Space Flight Ctr.; A. K. Thompson, Swales Aerospace; S. A. Rinehart, B. J. Frey, NASA Goddard Space Flight Ctr. [6687-43]
- ✓ **Cryogenic far-infrared detectors for the space infrared interferometric telescope (SPIRIT)**, D. J. Benford, S. A. Rinehart, T. T. Hyde, D. T. Leisawitz, NASA Goddard Space Flight Ctr. [6687-44]
- ✓ **Beam combination for stellar imager**, D. Mozurkewich, Seabrook Engineering; K. G. Carpenter, R. G. Lyon, NASA Goddard Space Flight Ctr. [6687-45]
- ✓ **New Worlds Observer tolerance overview**, A. F. Shipley, W. C. Cash, Jr., Univ. of Colorado/Boulder; J. W. Arenberg, A. S. Lo, Northrop Grumman Space Technology [6687-46]
- ✓ **Development update for the Orion MIDEX star formation survey mission**, P. A. Scowen, Arizona State Univ.; S. Nikzad, Jet Propulsion Lab.; T. J. Veach, Arizona State Univ.; M. N. Beasley, Univ. of Colorado/Boulder [6687-47]
- ✓ **Thermal calculation and structure analysis of space main optical telescope**, Z. Chen, Hangzhou Dianzi Univ. (China); Z. Chen, S. Yang, H. Shi, National Astronomical Observatories (China) [6687-48]
- ✓ **Coadding techniques for image-based wavefront sensing for segmented-mirror telescopes**, J. S. Smith, D. L. Aronstein, B. H. Dean, NASA Goddard Space Flight Ctr.; D. S. Acton, Ball Aerospace & Technologies Corp. [6687-49]
- ✓ **White-light demonstration of one hundred parts per billion irradiance suppression in air by new starshade occulter**, D. B. Leviton, NASA Goddard Space Flight Ctr.; W. C. Cash, Jr., B. T. Gleeson, M. J. Kaiser, S. A. Levine, Univ. of Colorado/Boulder; A. S. Lo, Northrop Grumman Space Technology; E. R. Schindhelm, A. F. Shipley, Univ. of Colorado/Boulder [6687-50]

Courses of Related Interest

See SPIE Cashier for information.

SC134 Optical Design Fundamentals for Infrared Systems (Riedl)
Sunday 26, 8:30 am - 5:30 pm

SC152 Infrared Focal Plane Arrays (Dereniak, Hubbs) Sunday 26,
1:30 - 5:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/
Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

SC659 Understanding Reflective Optical Design (Contreras)
Monday 27, 8:30 am - 5:30 pm

Conference 6688 • Conv. Ctr. 28E

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6688

Optics for EUV, X-Ray, and Gamma-Ray Astronomy III

Conference Chairs: **Stephen L. O'Dell**, NASA Marshall Space Flight Ctr.; **Giovanni Pareschi**, Osservatorio Astronomico di Brera

Program Committee: **Bernd E. Aschenbach**, Max-Planck-Institut für extraterrestrische Physik (Germany); **Marcos Bavdaz**, European Space Agency (Netherlands); **Webster C. Cash, Jr.**, Univ. of Colorado/Boulder; **Finn E. Christensen**, Danish National Space Ctr. (Denmark); **Oberto Citterio**, Osservatorio Astronomico di Brera (Italy); **Peter Friedrich**, Max-Planck-Institut für extraterrestrische Physik (Germany); **Paul Gorenstein**, Harvard-Smithsonian Ctr. for Astrophysics; **Fiona A. Harrison**, California Institute of Technology; **René Hudec**, Astronomical Institute (Czech Republic); **Hideyo Kunieda**, Japan Aerospace Exploration Agency (Japan); **Mikhail N. Pavlinsky**, Space Research Institute (Russia); **Robert Petre**, NASA Goddard Space Flight Ctr.; **Brian D. Ramsey**, NASA Marshall Space Flight Ctr.; **Paul B. Reid**, Harvard-Smithsonian Ctr. for Astrophysics; **Suzanne E. Romaine**, Harvard-Smithsonian Ctr. for Astrophysics; **John F. Seely**, Naval Research Lab.; **Gerald K. Skinner**, Ctr. d'Etude Spatiale des Rayonnements (France); **Yuzuru Tawara**, Nagoya Univ. (Japan); **Peter von Ballmoos**, Ctr. d'Etude Spatiale des Rayonnements (France); **Richard Willingale**, Univ. of Leicester (United Kingdom); **David L. Windt**, Reflective X-Ray Optics LLC; **William W. Zhang**, NASA Goddard Space Flight Ctr.

Tuesday 28 August

X-Ray/UV Optics Technical Event

Marriott Mission Hills Tues. 8:00 to 10:00 pm

Chair: **Forbes R. Powell**, Luxel Corp.

Please see page 23 for details.

Wednesday 29 August

SESSION 1

Conv. Ctr. 28E Wed. 8:20 to 10:20 am

Telescope Systems

Chairs: **Yasushi Ogasaka**, Nagoya Univ. (Japan); **Robert Petre**, NASA Goddard Space Flight Ctr.

8:20 am: **Constellation-X mirror technology development status and plan**, W. W. Zhang, NASA Goddard Space Flight Ctr.; K. Chan, Univ. of Maryland/Baltimore County; D. A. Content, NASA Goddard Space Flight Ctr.; T. J. Hadjimichael, C. C. He, M. Hong, Swales Aerospace; J. P. Lehan, Univ. of Maryland/Baltimore County; J. M. Mazzarella, Swales Aerospace; D. Nguyen, NASA Goddard Space Flight Ctr.; L. Olsen, Swales Aerospace; S. M. Owens, R. Petre, T. T. Saha, NASA Goddard Space Flight Ctr.; M. Sharpe, Swales Aerospace; G. Sneiderman, J. Sturm, T. E. Wallace, NASA Goddard Space Flight Ctr.; M. V. Gubarev, Universities Space Research Association; W. D. Jones, S. L. O'Dell, NASA Marshall Space Flight Ctr.; P. B. Reid, Harvard-Smithsonian Ctr. for Astrophysics [6688-01]

8:40 am: **Thin-foil multilayer-supermirror hard-x-ray telescopes for InFOCuS/SUMIT balloon experiments and NeXT satellite program**, Y. Ogasaka, H. Kunieda, K. Tamura, T. Miyazawa, Y. Fukaya, T. Iwahara, N. Sasaki, A. Furuzawa, Y. Haba, Y. Kanou, D. Ueno, K. Yamashita, Nagoya Univ. (Japan); T. Okajima, J. Tueller, P. J. Serlemitsos, Y. Soong, K. Chan, NASA Goddard Space Flight Ctr.; E. Miyata, H. Tsunemi, Osaka Univ. (Japan); R. Shibata, Nikon Corp. (Japan) [6688-02]

9:00 am: **Development of a hard-x-ray telescope for the Constellation-X mission**, S. E. Romaine, Harvard-Smithsonian Ctr. for Astrophysics; S. Basso, Osservatorio Astronomico di Brera (Italy); R. J. Bruni, Harvard-Smithsonian Ctr. for Astrophysics; W. Burkert, Max-Planck-Institut für extraterrestrische Physik (Germany); O. Citterio, V. Cotroneo, Osservatorio Astronomico di Brera (Italy); D. E. Engelhaupt, The Univ. of Alabama in Huntsville; M. J. Freyberg, Max-Planck-Institut für extraterrestrische Physik (Germany); P. Gorenstein, Harvard-Smithsonian Ctr. for Astrophysics; M. V. Gubarev, Universities Space Research Association; G. D. Hartner, Max-Planck-Institut für extraterrestrische Physik (Germany); F. Mazzoleni, Osservatorio Astronomico di Brera (Italy); S. L. O'Dell, NASA Marshall Space Flight Ctr.; G. Pareschi, Osservatorio Astronomico di Brera (Italy); B. D. Ramsey, NASA Marshall Space Flight Ctr.; C. O. Speegle, Raytheon-ITSS; D. Spiga, Osservatorio Astronomico di Brera (Italy) . [6688-03]

9:20 am: **Explorer of diffuse structures and gamma-ray burst explosions: EDGE**, J. A. den Herder, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); L. Piro, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); T. Ohashi, Tokyo Metropolitan Univ. (Japan) [6688-04]

9:40 am: **GRI: focusing on the evolving violent universe**, J. Knödseder, Ctr. d'Etude Spatiale des Rayonnements (France) [6688-05]

10:00 am: **A wide-field hybrid x-ray telescope for a lunar-based gamma-ray burst observatory**, P. Gorenstein, Harvard-Smithsonian Ctr. for Astrophysics [6688-06]

Coffee Break 10:20 to 10:50 am

SESSION 2

Conv. Ctr. 28E Wed. 10:50 am to 12:10 pm

Telescope Design and Optimization

Chairs: **Bernd E. Aschenbach**, Max-Planck-Institut für extraterrestrische Physik (Germany); **Paul Gorenstein**, Harvard-Smithsonian Ctr. for Astrophysics

10:50 am: **Design and optimization of the wide-field spectrometer for EDGE mission**, Y. Tawara, I. Sakurai, Nagoya Univ. (Japan); J. A. den Herder, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); G. Cusumano, T. Mineo, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); M. Barbera, Univ. degli Studi di Palermo (Italy) and Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); E. G. Perinati, Osservatorio Astronomico di Palermo G.S. Vaiana (Italy) [6688-07]

11:10 am: **New design for the Constellation-X spectroscopy x-ray telescope (SXT)**, P. B. Reid, Harvard-Smithsonian Ctr. for Astrophysics; M. Freeman, Smithsonian Astrophysical Observatory; T. T. Saha, NASA Goddard Space Flight Ctr. [6688-08]

11:30 am: **An alternative optical design for x-ray telescopes**, F. E. Zocchi, D. Vernani, Media Lario S.r.l. (Italy) [6688-09]

11:50 am: **SIMBOL-X: x-ray baffle for stray-light reduction**, G. Cusumano, M. Artale, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); V. Cotroneo, Osservatorio Astronomico di Brera (Italy); T. Mineo, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); G. Pareschi, Osservatorio Astronomico di Brera (Italy) [6688-10]

Lunch/Exhibition Break 12:10 to 1:40 pm

OPTICS

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SESSION 3

Conv. Ctr. 28E Wed. 1:40 to 3:00 pm

Performance Prediction and Calibration

Chairs: **Oberto Citterio**, Osservatorio Astronomico di Brera (Italy);
Paul B. Reid, Harvard-Smithsonian Ctr. for Astrophysics

1:40 pm: **Establishing the response function of the x-ray telescopes onboard the Suzaku satellite**, S. Okada, Institute of Space and Astronautical Science (Japan); H. Mori, Kyoto Univ. (Japan); R. Iizuka, A. Itoh, H. Inoue, Y. Yokoyama, M. Ebara, Y. Maeda, M. Ishida, Institute of Space and Astronautical Science (Japan); T. Hayashi, Y. Ishisaki, Tokyo Metropolitan Univ. (Japan); A. Furuzawa, H. Kunieda, Nagoya Univ. (Japan) [6688-11]

2:00 pm: **What we learned from the first 2.5 years of the Swift XRT experiment**, A. Moretti, Osservatorio Astronomico di Brera (Italy) ... [6688-12]

2:20 pm: **HEW simulations and quantification of the microroughness requirements for the soft and hard x-ray telescopes SIMBOL-X and EDGE**, D. Spiga, Osservatorio Astronomico di Brera (Italy); G. Cusumano, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); G. Pareschi, Osservatorio Astronomico di Brera (Italy) [6688-13]

2:40 pm: **Grazing incidence of MeV protons**, B. E. Aschenbach, Max-Planck-Institut für extraterrestrische Physik (Germany) [6688-14]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 28E Wed. 3:30 to 5:10 pm

Hard X-Ray and Gamma-Ray Imaging

Chairs: **Jürgen Knödlseeder**, Ctr. d'Etude Spatiale des Rayonnements (France); **Mikhail N. Pavlinsky**, Space Research Institute (Russia)

3:30 pm: **Hard x-ray telescope concentrator for astrophysical mission Spectrum-X-Gamma**, M. N. Pavlinsky, V. A. Arefiev, Space Research Institute (Russia); M. Revnivtsev, E. Churazov, M. Gilfanov, Space Research Institute (Russia) and Max-Planck-Institute for Astrophysics (Germany); S. Grigorovich, D. N. Litvin, RFNC-VNIIEF (Russia); I. Lapchov, V. A. Levin, V. V. Akimov, N. Semena, A. Tkachenko, Space Research Institute (Russia); A. Vikhlinin, Space Research Institute (Russia) and Harvard-Smithsonian Ctr. for Astrophysics; R. Sunyaev, Space Research Institute (Russia) and Max-Planck-Institute for Astrophysics (Germany) [6688-15]

3:50 pm: **Gamma-ray waveguides for astronomy**, D. Tourneir, R. Epstein, M. A. Hoffbauer, S. J. Pendleton, Los Alamos National Lab. [6688-16]

4:10 pm: **Development status of a Laue lens project for gamma-ray astronomy**, F. Frontera, V. Carassiti, F. Evangelisti, G. Loffredo, A. Pisa, Univ. degli Studi di Ferrara (Italy); E. Caroli, G. Landini, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); K. H. Andersen, P. Courtois, Institut Laue-Langevin (France) [6688-17]

4:30 pm: **R and D progress on second-generation crystals for Laue lens applications**, N. Barriere, P. von Ballmoos, Ctr. d'Etude Spatiale des Rayonnements (France); P. Bastie, Univ. Joseph Fourier (France); P. Courtois, Institut Laue-Langevin (France); N. V. Abrosimov, Institut für Kristallzüchtung (Germany); K. H. Andersen, Institut Laue-Langevin (France); T. Buslaps, European Synchrotron Radiation Facility (France); T. Camus, Ctr. d'Etude Spatiale des Rayonnements (France); H. Halloin, Collège de France (France); J. Knödlseeder, G. Roudil, Ctr. d'Etude Spatiale des Rayonnements (France); D. Serre, Observatoire Midi-Pyrénées (France); G. K. Skinner, NASA Goddard Space Flight Ctr. [6688-18]

4:50 pm: **Adaptive lobster-eye hard x-ray telescope with high-angular resolution and wide field of view**, V. Grubsky, M. Gertsenshteyn, K. Shoemaker, T. P. Jansson, Physical Optics Corp. [6688-19]

Poster Previews 5:10 to 5:30 pm

Poster authors will give a 1-2 minute preview of their poster presentation.

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Chairs: **Stephen L. O'Dell**, NASA Marshall Space Flight Ctr.;
Giovanni Pareschi, Osservatorio Astronomico di Brera (Italy)

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **A hard x-ray telescope science enhancement package for the Constellation-X mission**, B. D. Ramsey, NASA Marshall Space Flight Ctr.; P. Gorenstein, Harvard-Smithsonian Ctr. for Astrophysics [6688-40]
- ✓ **A diffraction limited dual-band x-ray telescope**, C. Braig, P. Predehl, Max-Planck-Institut für extraterrestrische Physik (Germany) [6688-41]
- ✓ **The problem of the calibration of SIMBOL-X x-ray telescope**, S. Basso, G. Pareschi, D. Spiga, Osservatorio Astronomico di Brera (Italy) . [6688-42]
- ✓ **Simulations of the HEW of multishell x-ray optical modules in soft and hard x-rays**, D. Spiga, Osservatorio Astronomico di Brera (Italy) . [6688-43]
- ✓ **Salient features of MACA and CMACA systems and their applications**, C. Ratnam, S. L. Goud, Osmania Univ. (India); V. L. Rao, New Science College (India) [6688-44]
- ✓ **Optical constants in the hard x-ray/soft gamma-ray range of selected materials for multilayer reflectors**, C. P. Jensen, Danish National Space Ctr. (Denmark); S. E. Romaine, R. J. Bruni, Smithsonian Astrophysical Observatory; F. E. Christensen, Danish National Space Ctr.; Z. Zhong, Brookhaven National Lab. [6688-45]
- ✓ **A new fabrication method of mirror substrate with multistage closed shell for high-throughput x-ray telescope**, Y. Tawara, I. Sakurai, T. Masuda, T. Torii, Nagoya Univ. (Japan) [6688-46]
- ✓ **Experimental results on slumped glass x-ray mirror segments**, P. Friedrich, H. W. Bräuninger, M. Fürmetz, A. Mazur, M. Vongehr, Max-Planck-Institut für extraterrestrische Physik (Germany) [6688-47]
- ✓ **Characterization of thin plastic foils for applications in x-ray optics technology**, A. Taibi, Univ. degli Studi di Ferrara (Italy) and Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); M. Barbera, Univ. degli Studi di Palermo (Italy) and Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); G. Pareschi, Osservatorio Astronomico di Brera (Italy); H. W. Schnopper, Harvard-Smithsonian Ctr. for Astrophysics [6688-48]
- ✓ **Mounting and alignment of full-shell replicated x-ray optics**, M. V. Gubarev, Universities Space Research Association; W. Arnold, Jacobs Engineering Group Inc.; T. J. Kester, B. D. Ramsey, M. E. Smithers, NASA Marshall Space Flight Ctr. [6688-49]
- ✓ **Thermal shielding of the SIMBOL-X mirror assembly**, A. Collura, Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); P. Attina, Alcatel Alenia Space (Italy); M. Barbera, Univ. degli Studi di Palermo (Italy) and Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); A. Ferri, Alcatel Alenia Space (Italy); G. Pareschi, Osservatorio Astronomico di Brera (Italy); E. G. Perinati, Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); F. R. Powell, Luxel Corp. [6688-50]
- ✓ **A soft x-ray polarimeter designed for broadband x-ray telescopes**, H. L. Marshall, Massachusetts Institute of Technology [6688-51]

Thursday 30 August

SESSION 5

Conv. Ctr. 28E Thurs. 8:40 to 10:00 am

Multilayer Coatings

Chairs: **Suzanne E. Romaine**, Harvard-Smithsonian Ctr. for Astrophysics; **David L. Windt**, Reflective X-Ray Optics LLC

8:40 am: **Multilayer deposition techniques for improved performance**, D. L. Windt, Reflective X-ray Optics LLC [6688-20]

9:00 am: **Characterization of Pt/C multilayer at 200-keV soft gamma rays**, Y. Ogasaka, T. Iwahara, T. Miyazawa, Y. Fukaya, N. Sasaki, K. Tamura, Y. Kanou, H. Kunieda, K. Yamashita, Nagoya Univ. (Japan) [6688-21]

9:20 am: **Stacked depth-graded multilayer for hard x-rays measured up to 140 keV**, C. P. Jensen, F. E. Christensen, Danish National Space Ctr. (Denmark); S. E. Romaine, R. J. Bruni, Smithsonian Astrophysical Observatory; Z. Zhong, Brookhaven National Lab. [6688-22]

9:40 am: **Light material coatings for soft-x-ray reflectivity enhancement**, V. Cotroneo, G. Pareschi, D. Spiga, Osservatorio Astronomico di Brera (Italy); M. Barbera, Univ. degli Studi di Palermo (Italy) and Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); S. E. Romaine, R. J. Bruni, Harvard-Smithsonian Ctr. for Astrophysics [6688-24]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 28E Thurs. 10:30 to 11:30 am

Spectroscopy

Chair: **John F. Seely**, Naval Research Lab.

10:30 am: **Comparison of solar spectra from the Hinode extreme ultraviolet imaging spectrometer to preflight calibrations**, J. F. Seely, Naval Research Lab.; U. Feldman, Artep Inc.; C. M. Brown, Naval Research Lab. ... [6688-25]

10:50 am: **Fabrication and characterization of blazed transmission gratings for x-ray astronomy**, R. K. Heilmann, M. Ahn, K. A. Flanagan, M. L. Schattenburg, Massachusetts Institute of Technology [6688-26]

11:10 am: **Spectrometer concept and design using a blazed transmission grating for x-ray astronomy**, K. A. Flanagan, J. E. Davis, R. K. Heilmann, D. P. Huenemoerder, A. M. Levine, H. L. Marshall, G. Y. Prigozhin, G. R. Ricker, Jr., M. L. Schattenburg, N. S. Schulz, Massachusetts Institute of Technology; A. P. Rasmussen, Stanford Linear Accelerator Ctr. [6688-27]

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

SESSION 7

Conv. Ctr. 28E Thurs. 1:00 to 3:00 pm

Mirror Fabrication and Characterization I

Chairs: **Finn E. Christensen**, Danish National Space Ctr. (Denmark); **William W. Zhang**, NASA Goddard Space Flight Ctr.

1:00 pm: **Progress in x-ray optics development with formed glass and silicon wafers**, R. Hudec, Astronomical Institute (Czech Republic); L. Pina, Czech Technical Univ. in Prague (Czech Republic); V. Semencova, REFLEX s.r.o. (Czech Republic); M. Skulinova, Astronomical Institute (Czech Republic); L. Sveda, Czech Technical Univ. in Prague (Czech Republic); A. J. Inneman, REFLEX s.r.o. (Czech Republic); M. Mika, Institute of Chemical Technology (Czech Republic); J. Sik, ON Semiconductor Czech Republic (Czech Republic) [6688-28]

1:20 pm: **Fabrication of mirror segments for the Constellation-X mission**, W. W. Zhang, NASA Goddard Space Flight Ctr.; M. Hong, J. M. Mazzarella, M. Sharpe, Swales Aerospace; T. T. Saha, NASA Goddard Space Flight Ctr.; M. V. Gubarev, Universities Space Research Association; W. D. Jones, S. L. O'Dell, NASA Marshall Space Flight Ctr. [6688-29]

1:40 pm: **X-ray imaging glass micro-pore optics**, M. J. Collon, M. W. Beijersbergen, cosine Research B.V. (Netherlands); K. Wallace, M. Bavdaz, European Space Agency (Netherlands); R. Fairbend, J. Ségué, D. Lacheze, E. Schyns, Photonis S.A.S. (France); M. K. Krumrey, Physikalisch-Technische Bundesanstalt (Germany); M. J. Freyberg, Max-Planck-Institut für extraterrestrische Physik (Germany) [6688-30]

2:00 pm: **Silicon pore optics for astrophysical x-ray missions**, M. W. Beijersbergen, M. J. Collon, R. Günther, S. Kraft, cosine Research B.V. (Netherlands); M. Bavdaz, K. Wallace, European Space Agency (Netherlands); M. K. Krumrey, Physikalisch-Technische Bundesanstalt (Germany); M. J. Freyberg, Max-Planck-Institut fuer extraterrestrische Physik (Germany)[6688-31]

2:20 pm: **The first light of a single-stage MEMS x-ray optic**, M. Koshiishi, Y. Ezoe, M. Mita, K. Mitsuda, Japan Aerospace Exploration Agency (Japan); A. Hoshino, Y. Ishisaki, Tokyo Metropolitan Univ. (Japan); T. Takano, R. Maeda, National Institute of Advanced Industrial Science and Technology (Japan) [6688-32]

2:40 pm: **Thin plastic foil x-ray optics with spiral geometry**, M. Barbera, Univ. degli Studi di Palermo (Italy) and Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); T. Mineo, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); E. G. Perinati, Osservatorio Astronomico di Palermo G.S. Vaiana (Italy); A. Taibi, Univ. degli Studi di Ferrara (Italy); H. W. Schnopper, Harvard-Smithsonian Ctr. for Astrophysics [6688-33]

Coffee Break 3:00 to 3:30 pm

SESSION 8

Conv. Ctr. 28E Thurs. 3:30 to 4:30 pm

Mirror Fabrication and Characterization II

Chair: **Webster C. Cash, Jr.**, Univ. of Colorado/Boulder

3:30 pm: **X-ray imaging and adaptive optics system for a 13.5-nm telescope**, S. Kitamoto, Y. Ohkubo, M. Tsujimoto, T. Ogita, K. Saitoh, M. Morii, Rikkyo Univ. (Japan) [6688-34]

3:50 pm: **Toward a complete metrologic solution for the mirrors for the Constellation-X Spectroscopy x-ray telescope**, J. P. Lehan, K. Chan, Univ. of Maryland/Baltimore County; T. J. Hadjimichael, Swales Aerospace; S. M. Owens, NASA Goddard Space Flight Ctr.; M. Hong, Swales Aerospace; W. W. Zhang, NASA Goddard Space Flight Ctr. [6688-35]

4:10 pm: **Testing of the mirrors for the Constellation-X Spectroscopy x-ray telescope with a refractive null**, J. P. Lehan, Univ. of Maryland/Baltimore County; T. J. Hadjimichael, Swales Aerospace; C. Skocik, Mantech International Corp.; D. A. Content, W. W. Zhang, NASA Goddard Space Flight Ctr. [6688-36]

SESSION 9

Conv. Ctr. 28E Thurs. 4:30 to 5:30 pm

Alignment and Mounting

Chair: **Brian D. Ramsey**, NASA Marshall Space Flight Ctr.

4:30 pm: **Breadboard micro-pore optic development for x-ray imaging**, K. Wallace, M. Bavdaz, European Space Agency (Netherlands); M. J. Collon, M. W. Beijersbergen, cosine Research B.V. (Netherlands); R. Fairbend, J. Ségué, E. Schyns, Photonis S.A.S. (France) [6688-37]

4:50 pm: **Alignment and integration techniques for mirror segment pairs on the Constellation-X telescope**, T. J. Hadjimichael, Swales Aerospace; J. P. Lehan, Univ. of Maryland/Baltimore County; L. Olsen, Swales Aerospace; S. M. Owens, T. T. Saha, NASA Goddard Space Flight Ctr.; K. Chan, Univ. of Maryland/Baltimore County; T. E. Wallace, W. W. Zhang, NASA Goddard Space Flight Ctr. [6688-38]

5:10 pm: **Mechanical and thermal analysis of the spectroscopy x-ray telescopes for the Constellation-X mission**, K. Chan, Univ. of Maryland/Baltimore County; V. Marquez, J. Sturm, W. W. Zhang, NASA Goddard Space Flight Ctr. [6688-39]

Conference 6689 • Conv. Ctr. 29A

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6689

Solar Physics and Space Weather Instrumentation II

Conference Chairs: **Silvano Fineschi**, Osservatorio Astronomico di Torino (Italy); **Rodney A. Viereck**, National Oceanic and Atmospheric Administration

Program Committee: **Jean-Marc Defise**, Ctr. Spatial de Liège (Belgium); **Leon Golub**, Harvard-Smithsonian Ctr. for Astrophysics; **Bernard V. Jackson**, Univ. of California/San Diego; **J. Daniel Moses**, Naval Research Lab.; **Pierre L. P. M. Rochus**, Ctr. Spatial de Liège (Belgium)

Sunday 26 August

SESSION 1

Conv. Ctr. 29A Sun. 8:40 to 11:30 am

The STEREO Mission

8:40 am: **The STEREO SECCHI Instrument Suite: integration, commissioning, and operation**, J. D. Moses, J. S. Newmark, R. A. Howard, Naval Research Lab. [6689-37]

9:00 am: **The STEREO SECCHI/COR1 Coronagraph**, J. M. Davila, NASA Goddard Space Flight Ctr.; W. T. Thompson, Emergent Information Technologies; O. C. St. Cyr, K. I. Mehalick, J. E. Mentzell, NASA Goddard Space Flight Ctr. [6689-39]

9:20 am: **The STEREO SECCHI/COR2 Coronagraph**, D. G. Socker, A. Vourlidas, S. P. Plunkett, C. M. Korendyke, Naval Research Lab.; R. W. Moyer II, Artep, Inc.; Q. Gong, Swales Aerospace [6689-38]

9:40 am: **The STEREO SECCHI/EUVI EUV Coronal Imager**, J. Wuelsel, J. R. Lemen, N. Nitta, Lockheed Martin Solar and Astrophysics Lab. [6689-40]

Coffee Break 10:00 to 10:30 am

10:30 am: **STEREO: heliospheric imager design, pre-flight, and in-flight response comparison**, J. A. L. Halain, E. Mazy, J. Defise, Univ. de Liège (Belgium); J. D. Moses, J. S. Newmark, C. M. Korendyke, Naval Research Lab.; C. J. Eyles, The Univ. of Birmingham (United Kingdom); R. A. Harrison, C. J. Davis, Rutherford Appleton Lab. (United Kingdom) [6689-02]

10:50 am: **In-orbit verification, calibration, and performance of the heliospheric imager on the STEREO mission**, C. J. Eyles, The Univ. of Birmingham (United Kingdom) and Rutherford Appleton Lab. (United Kingdom); C. J. Davis, R. A. Harrison, N. R. Waltham, Rutherford Appleton Lab. (United Kingdom); J. A. L. Halain, Univ. de Liège (Belgium); R. A. Howard, J. D. Moses, J. S. Newmark, S. P. Plunkett, Naval Research Lab. [6689-03]

11:10 am: **Design, development, and performance of the STEREO SECCHI CCD cameras**, N. R. Waltham, Rutherford Appleton Lab. (United Kingdom); C. J. Eyles, The Univ. of Birmingham (United Kingdom) and Rutherford Appleton Lab. (United Kingdom) [6689-04]

SESSION 2

Conv. Ctr. 29A Sun. 11:30 am to 12:10 pm

Observing the Solar Corona I

11:30 am: **UV-capped multilayer coatings for multiwavelength observations of the solar corona in the EUV/UV and visible-light**, S. Fineschi, Osservatorio Astronomico di Torino (Italy) [6689-05]

11:50 am: **HECOR: a helium coronagraphy aboard the Herschel sounding rocket**, F. Auchère, F. Rouesnel, J. Le Clec'h, J. Moalic, D. Barbet, M. Ravet-Krill, C. Hecquet, A. Jerome, F. Delmotte, Univ. Paris-Sud II (France) [6689-41]

Lunch Break 12:10 to 1:30 pm

SESSION 3

Conv. Ctr. 29A Sun. 1:30 to 2:30 pm

Observing the Solar Corona II

1:30 pm: **The solar ultraviolet magnetograph investigation**, E. A. West, K. Kobayashi, J. M. Davis, A. Gary, NASA Marshall Space Flight Ctr. ... [6689-06]

1:50 pm: **Optical design of a giant externally occulted coronagraph for the ASPIICS formation flying mission**, S. Vivès, Observatoire Astronomique de Marseille Provence (France); P. L. Lamy, Lab. d'Astrophysique de Marseille (France); M. Saisse, Observatoire Astronomique de Marseille-Provence (France); P. Levacher, J. Boit, Lab. d'Astrophysique de Marseille (France); S. L. Koutchmy, Institut d'Astrophysique de Paris (France) [6689-08]

2:10 pm: **SMEI observations in the STEREO era**, B. V. Jackson, A. Buffington, P. P. Hick, M. M. Bisi, E. A. Jensen, Univ. of California/San Diego ... [6689-01]

SESSION 4

Conv. Ctr. 29A Sun. 2:30 to 4:40 pm

Observing the Sun from GOES

2:30 pm: **Initial GOES 13 SXI on-orbit performance results**, S. M. Hill, V. J. Pizzo, D. Biesecker, A. Reinard, National Oceanic and Atmospheric Administration; J. R. Lemen, M. D. Morrison, R. A. Stern, P. R. Catura, D. Sabolish, T. Rink, Lockheed Martin Corp. [6689-10]

2:50 pm: **The solar x-ray imager on GOES-13: design, analysis and on-orbit performance**, J. E. Harvey, College of Optics & Photonics/Univ. of Central Florida; A. Krywonos, Florida Space Institute; M. Atanassova, Agfa-Gevaert Group (Belgium); P. L. Thompson, The Johns Hopkins Univ. Applied Physics Lab. [6689-11]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **Report on GOES SXI/XRS calibration effort**, A. Reinard, Univ. of Colorado/Boulder and National Oceanic and Atmospheric Administration; S. M. Hill, National Oceanic and Atmospheric Administration; S. Bailey, Virginia Polytechnic Institute and State Univ.; V. J. Pizzo, R. A. Viereck, National Oceanic and Atmospheric Administration [6689-13]

4:00 pm: **Solar extreme ultraviolet irradiance observations from GOES, R. A. Viereck**, National Oceanic and Atmospheric Administration [6689-14]

4:20 pm: **Analyses of GOES-13 EUV 5-channel spectra**, S. Guha, Swales Aerospace [6689-15]

4:40 pm: **EXIS: the next generation of solar EUV and x-ray sensors for GOES-R**, F. G. Eparvier, T. N. Woods, W. E. McClintock, P. C. Chamberlin, A. R. Jones, Univ. of Colorado/Boulder; R. A. Viereck, National Oceanic and Atmospheric Administration [6689-16]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 5

Conv. Ctr. 29A Mon. 8:30 am to 12:00 pm

Solar EUV Observing Systems

8:30 am: **SDO EVE EUV spectrograph optical design and performance**, D. A. Crotser, T. N. Woods, F. G. Eparvier, G. J. Ucker, R. A. Kohnert, M. A. Triplett, Univ. of Colorado/Boulder [6689-18]

8:50 am: **SDO EVE MEGS radiometric calibrations and results**, P. C. Chamberlin, T. N. Woods, F. G. Eparvier, D. A. Crotser, D. L. Woodraska, R. Hock, Univ. of Colorado/Boulder [6689-19]

9:10 am: **SDO EVE CCD and thin foil filter characterization and selection**, M. A. Triplett, D. A. Crotser, T. N. Woods, F. G. Eparvier, G. J. Ucker, R. A. Kohnert, Univ. of Colorado/Boulder; G. D. Berthiaume, D. M. Weitz, MIT Lincoln Lab.; R. E. Vest, National Institute of Standards and Technology ... [6689-20]

9:30 am: **SDO EVE ESP radiometric calibration and results**, L. V. Didkovsky, D. L. Judge, S. R. Wieman, M. Harmon, Univ. of Southern California; T. N. Woods, A. R. Jones, P. C. Chamberlin, D. L. Woodraska, B. Templeman, J. Harano, R. A. Kohnert, M. A. Triplett, F. G. Eparvier, Univ. of Colorado/Boulder; D. McMullin, Naval Research Lab.; M. L. Furst, R. E. Vest, National Institute of Standards and Technology [6689-21]

9:50 am: **A lightweight optics-free EUV spectrometer with substantially improved efficiency and spectral resolution**, L. V. Didkovsky, D. L. Judge, S. R. Wieman, Univ. of Southern California [6689-22]

Coffee Break 10:10 to 10:40 am

10:40 am: **Development and testing of a dual grating filter-free spectrometer for photometric solar EUV measurements**, S. R. Wieman, L. V. Didkovsky, D. L. Judge, M. Harmon, Univ. of Southern California; A. R. Jones, Univ. of Colorado/Boulder [6689-23]

11:00 am: **SWAP: a novel EUV telescope for space weather**, J. Defise, J. A. L. Halain, Univ. de Liège (Belgium); D. Berghmans, Royal Observatory of Belgium (Belgium); F. Denis, E. Mazy, P. L. P. M. Rochus, T. Thibert, Univ. de Liège (Belgium); B. Nicula, Royal Observatory of Belgium (Belgium); A. De Groof, Katholieke Univ. Leuven (Belgium); J. Hochedez, Royal Observatory of Belgium (Belgium); U. H. Schühle, Max-Planck-Institut für Sonnensystemforschung (Germany); M. Ravet-Krill, Univ. Paris-Sud II (France) [6689-24]

11:20 am: **AlxGa1-xN photo-detectors for focal plane arrays in the extreme ultraviolet (EUV) wavelength range**, J. John, P. Malinowski, A. Lorenz, G. Hellings, K. Cheng, M. Germain, IMEC (Belgium); F. Semond, J. Duboz, Ctr. National de la Recherche Scientifique (France); A. Ben Moussa, J. Hochedez, Royal Observatory of Belgium (Belgium) [6689-25]

11:40 am: **Silicon photodiodes for absolute soft x-ray radiometry**, J. Keister, SFA, Inc. [6689-26]

Lunch Break 12:00 to 1:40 pm

SESSION 6

Conv. Ctr. 29A Mon. 1:40 to 3:20 pm

Ground-based Solar Observing Systems

1:40 pm: **A large coronagraph for coronal magnetic field studies**, S. Tomczyk, P. G. Nelson, D. F. Elmore, National Ctr. for Atmospheric Research [6689-07]

2:00 pm: **Development of a hybrid imaging system for Udaipur Solar Observatory**, A. R. Bayanna, R. E. Louis, B. Kumar, S. K. Mathew, P. Venkatakrishnan, Udaipur Solar Observatory (India) [6689-27]

2:20 pm: **Mirrors for solar telescopes made from ZERODUR glass ceramics**, T. Doehring, R. Jedamzik, P. Hartmann, SCHOTT AG (Germany) [6689-28]

2:40 pm: **The thermal environment of the fiber glass dome for the new solar telescope at Big Bear Solar Observatory**, A. P. Verdoni, New Jersey Institute of Technology; C. J. Denker, New Jersey Institute of Technology and Astrophysikalisches Institut Potsdam (Germany); J. R. Varsik, S. Shumko, J. Nenow, Big Bear Solar Observatory [6689-29]

3:00 pm: **An image stabilization system for solar observations**, R. Sridharan, A. Raja Bayanna, R. E. Louis, B. Kumar, S. K. Mathew, P. Venkatakrishnan, Udaipur Solar Observatory (India) [6689-30]

Coffee Break 3:20 to 3:50 pm

SESSION 7

Conv. Ctr. 29A Mon. 3:50 to 5:10 pm

Solar Wind and Space Weather

3:50 pm: **Measuring the plane of polarization in a strongly circular signal**, E. A. Jensen, Ctr. for Astrophysics & Space Sciences; C. T. Russell, Univ. of California/Los Angeles [6689-09]

4:10 pm: **Combined STELab, EISCAT, ESR, and MERLIN IPS observations of the solar wind**, M. M. Bisi, B. V. Jackson, Univ. of California/San Diego; R. A. Fallows, A. R. Breen, Univ. of Wales/Aberystwyth (United Kingdom); P. P. Hick, Univ. of California/San Diego; G. Wannberg, EISCAT Scientific Association (Sweden); P. Thomasson, C. A. Jordan, The Univ. of Manchester (United Kingdom); G. D. Dorrian, Univ. of Wales/Aberystwyth (United Kingdom) [6689-31]

4:30 pm: **Performance of a prototype solar wind plasma analyzer for future solar and heliophysics missions**, D. O. Kataria, G. Collinson, A. J. Coates, A. F. Fazakerley, C. J. Owen, B. Talyor, L. Bradley, Mullard Space Science Lab. (United Kingdom) [6689-32]

4:50 pm: **Development of the spatial heterodyne spectrometer to detect thermospheric neutral oxygen density via Bowen fluorescence at 844 nm**, S. R. Watchorn, Scientific Solutions, Inc. and Univ. of Illinois Urbana-Champaign; J. Noto, M. A. Migliozi, Scientific Solutions, Inc.; L. Waldrop, Univ. of Illinois at Urbana-Champaign [6689-33]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

✓ **Analysis of the comparative responses of SMEI and LASCO, A**, Buffington, Univ. of California/San Diego; J. S. Morrill, Naval Research Lab.; P. P. Hick, Univ. of California/San Diego; R. A. Howard, Naval Research Lab.; B. V. Jackson, Univ. of California/San Diego; D. F. Webb, Boston College [6689-34]

✓ **A procedure for fitting point sources in SMEI white-light full-sky maps**, P. P. Hick, A. Buffington, B. V. Jackson, Univ. of California/San Diego [6689-35]

Conference 6690 • Conv. Ctr. 29A

Tuesday 28 August 2007 • Proceedings of SPIE Vol. 6690

Focal Plane Arrays for Space Telescopes III

Conference Chairs: **Thomas J. Grycewicz**, The Aerospace Corp.; **Cheryl J. Marshall**, NASA Goddard Space Flight Ctr.; **Penny G. Warren**, Ball Aerospace & Technologies Corp.

Program Committee: **Sachi Babu**, NASA Goddard Space Flight Ctr.; **James W. Beletic**, Teledyne Imaging Sensors; **Richard A. Bredthauer**, Semiconductor Technology Associates Inc.; **Mark C. Clampin**, NASA Goddard Space Flight Ctr.; **Michael P. Lesser**, The Univ. of Arizona; **Terrence S. Lomheim**, The Aerospace Corp.; **Kyle B. Miller**, Ball Aerospace & Technologies Corp.; **Peter J. Pool**, e2v technologies ltd. (United Kingdom); **John Traylor**, Naval Research Lab.

Monday 27 August

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Radiometric and noise characteristics of SI-19210 cameras built from the AlAtSens ProCamHD 3560 FPA**, R. A. Kessel, Naval Research Lab.; D. M. Huber, C. Rollins, Research Support Instruments, Inc.; B. N. Dorland, G. Hennessy, U.S. Naval Observatory; B. E. Plourde, Assurance Technology Corp. [6690-18]
- ✓ **Astrometric and photometric sky testing results for the TIS 5-micron 3T-class CMOS detector**, B. N. Dorland, G. Hennessy, N. Zacharias, U.S. Naval Observatory; C. Rollins, D. M. Huber, Research Support Instruments, Inc. [6690-19]
- ✓ **Laboratory and radiation performance testing results for the e2v model 212 CCD**, B. N. Dorland, U.S. Naval Observatory; A. Waczynski, G. Delo, NASA Goddard Space Flight Ctr.; R. Foltz, Sigma Space, Inc. ... [6690-20]
- ✓ **Characterization of the detector subsystem for near-infrared spectrograph (NIRSpec) on the James Webb Space Telescope**, D. B. Mott, NASA Goddard Space Flight Ctr.; A. Waczynski, Global Science & Technology, Inc.; Y. Wen, MEI Technologies, Inc.; W. Xia-Serafino, Global Science & Technology, Inc.; B. J. Rauscher, NASA Goddard Space Flight Ctr.; R. J. Hill, Science Systems and Applications, Inc.; G. Delo, R. Foltz, E. Kan, Global Science & Technology, Inc.; M. Chiao, MEI Technologies, Inc.; O. Fox, Univ. of Virginia; C. A. Cabelli, J. D. Garnett, M. Loose, S. Wong-Anglin, M. Zandian, Teledyne Imaging Sensors; D. Alexander, Northrop Grumman Technical Services; C. K. Brambora, R. J. Derro, NASA Goddard Space Flight Ctr.; T. Ellis, ITT Space Systems LLC; M. B. Garrison, NASA Goddard Space Flight Ctr.; B. Howe, ITT Space Systems LLC; T. E. Johnson, NASA Goddard Space Flight Ctr.; M. Jurado, ITT Space Systems LLC; S. S. Manthripragada, J. M. Marsh, C. J. Marshall, R. J. Martineau, NASA Goddard Space Flight Ctr.; J. Nieznanski, ITT Space Systems LLC; K. Novo-Gradac, Swales Aerospace; W. D. Roher, Northrop Grumman Technical Services; K. B. Shakoorezadeh, MEI Technologies, Inc.; M. T. Smith, D. Wilson, NASA Goddard Space Flight Ctr.; P. Wallis, ITT Space Systems LLC [6690-21]
- ✓ **Detectors for the James Webb Space Telescope near-infrared spectrograph (NIRSpec)**, B. J. Rauscher, NASA Goddard Space Flight Ctr. [6690-22]

Tuesday 28 August

SESSION 1

Conv. Ctr. 29A Tues. 8:30 to 11:50 am

New Developments in Satellite FPAs I

Chair: **Bernard J. Rauscher**, NASA Goddard Space Flight Ctr.

- 8:30 am: **Readout integrated circuit (ROIC) design for spaceflight focal plane arrays (Invited Paper)**, J. W. Beletic, A. B. Joshi, Teledyne Imaging Sensors [6690-01]
- 9:00 am: **Fundamental performance differences between CMOS and CCD imagers, part II (Invited Paper)**, J. R. Janesick, J. T. Andrews, J. R. Tower, Sarnoff Corp.; T. S. Elliott, Jet Propulsion Lab.; J. Cheng, J. Bishop, Chronicle Technology Inc. [6690-02]
- 9:30 am: **Inter-pixel capacitance in fully depleted silicon hybrid CMOS focal plane arrays**, Y. Bai, M. C. Farris, A. K. Petersen, J. W. Beletic, Teledyne Imaging Sensors [6690-03]
- 9:50 am: **Conversion gain nonlinearity and its correction in hybridized near-infrared detectors**, N. N. Bezawada, D. J. Ives, D. Atkinson, UK Astronomy Technology Ctr. (United Kingdom) [6690-04]
- Coffee Break 10:10 to 10:40 am
- 10:40 am: **Comparing the low-temperature performance of megapixel NIR InGaAs and HgCdTe imager arrays**, S. Seshadri, D. M. Cole, B. R. Hancock, P. G. Ringold, C. Peay, C. J. Wrigley, Jet Propulsion Lab.; R. M. Smith, M. Bonati, G. Rahmer, California Institute of Technology; G. Tarlé, M. S. Schubnell, M. G. Brown, Univ. of Michigan; D. F. Figer, Rochester Institute of Technology; C. J. Bebek, Lawrence Berkeley National Lab. [6690-05]
- 11:10 am: **Development of a thinned back-illuminated CMOS active pixel sensor for extreme ultraviolet spectroscopy and imaging in Space science (Invited Paper)**, N. R. Waltham, M. L. Prydderch, H. C. A. Mapson-Menard, Rutherford Appleton Lab. (United Kingdom); A. Harris, P. J. Pool, e2v (United Kingdom) [6690-06]
- 11:30 am: **111-million pixel detector camera: realization, performance, and applications**, N. Zacharias, B. N. Dorland, U.S. Naval Observatory; R. A. Bredthauer, K. L. Boggs, G. Bredthauer, Semiconductor Technology Associates Inc.; M. P. Lesser, The Univ. of Arizona/Steward Observatory [6690-08]
- Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 2

Conv. Ctr. 29A Tues. 1:30 to 2:50 pm

New Developments in Satellite FPAs II

Chair: **Bernard J. Rauscher**, NASA Goddard Space Flight Ctr.

- 1:30 pm: **Back-illuminated 3D integrated CMOS image sensor for scientific applications (Invited Paper)**, V. Suntharalingam, MIT Lincoln Lab. . . [6690-09]
- 2:00 pm: **The Gaia focal plane**, A. A. Laborie, R. Davancens, P. Pouny, C. Vetel, F. Chassat, P. Charvet, EADS Astrium (France); P. Gare, G. Sarri, European Space Research and Technology Ctr. (Netherlands) [6690-10]
- 2:20 pm: **Mission to Mars: the HiRISE camera on-board MRO (Invited Paper)**, T. H. Ebben, J. W. Bergstrom, Ball Aerospace & Technologies Corp. [6690-11]
- Coffee Break 2:50 to 3:20 pm

SESSION 3

Conv. Ctr. 29A Tues. 3:20 to 5:40 pm

FPA Characterization and Test

Chair: Mark E. McKelvey, NASA Ames Research Ctr.

3:20 pm: **High-performance focal plane arrays based on the HAWAII-2RG/4RG and the SIDECAR ASIC (Invited Paper)**, M. Loose, J. W. Beletic, J. D. Garnett, M. Xu, Teledyne Imaging Sensors [6690-12]

3:50 pm: **Laboratory and sky testing results for the TIS H4RG-10 4k x 4k 10-micron visible CMOS-hybrid detector (Invited Paper)**, B. N. Dorland, G. Hennessy, N. Zacharias, U.S. Naval Observatory; C. Rollins, Research Support Instruments, Inc.; P. K. Shu, L. Miko, D. B. Mott, A. Waczynski, NASA Goddard Space Flight Ctr. [6690-13]

4:20 pm: **Radiation effects in two InGaAs focal plane arrays**, F. K. Knight, M. Waldon, MIT Lincoln Lab. [6690-14]

4:40 pm: **Cryogenic testing of a 1024x1024 Si:As array for WISE**, J. L. Dotson, M. E. McKelvey, R. E. McMurray, Jr., J. H. Goebel, NASA Ames Research Ctr.; A. K. Mainzer, Jet Propulsion Lab. [6690-15]

5:00 pm: **Characterization of blocked-impurity-band Si:As detectors**, S. M. Birkmann, J. M. Stegmaier, U. Grözinger, O. Krause, Max-Planck-Institut für Astronomie (Germany); J. Putzeys, D. Sabuncuoglu Tezcan, P. J. Merken, P. de Moor, IMEC (Belgium) [6690-16]

5:20 pm: **First results with a 4K² SiPIN array detector on a telescope**, L. M. Simms, Stanford Linear Accelerator Ctr.; D. F. Figer, Rochester Institute of Technology; J. A. Tyson, Univ. of California/Davis; D. K. Gilmore, Stanford Linear Accelerator Ctr.; B. J. Hanold, Rochester Institute of Technology ... [6690-17]

Courses of Related Interest

See SPIE Cashier for information.

SC152 Infrared Focal Plane Arrays (Dereniak, Hubbs) Sunday 26, 1:30 - 5:30 pm

SC504 Introduction to CCD and CMOS Imaging Sensors and Applications (Janesick) Monday 27, 8:30 am - 5:30 pm

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Conference 6691 • Conv. Ctr. 29A

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6691

Astronomical Adaptive Optics Systems and Applications III

Conference Chairs: **Robert K. Tyson**, Univ. of North Carolina/Charlotte; **Michael Lloyd-Hart**, The Univ. of Arizona/Steward Observatory

Program Committee: **Guido Brusa Zappellini**, The Univ. of Arizona/Steward Observatory; **Brent L. Ellerbroek**, California Institute of Technology; **Mark E. Furber**, Schafer Corp.; **Edward J. Kibblewhite**, The Univ. of Chicago; **Miska Le Louarn**, European Southern Observatory (Germany); **Carl Paterson**, Imperial College London (United Kingdom); **Gérard Rousset**, Observatoire de Paris à Meudon (France)

Tuesday 28 August

Adaptive Optics Technical Event and Panel
Marriott Coronado Tue. 8:00 to 10:00 pm

Keynote speaker: Olivier Guyon, National Astronomical Observatory of Japan/Subaru Telescope

See pg. 22 for details.

Wednesday 29 August

SESSION 1

Conv. Ctr. 29A Wed. 8:30 to 11:20 am

System Testing and Operations

Chair: Michael Lloyd-Hart, The Univ. of Arizona/Steward Observatory

8:30 am: **Test stand for the adaptive secondary at the MMT Observatory**, T. E. Stalcup, Jr., O. Durney, P. M. Hinz, T. Connors, The Univ. of Arizona/Steward Observatory [6691-01]

8:50 am: **FPGA developments for the SPARTA project: part 3**, S. J. Goodsell, D. Geng, E. Younger, N. A. Dipper, R. M. Myers, Univ. of Durham (United Kingdom); E. Fedrigo, R. Donaldson, C. Soenke, European Southern Observatory (Germany) [6691-02]

9:10 am: **ASSIST: development of a test-infrastructure for the VLT AO facility**, R. Stuik, Leiden Univ. (Netherlands); R. Arsenault, European Southern Observatory (Germany); A. Deep, IUCAA (India); B. Delabre, European Southern Observatory (Germany); P. Hallibert, Leiden Univ. (Netherlands); L. Jolissaint, National Research Council Canada (Canada); N. N. Hubin, European Southern Observatory (Germany); S. Kendrew, Univ. College London (United Kingdom); P. Madec, J. Paufique, S. Stroebele, European Southern Observatory (Germany) [6691-03]

9:30 am: **EAGLE: a multiobject AO instrument for the European Extremely Large Telescope**, G. Moretto, INSU (France); J. G. Cuby, Observatoire Astronomique de Marseille-Provence (France); J. Hammer, G. Rousset, Observatoire de Paris à Meudon (France); T. Fusco, ONERA (France); J. Devriendt, Observatoire de Lyon (France) [6691-29]

Coffee Break 9:50 to 10:20 am

10:20 am: **A target selection system for ELTs multi-object instruments: system and trade-off analysis**, E. Prieto, F. Madec, P. Vola, E. Hugot, M. Ferrari, J. G. Cuby, Observatoire Astronomique de Marseille Provence (France) [6691-04]

10:40 am: **The necessity of linearity calibrations for open-loop wavefront sensing**, S. M. Ammons, D. T. Gavel, E. A. Laag, R. Kupke, C. E. Max, Univ. of California/Santa Cruz [6691-05]

11:00 am: **An automated airplane detection system for the safeguard against airplane illumination from the laser guide star beacons at the MMT**, M. Snyder, M. Lloyd-Hart, The Univ. of Arizona/Steward Observatory [6691-06]

Lunch/Exhibition Break 11:20 am to 1:00 pm

SESSION 2

Conv. Ctr. 29A Wed. 1:00 to 3:00 pm

Wavefront Sensing Algorithms and Simulations I

Chair: Brent L. Ellerbroek, California Institute of Technology

1:00 pm: **Broadband wavefront correction algorithm**, A. Give'on, S. B. Shaklan, Jet Propulsion Lab. [6691-07]

1:20 pm: **Real-time atmospheric turbulence profile estimation using modal covariance measurements from multiple guide stars**, N. M. Milton, M. Lloyd-Hart, J. A. Bernier, C. J. Baranec, The Univ. of Arizona/Steward Observatory [6691-08]

1:40 pm: **Electric field conjugation-based wavefront correction algorithm for high-contrast imaging systems: experimental results**, A. Give'on, B. D. Kern, S. B. Shaklan, Jet Propulsion Lab. [6691-09]

2:00 pm: **Demonstration of wavefront correction in a shaped-pupil coronagraph using a Gerchberg-Saxton-based estimation scheme**, J. D. Kay, R. Belikov, N. J. Kasdin, Princeton Univ. [6691-10]

2:20 pm: **Application of adaptive wavelets for laser beam compensation in astronomical adaptive optics**, K. J. Jones, Rice Univ. [6691-11]

2:40 pm: **Wavefront sensor based on phase knife**, A. V. Larichev, A. S. Goncharov, M.V. Lomonosov Moscow State Univ. (Russia) [6691-12]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Conv. Ctr. 29A Wed. 3:30 to 4:50 pm

Wavefront Sensing Algorithms and Simulations II

Chair: Miska Le Louarn, European Southern Observatory (Germany)

3:30 pm: **High-performance curvature wavefront sensing for extreme AO**, O. Guyon, National Astronomical Observatory of Japan/Subaru Telescope [6691-13]

3:50 pm: **Effects of phase-shifting error upon the self-referencing interferometer**, R. A. Vincent, Air Force Research Lab.; D. Oesch, Air Force Research Lab. and Starfire Optical Range, Asalt Lab.; D. J. Sanchez, The Univ. of New Mexico [6691-14]

4:10 pm: **Phase calculation and tolerances in a self-referenced interferometer (SRI) spatial phase shifter**, D. Oesch, Air Force Research Lab.; T. A. Rhoadarmer, Science Applications International Corp.; L. M. Klein, R. A. Vincent, Air Force Research Lab.; D. J. Sanchez, The Univ. of New Mexico [6691-15]

4:30 pm: **Fast and accurate wavefront sensing algorithm of Shack-Hartmann sensor for adaptive optics**, J. Yoo, S. Youn, Korea Advanced Institute of Science and Technology (South Korea) [6691-16]

Conference 6691 • Conv. Ctr. 29A

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **A study on Shack-Hartmann sensors for adaptive optics**, J. Kim, T. Uhm, K. Park, S. Youn, Korea Advanced Institute of Science and Technology (South Korea) [6691-25]
- ✓ **Loki: a ground-layer adaptive optics high-resolution near-infrared survey camera**, C. J. Baranec, M. Lloyd-Hart, M. R. Meyer, M. J. Rieke, The Univ. of Arizona/Steward Observatory [6691-26]
- ✓ **Space variant point spread function modeling for astronomical image data processing**, M. Rerabek, P. Pata, K. Fliegel, J. Svihlik II, Czech Technical Univ. in Prague (Czech Republic) [6691-27]
- ✓ **Status of the production of the thin shells for the LBT adaptive secondaries**, G. Brusa Zappellini, H. M. Martin, S. M. Miller, B. Cuerden, The Univ. of Arizona/Steward Observatory; A. Riccardi, Osservatorio Astrofisico di Arcetri (Italy); B. K. Smith, The Univ. of Arizona/Steward Observatory [6691-28]

Thursday 30 August

SESSION 4

Conv. Ctr. 29A Thurs. 9:20 to 10:00 am

Wavefront Correction Optics

Chair: **Mark E. Furber**, Schafer Corp.

- 9:20 am: **Development of lightweight segments for adaptive optics**, M. Ghigo, S. Basso, R. Canestrari, G. Pareschi, Osservatorio Astronomico di Brera (Italy) [6691-17]
- 9:40 am: **Fast and compact tip-tilt/low-order deformable mirror**, F. P. Wildi, G. Muehlebach, T. Maulaz, Ecole d'Ingénieurs du Canton de Vaud (Switzerland) [6691-18]
- Coffee Break 10:00 to 10:30 am

SESSION 5

Conv. Ctr. 29A Thurs. 10:30 am to 12:30 pm

Laser Guide Stars

Chair: **Robert K. Tyson**, The Univ. of North Carolina at Charlotte

- 10:30 am: **Status of the MMT Observatory multiple laser beacon projector**, T. E. Stalcup, Jr., R. Angel, M. Lloyd-Hart, M. J. Rademacher, The Univ. of Arizona/Steward Observatory [6691-19]
- 10:50 am: **Astronomical imaging using ground-layer adaptive optics**, C. J. Baranec, M. Lloyd-Hart, N. M. Milton, T. E. Stalcup, Jr., M. Snyder, V. Vaitheeswaran, D. W. McCarthy, Jr., P. M. Hinz, R. Angel, The Univ. of Arizona/Steward Observatory [6691-20]
- 11:10 am: **Multilaser guide star adaptive optics for the large binocular telescope**, M. Lloyd-Hart, R. Angel, The Univ. of Arizona/Steward Observatory; R. F. Green, The Univ. of Arizona [6691-21]
- 11:30 am: **Dynamic refocus optical design for a LBT Rayleigh laser guidestar**, T. E. Stalcup, Jr., R. Angel, M. J. Rademacher, The Univ. of Arizona/Steward Observatory [6691-22]
- 11:50 am: **The European LGS test facility**, R. M. Myers, Univ. of Durham (United Kingdom); D. Bonaccini Calia, European Southern Observatory (Germany); M. N. Devaney, National Univ. of Ireland/Galway (Ireland); S. Esposito, Osservatorio Astrofisico di Arcetri (Italy); S. J. Goodsell, Univ. of Durham (United Kingdom); A. V. Goncharov, National Univ. of Ireland/Galway (Ireland); J. C. Guerra, Isaac Newton Group of Telescopes (Spain); H. Guillet de Chatellus, Univ. Joseph Fourier (France); M. A. Harrison, Univ. of Durham (United Kingdom); R. Holzloehner, E. Marchetti, European Southern Observatory (Germany); T. J. Morris, Univ. of Durham (United Kingdom); E. Pinna, Osservatorio Astrofisico di Arcetri (Italy); J. Pique, Univ. Joseph Fourier (France); S. Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany); M. Reyes Garcia-Talavera, Instituto de Astrofisica de Canarias (Spain); E. Ribak, Technion-Israel Institute of Technology (Israel); R. G. M. Rutten, Isaac Newton Group of Telescopes (Spain); H. Schnetler, M. Strachan, UK Astronomy Technology Ctr. (United Kingdom); R. Stuik, Leiden Univ. (Netherlands); G. Talbot, S. M. Tulloch, Isaac Newton Group of Telescopes (Spain) ... [6691-23]
- 12:10 pm: **The polychromatic laser guide star for the tilt measurement: progress report of the demonstrator at Observatoire de Haute Provence**, R. Foy, Observatoire de Lyon (France); A. Le Van Suu, Observatoire de Haute Provence (France); J. Girard, Univ. Nacional Autónoma de México (Mexico); X. Rondeau, Observatoire de Lyon (France) [6691-24]

Course of Related Interest

See SPIE Cashier for information.

SC135 Adaptive Optics (Tyson) Tuesday 28, 8:30 am - 5:30 pm

Conference 6692 • Conv. Ctr. 28B

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6692

Cryogenic Optical Systems and Instruments XII

Conference Chairs: **James B. Heaney**, Stringer Ghaffarian Technologies, Inc.; **Lawrence G. Burriesci**, Lockheed Martin Advanced Technology Ctr.

Program Committee: **David M. Chaney**, Ball Aerospace & Technologies Corp.; **Eric T. Kvamme**, Lockheed Martin Advanced Technology Ctr.; **Raymond G. Ohl IV**, NASA Goddard Space Flight Ctr.; **Leigh A. Ryder**, Lockheed Martin Corp.; **Mark T. Stier**, Goodrich Corp.; **Theodore D. Swanson**, NASA Goddard Space Flight Ctr.

Sunday 26 August

Introduction

Conv. Ctr. 28B **Sun. 1:00 to 1:10 pm**

James B. Heaney, Stringer Ghaffarian Technologies, Inc.

SESSION 1

Conv. Ctr. 28B **Sun. 1:10 to 2:50 pm**

Cryogenic Optical Properties and Instrument Technology I

Chair: **Raymond G. Ohl IV**, NASA Goddard Space Flight Ctr.

1:10 pm: **High-fidelity cryothermal test of a subscale large space telescope cooling system**, M. J. DiPirro, J. G. Tuttle, S. Ollendorf, A. N. Mattern, D. T. Leisawitz, M. L. Jackson, J. J. Francis, T. Hait, NASA Goddard Space Flight Ctr.; P. Cleveland, Energy Solutions International, LLC; D. Muheim, NASA Goddard Space Flight Ctr.; A. J. Mastropietro, NASA Goddard Space Flight Ctr. and Jet Propulsion Lab. [6692-01]

1:30 pm: **The high-spatial frequency cut-off in the cryogenic deformation of various lightweight mirrors**, J. B. Hadaway, The Univ. of Alabama in Huntsville; R. Eng, D. E. Zissa, M. E. Smithers, NASA Marshall Space Flight Ctr. [6692-02]

1:50 pm: **Cryogenic temperature-dependent refractive index measurements of CaF₂ and Infrasil 301**, B. J. Frey, T. J. Madison, NASA Goddard Space Flight Ctr. [6692-03]

2:10 pm: **Cryogenic temperature-dependent refractive index measurements of N-BK7, BaLKN3, SF15, and E-SF03**, B. J. Frey, D. B. Leviton, T. J. Madison, NASA Goddard Space Flight Ctr. [6692-04]

2:30 pm: **Temperature evolution in excitonic absorptions of Cd_{0.96}Zn_{0.04} materials**, M. A. Quijada, R. M. Henry, NASA Goddard Space Flight Ctr. [6692-05]

Coffee Break 2:50 to 3:40 pm

SESSION 2

Conv. Ctr. 28B **Sun. 3:40 to 5:20 pm**

Cryogenic Optical Properties and Instrument Technology II

Chair: **David M. Chaney**, Ball Aerospace & Technologies Corp.

3:40 pm: **Cryogenic system for interferometric measurement of dimensional changes at 40 K**, P. N. Blake, E. R. Canavan, NASA Goddard Space Flight Ctr.; J. A. Crane, Swales Aerospace; T. J. Madison, F. Miller, NASA Goddard Space Flight Ctr.; D. O. Miller, Bastion Technologies, Inc.; T. J. Zukowski, Research Support Instruments, Inc. [6692-06]

4:00 pm: **Cryogenic tunable Fabry-Perot interferometer for astronomical observations**, J. K. Chow, Lockheed Martin Space Systems Co.; L. A. Ryder, I. Chapman, Lockheed Martin Corp.; S. D. Horner, P. D. Dean, Lockheed Martin Advanced Technology Ctr. [6692-07]

4:20 pm: **Development and performance of a cryogenic Michelson interferometer**, P. Lagueux, M. Chamberland, F. Marcotte, M. Duval, Telops, Inc. (Canada); A. C. Carter, National Institute of Standards and Technology [6692-08]

4:40 pm: **The development of a breadboard cryogenic optical delay line for DARWIN**, T. C. van den Dool, W. L. M. Giesen, F. Kamphues, B. C. B. Braam, TNO TPD (Netherlands); N. Loix, Micromega Dynamics sa (Belgium); P. P. Kooijman, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); G. Velsink, Dutch Space B.V. (Netherlands); Y. Stockman, Univ. de Liège (Belgium); J. Benoit, Alcatel Alenia Space (France); F. Sève, SAGEIS-CSO (France) [6692-09]

5:00 pm: **Mid-infrared instrumentation for the European Extremely Large Telescope**, S. Kendrew, B. R. Brandl, Leiden Observatory (Netherlands); R. Lenzen, Max-Planck-Institut für Astronomie (Germany); R. Stuik, Leiden Observatory (Netherlands); L. B. Venema, ASTRON (Netherlands); H. Kaeuffl, G. Finger, European Southern Observatory (Germany); A. C. H. Glasse, UK Astronomy Technology Ctr. (United Kingdom) [6692-10]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A **Sun. 6:00 to 7:30 pm**

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

Introduction

Conv. Ctr. 28B **Mon. 9:10 to 9:50 am**

Lawrence G. Burriesci, Lockheed Martin Advanced Technology Ctr.

SESSION 3

Conv. Ctr. 28B **Mon. 9:10 to 9:50 am**

Cryogenic Mechanisms and Refrigeration Technology

Chair: **Theodore D. Swanson**, NASA Goddard Space Flight Ctr.

9:30 am: **Fiber optic microsensor hydrogen leak detection system on launch vehicle applications**, A. A. Kazemi, J. W. Goepp, The Boeing Co.; D. B. Larson, Poly-Optical Products Inc.; M. D. Wuestling, The Boeing Co. [6692-13]

Coffee Break 9:50 to 10:30 am

Conference 6692 • Conv. Ctr. 28B

SESSION 4

Conv. Ctr. 28B Mon. 10:30 to 11:50 am

Space Cryogenic Systems I

Chair: **Eric T. Kvamme**, Lockheed Martin Advanced Technology Ctr.

10:30 am: **James Webb Space Telescope primary mirror segment assembly architecture overview**, J. A. Lewis, Ball Aerospace & Technologies Corp. [6692-14]

10:50 am: **An overview of integration and test of the James Webb Space Telescope integrated science instrument module**, M. Drury, N. Becker, ManTech International Corp.; B. J. Bos, P. S. Davila, B. J. Frey, J. E. Hylan, J. M. Marsh, NASA Goddard Space Flight Ctr.; D. B. McGuffey, Swales Aerospace; M. D. Nowak, R. G. Ohl IV, NASA Goddard Space Flight Ctr.; K. W. Redman, ManTech International Corp.; H. P. Sampler, NASA Goddard Space Flight Ctr.; J. F. Sullivan, Ball Aerospace & Technologies Corp.; I. Walker, ManTech International Corp.; G. A. Wright, NASA Goddard Space Flight Ctr.; P. Young, Young Engineering Services [6692-15]

11:10 am: **NIRCam fold mirror design**, A. A. Nordt, M. Jacoby, B. Biggs, E. T. Kvamme, T. Cahoon, Lockheed Martin Advanced Technology Ctr. . . [6692-16]

11:30 am: **Cryo-test results of NIRCam optical elements**, L. W. Huff, Lockheed Martin Advanced Technology Ctr.; L. A. Ryder, Lockheed Martin Corp. [6692-17]

Lunch Break 11:50 am to 1:30 pm

SESSION 5

Conv. Ctr. 28B Mon. 1:30 to 2:30 pm

Space Cryogenic Systems II

Chair: **Mark T. Stier**, Goodrich Corp.

1:30 pm: **Cryogenic measurements of the dichroic beam splitter for the NIRCam instrument**, Y. Mao, Lockheed Martin Advanced Technology Ctr. [6692-18]

1:50 pm: **A low-stress cryogenic mount for spaceborne lithium fluoride optics**, E. T. Kvamme, Lockheed Martin Advanced Technology Ctr. . [6692-19]

2:10 pm: **NIRCam thermal subsystem**, L. Osborne, Lockheed Martin Advanced Technology Ctr. [6692-20]

Coffee Break 2:30 to 3:30 pm

SESSION 6

Conv. Ctr. 28B Mon. 3:30 to 4:50 pm

Space Cryogenic Systems III

Chair: **Leigh A. Ryder**, Lockheed Martin Corp.

3:30 pm: **JWST-MIRI spectrometer main optics verification and qualification**, M. Meijers, A. Oudenhuisen, A. A. Schoenmaker, ASTRON (Netherlands) [6692-21]

3:50 pm: **MIRI telescope simulator folding mirrors**, J. Serrano, A. Moral, E. Pedrosa, J. Moreno, L. Diez, J. Allo, LIDAX (Spain) [6692-22]

4:10 pm: **The near-infrared spectrograph (NIRSpec) instrument on board the James Webb Space Telescope: an instrument overview**, G. Bagnasco, European Space Agency (Netherlands); M. Kolm, EADS Astrium GmbH (Germany); M. B. J. te Plate, P. Rumler, J. Salvignol, P. Strada, European Space Agency (Netherlands); M. Melf, G. Noyer, K. Honnen, R. Lemke, EADS Astrium GmbH (Germany) [6692-23]

4:30 pm: **Physical optics model for simulating the optical performance of the NIRSpec**, M. B. J. te Plate, European Space Agency (Netherlands); P. Marenaci, EADS Astrium GmbH (Germany); J. Lorenzo Alvarez, P. Frugier, European Space Agency (Netherlands) [6692-24]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **A low emissivity window for cryogenic testing of large optics**, B. W. Greeley, NASA Goddard Space Flight Ctr.; Q. Gong, D. C. Bugby, Swales Aerospace; D. A. Kubalak, NASA Goddard Space Flight Ctr. [6692-25]
- ✓ **Photogrammetric metrology for the James Webb Space Telescope integrated science instrument module**, M. D. Nowak, NASA Goddard Space Flight Ctr.; J. A. Crane, Swales Aerospace; P. S. Davila, W. L. Eichhorn, NASA Goddard Space Flight Ctr.; J. E. Gill, ManTech International Corp.; A. A. Herrera, Swales Aerospace; M. D. Hill, J. E. Hylan, NASA Goddard Space Flight Ctr.; M. Jetten, Northrop Grumman Space Technology; J. M. Marsh, R. G. Ohl IV, NASA Goddard Space Flight Ctr.; R. Quigley, Swales Aerospace; K. W. Redman, ManTech International Corp.; H. P. Sampler, G. A. Wright, NASA Goddard Space Flight Ctr.; P. Young, Young Engineering Services [6692-26]
- ✓ **Thermal analysis and seeing improvement of LAMOST enclosure**, Z. Chen, Hangzhou Dianzi Univ. (China); H. Shi, R. Li, Z. Yao, National Astronomical Observatories (China) [6692-27]
- ✓ **Optical alignment of the JWST ISIM to the OTE simulator (OSIM): current concept and design studies**, B. J. Frey, P. S. Davila, J. G. Hagopian, J. M. Marsh, R. G. Ohl IV, NASA Goddard Space Flight Ctr.; J. F. Sullivan, Ball Aerospace & Technologies Corp.; G. A. Wright, NASA Goddard Space Flight Ctr. [6692-29]
- ✓ **Effects of ice on the James Webb Space Telescope**, J. W. Arenberg, Northrop Grumman Space Technology [6692-30]

Courses of Related Interest

See SPIE Cashier for information.

SC134 Optical Design Fundamentals for Infrared Systems (Riedl)
Sunday 26, 8:30 am - 5:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/
Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

Conference 6693 • Conv. Ctr. 29B

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6693

Techniques and Instrumentation for Detection of Exoplanets III

Conference Chair: **Daniel R. Coulter**, Jet Propulsion Lab.

Program Committee: **Charles A. Beichman**, California Institute of Technology; **James B. Breckinridge**, Jet Propulsion Lab.; **Tristram T. Hyde**, NASA Goddard Space Flight Ctr.; **David C. Hyland**, Texas A&M Univ.; **Peter R. Lawson**, Jet Propulsion Lab.; **Marie B. Levine**, Jet Propulsion Lab.; **Martin C. Noecker**, Ball Aerospace & Technologies Corp.; **John T. Trauger**, Jet Propulsion Lab.

Tuesday 28 August

Adaptive Optics Technical Event and Panel
Marriott Coronado **Tue. 8:00 to 10:00 pm**

Keynote speaker: Olivier Guyon, National Astronomical Observatory of Japan/Subaru Telescope

See pg. 22 for details.

Tuesday 28 August

SESSION 1

Joint Session with Conference 6687: UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III

Conv. Ctr. 29B **Tues. 8:00 to 9:50 am**

TPF-External Occulter I

Chair: Wesley A. Traub, Jet Propulsion Lab.

8:00 am: **External occulter for direct observation of exoplanets: an overview (Invited Paper)**, W. C. Cash, Jr., E. R. Schindhelm, Univ. of Colorado/Boulder; J. W. Arenberg, A. S. Lo, R. S. Polidan, Northrop Grumman Space Technology; N. J. Kasdin, R. J. Vanderbei, Princeton Univ.; S. R. Heap, M. J. Kuchner, NASA Goddard Space Flight Ctr.; S. Kilston, M. C. Noecker, Ball Aerospace & Technologies Corp.; S. Seager, Massachusetts Institute of Technology [6687-31]

8:30 am: **The TPF-O science program (Invited Paper)**, S. R. Heap, NASA Goddard Space Flight Ctr. [6687-32]

9:00 am: **New Worlds Observer: system and mission architecture (Invited Paper)**, J. W. Arenberg, Northrop Grumman Space Technology [6693-01]

9:30 am: **TPF-O design reference mission**, D. J. Lindler, Sigma Space Corp. [6687-33]

Coffee Break 9:50 to 10:20 am

SESSION 2

Joint Session with Conference 6687: UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III

Conv. Ctr. 29B **Tues. 10:20 am to 12:00 pm**

TPF-External Occulter II

Chair: Wesley A. Traub, Jet Propulsion Lab.

10:20 am: **New Worlds Observer optical performance**, A. S. Lo, T. Glassman, C. F. Lillie, Northrop Grumman Space Technology [6687-34]

10:40 am: **A UV/optical telescope for the New Worlds Observer mission**, C. F. Lillie, D. R. Dailey, A. S. Lo, R. S. Polidan, Northrop Grumman Space Technology [6687-35]

11:00 am: **Conceptual design of the TPF-O SC bus**, L. R. Purves, NASA Goddard Space Flight Ctr. [6687-36]

11:20 am: **Detecting and characterizing extra-solar Earth-like planets with two external occulter**, S. L. Hunyadi, Jet Propulsion Lab.; A. S. Lo, Northrop Grumman Space Technology [6693-02]

11:40 am: **Externally occulted terrestrial planet finder coronagraph: simulations and sensitivities**, R. G. Lyon, S. R. Heap, NASA Goddard Space Flight Ctr.; A. S. Lo, Northrop Grumman Space Technology; W. C. Cash, Jr., Univ. of Colorado/Boulder; G. D. Starkman, Case Western Reserve Univ.; R. J. Vanderbei, N. J. Kasdin, Princeton Univ.; C. J. Copi, Case Western Reserve Univ. [6687-37]

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

SESSION 3

Joint Session with Conference 6687: UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III

Conv. Ctr. 29B **Tues. 1:30 to 2:50 pm**

TPF-External Occulter III

Chair: Daniel R. Coulter, Jet Propulsion Lab.

1:30 pm: **Optimal design of petal-shaped occulter for extra-solar planet detection**, E. J. Cady, N. J. Kasdin, R. J. Vanderbei, R. Belikov, Princeton Univ. [6693-03]

1:50 pm: **Laboratory studies of petal-shaped occulter**, E. R. Schindhelm, W. C. Cash, Jr., A. F. Shipley, P. Oakley, Univ. of Colorado/Boulder; D. B. Leviton, Ball Aerospace & Technologies Corp. [6693-04]

2:10 pm: **Alignment of a terrestrial planet finder occulter at 20-100 megameters**, M. C. Noecker, Ball Aerospace & Technologies Corp. [6693-05]

2:30 pm: **Dynamics and control of a space based extra-solar planet imaging mission consisting of a telescope and multiple occulter**, E. Kolenen, N. J. Kasdin, Princeton Univ. [6687-38]

Coffee Break 2:50 to 3:20 pm

SESSION 4

Joint Session with Conference 6687: UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III

Conv. Ctr. 29B **Tues. 3:20 to 4:40 pm**

Formation Flying

Chair: David W. Miller, Massachusetts Institute of Technology

3:20 pm: **Formation flying system design for a planet-finding telescope occulter system**, J. A. Leitner, NASA Goddard Space Flight Ctr. ... [6687-39]

3:40 pm: **Flight-like ground demonstration of precision formation flying spacecraft**, D. P. Scharf, J. A. Keim, F. Y. Hadaegh, E. G. Benowitz, P. R. Lawson, Jet Propulsion Lab. [6693-06]

4:00 pm: **Formation control and reconfiguration through synthetic imaging formation flying testbed (SIFFT)**, S. Mohan, H. Sakamoto, D. W. Miller, Massachusetts Institute of Technology [6687-40]

4:20 pm: **Satellite formation flight and realignment maneuver demonstration aboard the International Space Station**, C. P. Mandy, A. Saenz-Otero, D. W. Miller, Massachusetts Institute of Technology ... [6687-41]

SESSION 5

Joint Session with Conference 6687: UV/Optical/IR Space Telescopes: Innovative Technologies and Concepts III

Conv. Ctr. 29B **Tues. 4:40 to 5:50 pm**

TPF-Interferometer

Chair: Daniel R. Coulter, Jet Propulsion Lab.

4:40 pm: **Terrestrial planet finder interferometer: 2006-2007 progress and plans**, P. R. Lawson, O. P. Lay, R. O. Gappinger, A. Ksendzov, S. R. Martin, R. D. Peters, D. P. Scharf, C. A. Beichman, S. C. Unwin, Jet Propulsion Lab. [6693-07]

5:10 pm: **TPF-Emma: concept study of a planet finding space interferometer**, S. R. Martin, Jet Propulsion Lab. [6693-08]

5:30 pm: **Planet-finding performance of the TPF-I Emma architecture**, O. P. Lay, S. R. Martin, S. L. Hunyadi, Jet Propulsion Lab. [6693-09]

Wednesday 29 August

SESSION 6

Conv. Ctr. 29B **Wed. 8:00 to 10:00 am**

Missions and Instruments I

Chair: Charles A. Beichman, Jet Propulsion Lab.

8:00 am: **COROTEL: the Corot Telescope (Invited Paper)**, V. Thierry, Alcatel Alenia Space (France) [6693-10]

8:30 am: **Finding Earth clones with SIM (Invited Paper)**, M. Shao, J. C. Marr IV, Jet Propulsion Lab. [6693-11]

9:00 am: **SIM PlanetQuest science and technology: a status report**, S. J. Edberg, R. A. Laskin, J. C. Marr IV, S. C. Unwin, M. Shao, Jet Propulsion Lab. [6693-12]

9:20 am: **SIM PlanetQuest precision white light interferometry**, M. H. Milman, M. W. Regehr, Jet Propulsion Lab. [6693-13]

9:40 am: **The microlensing planet finder: completing the census of extrasolar planets**, D. P. Bennett, Univ. of Notre Dame; E. S. Cheng, Conceptual Analytics, LLC; A. J. Anderson, Rice Univ.; J. Beaulieu, Institut d'Astrophysique (France); I. Bond, Massey Univ. (New Zealand); M. E. Brown, California Institute of Technology; K. H. Cook, Lawrence Livermore National Lab.; S. D. Friedman, Space Telescope Science Institute; B. S. Gaudi, The Ohio State Univ.; R. L. Gilliland, Space Telescope Science Institute; A. Gould, The Ohio State Univ.; J. M. Jenkins, SETI Institute; R. A. Kimble, NASA Goddard Space Flight Ctr.; J. I. Lunine, The Univ. of Arizona; J. C. Mather, NASA Goddard Space Flight Ctr.; D. Minniti, Pontificia Univ. Católica de Chile (Chile); R. M. Rich, Univ. of California/Los Angeles; K. Sahu, Space Telescope Science Institute; M. Shao, Jet Propulsion Lab.; D. J. Tenerelli, Lockheed Martin Space Systems Co.; A. Udalski, Univ. Warszawski (Poland); P. Yock, The Univ. of Auckland (New Zealand) [6693-14]

Coffee Break 10:00 to 10:30 am

SESSION 7

Conv. Ctr. 29B **Wed. 10:30 am to 12:20 pm**

Missions and Instruments II

Chair: James B. Breckinridge, Jet Propulsion Lab.

10:30 am: **Observing exoplanets with the long-wave grism on JWST NIRCcam (Invited Paper)**, T. P. Greene, NASA Ames Research Ctr.; C. A. Beichman, California Institute of Technology; D. Eisenstein, The Univ. of Arizona/Steward Observatory; K. Hodapp, Univ. of Hawaii at Hilo; S. D. Horner, Y. Mao, Lockheed Martin Advanced Technology Ctr.; M. R. Meyer, M. J. Rieke, The Univ. of Arizona/Steward Observatory; F. Shi, Jet Propulsion Lab. [6693-15]

11:00 am: **Hunting planets and observing disks with the JWST NIRCcam coronagraph**, J. E. Krist, C. A. Beichman, J. T. Trauger, Jet Propulsion Lab.; M. J. Rieke, The Univ. of Arizona/Steward Observatory; S. D. Horner, Lockheed Martin Advanced Technology Ctr.; F. Shi, K. R. Stapelfeldt, Jet Propulsion Lab.; J. A. Stansberry, The Univ. of Arizona/Steward Observatory; T. L. Roellig, NASA Ames Research Ctr. [6693-16]

11:20 am: **The coronagraph project with the SPICA mission**, K. Enya, Japan Aerospace Exploration Agency (Japan); L. Abe, National Astronomical Observatory of Japan (Japan); S. Tanaka, T. Nakagawa, H. Kataza, Japan Aerospace Exploration Agency (Japan); M. Tamura, J. Nishikawa, N. Murakami, National Astronomical Observatory of Japan (Japan); Y. Itoh, K. Fujita, Kobe Univ. (Japan); O. Guyon, National Astronomical Observatory of Japan/Subaru Telescope (Japan); M. Venet, Univ. de Provence (France) [6693-17]

11:40 am: **TOPS: direct imaging and characterization of rocky and giant planets with a small-size telescope**, O. Guyon, National Astronomical Observatory of Japan/Subaru Telescope (Japan); R. Angel, The Univ. of Arizona/Steward Observatory; C. W. Bowers, NASA Goddard Space Flight Ctr.; J. H. Burge, The Univ. of Arizona/Steward Observatory; A. S. Burrows, The Univ. of Arizona; J. L. Codona, The Univ. of Arizona/Steward Observatory; T. P. Greene, NASA Ames Research Ctr.; M. Iye, National Astronomical Observatory of Japan (Japan); J. Kasting, The Pennsylvania State Univ.; H. M. Martin, D. W. McCarthy, Jr., The Univ. of Arizona/Steward Observatory; V. Meadows, California Institute of Technology; M. R. Meyer, The Univ. of Arizona/Steward Observatory; N. Sleep, Stanford Univ.; M. Tamura, National Astronomical Observatory of Japan (Japan); R. J. Vanderbei, Princeton Univ.; B. E. Woodgate, NASA Goddard Space Flight Ctr.; R. A. Woodruff, Lockheed Martin Space Systems Co.; N. J. Woolf, The Univ. of Arizona/Steward Observatory [6693-18]

12:00 pm: **A conceptual design for an exoplanet imager**, D. C. Hyland, R. Mosher, A. Momin, G. Iglesias, Q. Donnellan, Texas A&M Univ. [6693-19]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 8

Conv. Ctr. 29B **Wed. 1:50 to 3:10 pm**

Missions and Instruments III

Chair: Tristram T. Hyde, NASA Goddard Space Flight Ctr.

1:50 pm: **A new mission concept THESIS: the Transiting Habitable-zone Exoplanet Spectroscopy Infrared Spacecraft**, M. R. Swain, Jet Propulsion Lab. [6693-20]

2:10 pm: **Developments in polarization nulling interferometry for exoplanet detection**, J. Spronck, S. F. Pereira, J. J. M. Braat, Technische Univ. Delft (Netherlands) [6693-21]

2:30 pm: **Analytic treatment of instrumental defects in exoplanet imaging with particular reference to the pupil-replication method**, A. H. Greenaway, G. N. Craik, A. N. Johnson, R. J. Eastwood, F. H. P. Spaan, Heriot-Watt Univ. (United Kingdom) [6693-22]

2:50 pm: **Calculation of signal-to-noise ratio for image formation using multispectral intensity correlation**, D. C. Hyland, Texas A&M Univ. [6693-23]

Coffee Break 3:10 to 3:40 pm

OPTICS

Conference 6693 • Conv. Ctr. 29B

SESSION 9

Conv. Ctr. 29B Wed. 3:40 to 5:10 pm

TPF-Coronagraph

Chair: Martin C. Noecker, Ball Aerospace & Technologies Corp.

- 3:40 pm: **Recent developments in visible terrestrial planet finder mission design and technology (Invited Paper)**, M. B. Levine, S. B. Shaklan, W. A. Traub, Jet Propulsion Lab. [6693-24]
- 4:10 pm: **The lighter side of TPF-C: evaluating the scientific gain from a smaller mission concept**, S. L. Hunyadi, S. B. Shaklan, Jet Propulsion Lab. [6693-26]
- 4:30 pm: **Broadband wave front control in a pupil remapping coronagraph**, O. Guyon, National Astronomical Observatory of Japan/Subaru Telescope; S. B. Shaklan, Jet Propulsion Lab. [6693-27]
- 4:50 pm: **A holographic vortex coronagraph for high-contrast imaging**, D. M. Palacios, Jet Propulsion Lab. [6693-28]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Optimizing the broadband performance of TPF's high-contrast imaging testbed through modeling and simulations**, E. Sidick, B. D. Kern, A. C. Kuhnet, J. T. Trauger, Jet Propulsion Lab. [6693-49]
- ✓ **Effects of optical density and phase dispersion of an imperfect band-limited occulting mask on the broadband performance of a TPF coronagraph**, E. Sidick, K. Balasubramanian, Jet Propulsion Lab. [6693-50]
- ✓ **Fractal analysis of noise buried time series signals with application to exoplanet spectroscopy**, G. Tremberger, Jr., T. Holden, E. Cheung, J. Boteju, F. Garcia, P. S. Schneider, H. Yao, A. Flamholz, P. J. Marchese, D. H. Lieberman, T. D. Cheung, Queensborough Community College/CUNY [6693-51]
- ✓ **Light scattering from the New Worlds Observer occulter**, J. W. Arenberg, Northrop Grumman Space Technology [6693-52]
- ✓ **Wavelength-dependent complex transmission profiles of band-limited coronagraph occulting masks measured in situ**, B. D. Kern, D. W. Wilson, Jet Propulsion Lab. [6693-53]
- ✓ **A proposed laser frequency comb based wavelength reference for high-resolution spectroscopy**, S. N. Osterman, C. S. Froning, M. Beasley, Univ. of Colorado/Boulder; S. A. Diddams, National Institute of Standards and Technology; P. J. MacQueen, The Univ. of Texas at Austin [6693-54]
- ✓ **Estimation of confusion in SIM targets with a detailed focal plane model**, S. Rengaswamy, R. J. Allen, Space Telescope Science Institute [6693-56]
- ✓ **The use of amplitude and phase in the design of hybrid Lyot coronagraph masks**, D. C. Moody, Jr., J. T. Trauger, Jet Propulsion Lab. [6693-57]
- ✓ **Detection of synthetic exoplanets and exo-zodiacal light in the lab with the shaped pupil coronagraph**, R. Belikov, L. A. Pueyo, Princeton Univ.; A. Give' on, Jet Propulsion Lab.; N. J. Kasdin, Princeton Univ. [6693-58]
- ✓ **Lithographically defined silicon high-resolution shaped pupil masks for TPF coronagraph**, V. E. White, M. R. Dickie, P. M. Echternach, K. Balasubramanian, Jet Propulsion Lab.; R. Belikov, Princeton Univ. [6693-59]

- ✓ **Fresnel rhombs as achromatic phase shifters for infrared nulling interferometry**, C. P. Hanot, D. Mawet, C. J. M. Lenaerts, Institut d'Astrophysique et de Géophysique, Université de Liège (Belgium); P. Riaud, Observatoire de Paris à Meudon (Belgium); J. J. D. Loicq, D. P. G. Vandormael, Centre Spatial de Liège-Université de Liège (Belgium); D. Defrère, Institut d'Astrophysique et de Géophysique, Université de Liège (Belgium); K. Fleury, J. D. Plesseria, Centre Spatial de Liège-Université de Liège (Belgium); J. M. G. Surdej, Institut d'Astrophysique et de Géophysique, Université de Liège (Belgium); S. L. M. Habraken, Institut d'Astrophysique et de Géophysique, Université de Liège (Belgium) and Centre Spatial de Liège (Belgium) [6693-62]
- ✓ **The annular groove phase mask coronagraph: an achromatic optical vortex**, D. Mawet, Univ. de Liège (Belgium); P. Riaud, Observatoire de Paris à Meudon (Belgium); C. P. Hanot, Univ. de Liège (Belgium) [6693-63]
- ✓ **Potential of space-based infrared Bracewell interferometers for planet detection**, D. Defrère, Institut d'Astrophysique et de Géophysique, Univ. de Liège (Belgium); O. Absil, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); C. P. Hanot, Institut d'Astrophysique et de Géophysique, Univ. de Liège (Belgium) [6693-64]

Thursday 30 August

SESSION 10

Conv. Ctr. 29B Thurs. 8:40 to 10:00 am

Missions and Instruments IV

Chair: David C. Hyland, Texas A&M Univ.

- 8:40 am: **System assessment study of the ESA Darwin Mission: concepts trade-off and first iteration design on novel Emma arrangement**, C. Ruilier, R. Krawczyk, M. Sghedoni, O. Chanal, C. Degrelle, L. Pirson, O. Simane, E. Thomas, Alcatel Alenia Space (France) [6693-30]
- 9:00 am: **X-array aperture configuration in planar or non-planar spacecraft formation for DARWIN/TPF-I candidate architectures**, O. Wallner, K. Ergenzinger, R. Flatscher II, U. A. Johann, EADS Astrium GmbH (Germany) [6693-31]
- 9:20 am: **GEDI: the Gemini Exoplanet Discovery Instrument**, J. P. Lloyd, Cornell Univ.; T. S. Barman, Lowell Observatory; D. B. Charbonneau, Harvard-Smithsonian Ctr. for Astrophysics; R. T. Duck, J. Edelstein, D. J. Erskine, W. M. Feuerstein, Univ. of California/Berkeley; G. E. Gull, C. P. Henderson, T. L. Herter, Cornell Univ.; M. S. Marley, NASA Ames Research Ctr.; A. M. Moore, California Institute of Technology; M. W. Muterspaugh, Univ. of California/Berkeley; S. C. Parshley, B. E. Pirger, Cornell Univ.; I. N. Reid, Space Telescope Science Institute; D. Saumon, Los Alamos National Lab.; H. R. Schember, J. Schoenwald, G. W. Stasavage, Cornell Univ.; J. M. Wheatley, Univ. of California/Berkeley; R. J. White, The Univ. of Alabama in Huntsville; E. H. Wishnow, Univ. of California/Berkeley [6693-32]
- 9:40 am: **TEDI: the TripleSpec Exoplanet Discovery Instrument**, J. Edelstein, Univ. of California/Berkeley; D. J. Erskine, Lawrence Berkeley National Lab.; W. M. Feuerstein, M. R. Marckwordt, M. W. Muterspaugh, E. Wishnow, Univ. of California/Berkeley; J. P. Lloyd, T. L. Herter, C. P. Henderson, S. C. Parshley, Cornell Univ. [6693-33]
- Coffee Break 10:00 to 10:30 am

SESSION 11

Conv. Ctr. 29B **Thurs. 10:30 am to 12:00 pm**

Coronagraph Technology I

Chair: Marie B. Levine, Jet Propulsion Lab.

- 10:30 am: **Laboratory demonstration of high-contrast imaging technologies and algorithms for Space coronagraphy (Invited Paper)**, J. T. Trauger, B. Gordon, B. D. Kern, A. C. Kuhnert, D. C. Moody, Jr., A. F. Niessner, F. Shi, D. W. Wilson, Jet Propulsion Lab.; C. J. Burrows, Metajiva [6693-35]
- 11:00 am: **Demonstration of high contrast in broadband light with the shaped pupil coronagraph**, R. Belikov, Princeton Univ.; A. Give'on, Jet Propulsion Lab.; E. J. Cady, J. D. Kay, N. J. Kasdin, Princeton Univ.; S. B. Shaklan, J. T. Trauger, Jet Propulsion Lab. [6693-36]
- 11:20 am: **Thickness-dependent optical properties of metals and alloys applicable to TPF coronagraph image masks**, K. Balasubramanian, D. W. Wilson, B. D. Kern, E. Sidick, Jet Propulsion Lab. [6693-37]
- 11:40 am: **Contrast enhancement of a high Strehl PSF using wavelength diversity**, L. A. Pueyo, R. Belikov, N. J. Kasdin, Princeton Univ. [6693-38]
- Lunch/Exhibition Break 12:00 to 1:40 pm

SESSION 12

Conv. Ctr. 29B **Thurs. 1:40 to 3:00 pm**

Coronagraph Technology II

Chair: John T. Trauger, Jet Propulsion Lab.

- 1:40 pm: **Advancements of the optical vortex coronagraph**, G. A. Swartzlander, E. Ford, R. S. Abdul-Malik, J. Kim, College of Optical Sciences/The Univ. of Arizona; L. M. Close, M. A. Peters, The Univ. of Arizona/Steward Observatory; D. M. Palacios, D. W. Wilson, Jet Propulsion Lab. [6693-39]
- 2:00 pm: **Amplitude variations on the ExAO testbed**, J. W. Evans, Lawrence Livermore National Lab.; S. Thomas, Univ. of California/Santa Cruz; D. W. Phillion, Lawrence Livermore National Lab.; D. T. Gavel, D. R. Dillon, Univ. of California/Santa Cruz; B. A. Macintosh, Lawrence Livermore National Lab. [6693-40]
- 2:20 pm: **Active thermal figure control for the TOPS II primary mirror**, J. R. P. Angel, T. Kang, B. Cuerden, The Univ. of Arizona/Steward Observatory; H. P. Stahl, NASA Marshall Space Flight Ctr.; O. Guyon, National Astronomical Observatory of Japan/Subaru Telescope [6693-41]
- 2:40 pm: **Broadband effects in hybrid pupil mapping shaped pupil designs**, L. A. Pueyo, R. J. Vanderbei, N. J. Kasdin, Princeton Univ. [6693-42]
- Coffee Break 3:00 to 3:30 pm

SESSION 13

Conv. Ctr. 29B **Thurs. 3:30 to 5:30 pm**

Interferometer Technology

Chair: Peter R. Lawson, Jet Propulsion Lab.

- 3:30 pm: **Adaptive nulling in the mid-IR for the terrestrial planet finder interferometer**, R. D. Peters, O. P. Lay, M. Jeganathan, Jet Propulsion Lab.; A. Hirai, National Institute of Advanced Industrial Science and Technology (Japan) [6693-43]
- 3:50 pm: **Achromatic phase shifter**, D. Rouan, D. Pelat, Observatoire de Paris à Meudon (France) [6693-44]
- 4:10 pm: **Deep nulling in unpolarized light**, C. Buisset, Observatoire de la Côte d'Azur (France); X. Rejeaunier, Alcatel Alenia Space (France); Y. Rabbia, Observatoire de la Côte d'Azur (France); M. Barillot, Alcatel Alenia Space (France) [6693-45]
- 4:30 pm: **Current progress on TPF-I achromatic nulling at the Jet Propulsion Laboratory**, R. O. Gappinger, R. T. Diaz, S. R. Martin, F. M. Loya, P. R. Lawson, Jet Propulsion Lab. [6693-46]
- 4:50 pm: **Single-mode nulling coronagraphy: first IR results**, B. P. Mennesson, E. Serabyn, Jet Propulsion Lab. [6693-47]
- 5:10 pm: **Vectorial analysis of polarization issues in multi-axial nulling interferometers for exoplanet detection**, J. Spronck, S. F. Pereira, J. J. M. Braat, Technische Univ. Delft (Netherlands) [6693-48]



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Conference 6694 • Conv. Ctr. 29C

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6694

Instruments, Methods, and Missions for Astrobiology X

Conference Chairs: **Richard B. Hoover**, NASA Marshall Space Flight Ctr.; **Gilbert V. Levin**, Spherix Inc.; **Alexei Y. Rozanov**, Paleontological Institute (Russia); **Paul C. W. Davies**, Arizona State Univ.

Program Committee: **Mian M. Abbas**, NASA Marshall Space Flight Ctr.; **Sabit S. Abyzov**, Institute of Microbiology (Russia); **Marina M. Astafieva**, Paleontological Institute (Russia); **Stanley M. Awramik**, Univ. of California/Santa Barbara; **Bonnie K. Baxter**, Westminster College; **Lee Bebout**, NASA Ames Research Ctr.; **Kathleen C. Benison**, Central Michigan Univ.; **Adrian J. Brown**, SETI Institute; **Donald E. Brownlee**, Univ. of Washington; **Mark A. Bullock**, Southwest Research Institute; **Mark J. Burchell**, Univ. of Kent (United Kingdom); **Nathalie A. Cabrol**, NASA Ames Research Ctr.; **Francisco J. Carrapico**, Univ. de Lisboa (Portugal); **Bin Chen**, SETI Institute; **Max L. Coleman**, Jet Propulsion Lab.; **David W. Deamer**, Univ. of California/Santa Cruz; **Michael H. Engel**, Univ. of Oklahoma; **Sabrina Feldman**, Jet Propulsion Lab.; **Eric M. Galimov**, V.I. Vernadsky Institute (Russia); **David H. Grinspoon**, Denver Museum of Art and Science; **J. Patrick Kociolek**, California Academy of Sciences; **Vera M. Kolb**, Univ. of Wisconsin/Parkside; **Jere H. Lipps**, Univ. of California/Berkeley; **Gene D. McDonald**, The Univ. of Texas at Austin; **David S. McKay**, NASA Johnson Space Ctr.; **Uwe Meierhenrich**, Univ. de Nice Sophia Antipolis (France); **Melanie R. Mormile**, Univ. of Missouri/Rolla; **David J. Mossman**, Mount Allison Univ. (Canada); **Roland R. Paepe**, Geobound International Ltd. (Netherlands); **Randall S. Perry**, Imperial College London (United Kingdom); **Elena V. Pikuta**, NASA Marshall Space Flight Ctr.; **Holly C. Pinkart**, Central Washington Univ.; **Malcom Potts**, Virginia Polytechnic Institute and State Univ.; **Lisa M. Pratt**, Indiana Univ.; **Francois C. Raulin**, Univ. Paris 12 Val-de-Marne (France); **Birgit I. Sattler**, Leopold-Franzens-Univ. Innsbruck (Austria); **Joseph Seckbach**, The Hebrew Univ. of Jerusalem (Israel); **Zdenek Sekanina**, Jet Propulsion Lab.; **Mark A. Sephton**, Imperial College London (United Kingdom); **Alexandre S. Simionovici**, Ecole normale supérieure de Lyon (France); **Paul P. Siplera**, Harper College; **Peter Smith**, The Univ. of Arizona; **Michael C. Storrie-Lombardi**, Kinohi Institute; **Vitaly J. Vodyanoy**, Auburn Univ.; **Milton Wainwright**, The Univ. of Sheffield (United Kingdom); **Max K. Wallis**, Cardiff Univ. (United Kingdom); **Nalin C. Wickramasinghe**, Cardiff Univ. (United Kingdom); **Andreja Zalar**, Institut National de la Recherche Agronomique (France); **Georgi A. Zavarzin**, Institute of Microbiology (Russia)

Tuesday 28 August

Introduction

Conv. Ctr. 29C Tues. 8:00 to 8:05 am

Richard R. Hoover, NASA Marshall Space Flight Ctr.

SESSION 1

Conv. Ctr. 29C Tues. 8:05 to 10:20 am

The Origin of Life

Chairs: **David S. McKay**, NASA Johnson Space Ctr.; **David W. Deamer**, Univ. of California/Santa Cruz

Keynote

8:05 am: **Reduced condition on early Earth and ATP-related mechanism of prebiological evolution (Keynote)**, E. M. Galimov, V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry (Russia) [6694-01]

8:50 am: **Search for the origin of life homochirality: asymmetric photon-induced processes on amino acids with far-UV circularly polarized synchrotron radiation (Invited Paper)**, L. F. Nahon, G. Garcia, Synchrotron SOLEIL (France); I. Powis, The Univ. of Nottingham (United Kingdom); U. Meierhenrich, Univ. de Nice Sophia Antipolis (France); A. Brack, Ctr. National de la Recherche Scientifique (France) [6694-02]

9:20 am: **Could there have been a single origin of life in a big bang universe?**, R. Gordon, Univ. of Manitoba (Canada); R. B. Hoover, NASA Marshall Space Flight Ctr. [6694-03]

9:40 am: **Importance of the interaction between sodium silicate and organic materials to astrobiology: examples from our laboratory**, V. M. Kolb, P. J. Liesch, Univ. of Wisconsin/Parkside [6694-04]

10:00 am: **Contribution for a simbiogenic approach in astrobiology**, F. J. Carrapico, L. Pereira, T. Rodrigues, Univ. de Lisboa (Portugal) [6694-05]

Coffee Break 10:20 to 10:40 am

SESSION 2

Conv. Ctr. 29C Tues. 10:40 am to 12:00 pm

Microfossils in Ancient Rocks and Meteorites

Chairs: **Eric M. Galimov**, V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry (Russia); **Vera M. Kolb**, Univ. of Wisconsin/Parkside

10:40 am: **Recent investigations of the Mars meteorites (Invited Paper)**, D. S. McKay, NASA Johnson Space Ctr. [6694-06]

11:10 am: **Fossil cyanobacteria in carbonaceous meteorites**, R. B. Hoover, NASA Marshall Space Flight Ctr. [6694-07]

11:40 am: **Early Proterozoic (2.0 GA) phosphorites from Pechenga Greenstone Belt and their origin (Invited Paper)**, A. Y. Rozanov, M. M. Astafieva, Paleontological Institute (Russia); R. B. Hoover, NASA Marshall Space Flight Ctr. [6694-08]

Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 3

Conv. Ctr. 29C Tues. 1:20 to 3:30 pm

Chemical and Mineral Biomarkers

Chairs: **Mark J. Burchell**, Univ. of Kent at Canterbury (United Kingdom); **Zdenek Sekanina**, Jet Propulsion Lab.

1:20 pm: **Stable sulfur isotopes as probes for ancient life in the solar system (Invited Paper)**, M. H. Engel, Univ. of Oklahoma [6694-10]

1:50 pm: **The case for vestiges of early solar system biota in carbonaceous chondrites: petroleum geochemical snapshots and possible future petroleum prospects on Mars expedition (Invited Paper)**, P. K. Mukhopadhyay, Global Geoenergy Research Ltd. (Canada); D. J. Mossman, J. M. Ehrman, Mt. Allison Univ. (Canada); M. A. Kruge, Montclair State Univ. [6694-11]

2:10 pm: **Ratios of biogenic elements for distinguishing recent from fossil micro-organisms**, R. B. Hoover, NASA Marshall Space Flight Ctr. . [6694-12]

2:30 pm: **An integrated strategy for detecting present or former life on other planets: the case for mineral biosignatures (Invited Paper)**, M. L. Coleman, Jet Propulsion Lab. [6694-13]

3:00 pm: **Possible interstellar origin of amino acids in carbonaceous chondrites (Invited Paper)**, Y. Ellinger, M. Lattalais, F. Pauzat, Univ. Pierre et Marie Curie (France); B. Zanda, Muséum National d'Histoire Naturelle (France) [6694-55]

Coffee Break 3:30 to 3:50 pm

SESSION 4

Conv. Ctr. 29C Tues. 3:50 to 5:30 pm

Comets, Meteorites, and the Biosphere

Chairs: **Gilbert V. Levin**, Spherix Inc.; **Max L. Coleman**, Jet Propulsion Lab.

3:50 pm: **Stardust and comets (Invited Paper)**, M. J. Burchell, Univ. of Kent at Canterbury (United Kingdom) [6694-14]

4:20 pm: **The cometary biosphere (Invited Paper)**, R. B. Sheldon, R. B. Hoover, NASA Marshall Space Flight Ctr. [6694-15]

4:40 pm: **Dust jets, outbursts, and fragmentation of comets (Invited Paper)**, Z. Sekanina, Jet Propulsion Lab. [6694-16]

5:10 pm: **Probabilistic classification of elemental abundance distributions in Nakhla and Apollo 17 lunar dust samples**, M. C. Storrie-Lombardi, Kinohi Institute; R. B. Hoover, NASA Marshall Space Flight Ctr. [6694-17]

Panel Discussion

Marriott Marina F. Tues 8:00 to 10:00 pm

Life in the Cosmos

Panel Moderators:

Paul C. W. Davies, BEYOND - Ctr. for Fundamental Concepts in Science, Arizona State Univ.

Richard B. Hoover, NASA/National Space Science and Technology Ctr.

Panel Members:

Erik M. Galimov, V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry (Russia)

Francois C. Raulin, GDR CNRS Exobio (France)

Alexei Yu. Rozanov, Institute of Paleontology (Russia)

David S. McKay, NASA Johnson Space Ctr.

Gilbert V. Levin, Spherix, Inc.

Michael Storrie-Lombardi, Kinohi Institute

Jere H. Lipps, Univ. of California/Berkeley

David Deamer, Univ. California/Santa Cruz

Joseph Seckbach, The Hebrew Univ. of Jerusalem (Israel)

Wednesday 29 August

Session 5

Conv. Ctr. 29C Wed. 8:00 to 8:50 am

Life as We Do Not Know It

Chair: **Richard B. Hoover**, NASA Marshall Space Flight Ctr.

Keynote Presentation

8:00 am: **Searching for an alternative form of life on Earth (Keynote)**, P. C. W. Davies, Arizona State Univ. [6694-19]

SESSION 6

Conv. Ctr. 29C Wed. 8:50 am to 12:30 pm

Astrobiology of Venus, Mars, and Icy Moons

Chairs: **Jere H. Lipps**, Univ. of California/Berkeley; **Peter Smith**, The Univ. of Arizona

Keynote Presentation

8:50 am: **Titan: an astrobiological laboratory in the solar system (Keynote)**, F. C. Raulin, P. Coll, M. Nguyen, Univ. Paris 12 Val-de-Marne (France) [6694-20]

9:30 am: **The revival of life on Mars (Invited Paper)**, G. V. Levin, Spherix Inc. [6694-21]

10:00 am: **Biogenic hydrogen peroxide: reinterpretation of the Viking results and properties of possible life on Mars**, J. M. Houtkooper, Justus-Liebig-Univ. Giessen (Germany); D. Schulze-Makuch, Washington State Univ. [6694-22]

Coffee Break 10:20 to 10:40 am

10:40 am: **The biological oxidant and life detection (BOLD) mission: a new proposal for a mission to Mars**, D. Schulze-Makuch, Washington State Univ.; J. M. Houtkooper, Justus-Liebig-Univ. Giessen (Germany) [6694-23]

11:00 am: **The Phoenix mission to Mars (Invited Paper)**, P. Smith, The Univ. of Arizona [6694-24]

11:30 am: **Astrobiology on the surface of Venus (Invited Paper)**, M. A. Bullock, D. H. Grinspoon, Southwest Research Institute [6694-25]

12:00 pm: **Origin and early evolution of life on icy worlds (Invited Paper)**, J. H. Lipps, Univ. of California/Berkeley; D. Schulze-Makuch, Washington State Univ. [6694-26]

Lunch/Exhibition Break 12:30 to 1:40 pm

SESSION 7

Conv. Ctr. 29C Wed. 1:40 to 3:10 pm

Distribution of Life

Chairs: **François C. Raulin**, Univ. Paris 12 Val-de-Marne (France); **Melanie R. Mormile**, Univ. of Missouri/Rolla

1:40 pm: **Diatoms: unique eukaryotic extremophiles providing insights into planetary change (Invited Paper)**, J. P. Kociolek, California Academy of Sciences [6694-27]

2:10 pm: **How do bacteria reach the stratosphere?**, M. Wainwright, A. Laswd, J. Gilmour, F. Alshammari, The Univ. of Sheffield (United Kingdom) . [6694-29]

2:30 pm: **UV-VUV absorption spectroscopy of DNA and UV screens suggests strategies for UV resistance during evolution and space travel (Invited Paper)**, A. Zalar, D. A. Tepfer, Institut National de la Recherche Agronomique (France); S. V. Hoffmann, Århus Univ. (Denmark); A. Kollmann, Institut National de la Recherche Agronomique (France); S. Leach, Observatoire de Paris à Meudon (France) [6694-30]

2:50 pm: **Testing prospects for reliable diatom nanotechnology in microgravity**, R. Gordon, Univ. of Manitoba (Canada); R. B. Hoover, NASA Marshall Space Flight Ctr.; J. A. Tuszyński, Univ. of Alberta (Canada) [6694-31]

Coffee Break 3:10 pm

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SESSION 8

Conv. Ctr. 29C Wed. 3:50 to 5:40 pm

Microbial Extremophiles

Chairs: **Mark A. Bullock**, Southwest Research Institute; **J. Patrick Kociolek**, California Academy of Sciences

3:50 pm: **Extremophilic candidates to astrobiology (Invited Paper)**, J. Seckbach, The Hebrew Univ. of Jerusalem (Israel) [6694-32]

4:20 pm: **Characterization of a moderately halo-acidophilic bacterium isolated from Lake Brown, Western Australia**, M. R. Mormile, B. Hong, N. Adams, Univ. of Missouri/Rolla; K. C. Benison, Central Michigan Univ.; F. Obokunle, Univ. of Missouri/Rolla [6694-33]

4:40 pm: **Diversity, evolution, and horizontal gene transfer in Soda Lakes**, H. C. Pinkart, Central Washington Univ.; M. C. Storrie-Lombardi, Kinohi Institute [6694-34]

5:00 pm: **Investigating microbial diversity and UV radiation impact at the high-altitude Lake Aguas Calientes, Chile**, C. S. Demergasso, L. E. González, Univ. Católica del Norte (Chile); E. O-Casamayor, Ctr. d'Estudis Avançats de Blanes (Spain); M. E. Farias, Consejo Superior de Investigaciones Científicas (Spain); N. A. Cabrol, E. A. Grin, NASA Ames Research Ctr.; E. Minkley, Jr., Y. Yu, Carnegie Mellon Univ. [6694-35]

5:20 pm: **2006 HLP diving expedition in the highest volcanic lake on Earth and characterization of its ecosystem (Invited Paper)**, N. A. Cabrol, NASA Ames Research Ctr.; E. Minkley, Jr., Y. Yu, Carnegie Mellon Univ.; E. A. Grin, C. Woosley, R. L. Morris, NASA Ames Research Ctr. [6694-36]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

✓ **Living strategies of unusual life forms on Earth and the relevance to astrobiology (Invited Paper)**, V. M. Kolb, P. J. Liesch, Univ. of Wisconsin/Parkside [6694-48]

✓ **The importance of the Maillard-metal complexes and their silicates in astrobiology**, V. M. Kolb, P. J. Liesch, Univ. of Wisconsin/Parkside [6694-49]

Thursday 30 August

SESSION 9

Conv. Ctr. 29C Thurs. 8:40 to 10:00 am

Instruments and Methods for Astrobiology

Chairs: **Holly C. Pinkart**, Central Washington Univ.; **Michael C. Storrie-Lombardi**, Kinohi Institute

8:40 am: **Nanopore biosensors and the search for biosignatures**, D. W. Deamer, Univ. of California/Santa Cruz [6694-37]

9:00 am: **MR PRISM: a software suite for CRISM data analysis**, A. J. Brown, SETI Institute; M. C. Storrie-Lombardi, Kinohi Institute [6694-40]

9:20 am: **High-resolution light microscopy of nanoforms**, V. J. Vodyanoy, O. M. Pustovsky, A. Vainrub, Auburn Univ. [6694-41]

9:40 am: **In situ search for life traces in extraterrestrial samples by synchrotron x-ray fluorescence 2D and 3D imaging**, L. Lemelle, A. S. Simionovici, Ecole normale supérieure de Lyon (France); M. Salome, P. Bleuet, J. Susini, European Synchrotron Radiation Facility (France); P. Gillet, Ecole normale supérieure de Lyon (France) [6694-42]

Coffee Break 10:00 to 10:30 am

SESSION 10

Conv. Ctr. 29C Thurs. 10:30 to 11:50 am

Survivability to Radiation, Dessication, and Shock

Chairs: **Nathalie A. Cabrol**, NASA Ames Research Ctr.; **Lee Bebout**, NASA Ames Research Ctr.

10:30 am: **Great Salt Lake halophilic archaea as models for astrobiology: evidence for ultraviolet irradiation and desiccation resistance**, B. K. Baxter, B. Eddington, M. R. Riddle, T. Webster, B. J. Avery, Westminster College [6694-43]

10:50 am: **Survival of microbial life under shock compression: implications for panspermia**, M. J. Burchell, Univ. of Kent at Canterbury (United Kingdom) [6694-44]

11:10 am: **ATCG nucleotide fluctuation of Deinococcus radiodurans radiation genes**, T. Holden, R. Subramaniam, R. Sullivan, E. Cheung, C. Schneider, G. Tremberger, Jr., A. Flamholz, D. H. Lieberman, T. D. Cheung, Queensborough Community College/CUNY [6694-45]

11:30 am: **Radiotolerance of micro-organisms isolated from radiation fields on a university campus: implications for shallow subsurface growth of micro-organisms on Mars**, M. R. Mormile, J. J. Elmer, S. J. Spsychala, Univ. of Missouri-Rolla [6694-46]

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

SESSION 11

Conv. Ctr. 29C Thurs. 1:30 to 3:30 pm

Chirality and Astrobiology

Chairs: **Joseph Seckbach**, The Hebrew Univ. of Jerusalem (Israel); **Milton Wainwright**, The Univ. of Sheffield (United Kingdom)

1:30 pm: **Astrobiological polarimeter**, N. Kothari, A. Jafarpour, R. P. Trebino, T. L. Thaler, A. S. Bommaris, Georgia Institute of Technology [6694-47]

1:50 pm: **Apparent biotic micromorphologies of abiotic origins**, G. A. Konesky, SGK Nanostructures, Inc. [6694-50]

2:10 pm: **The red soil on Mars as a proof for water and vegetation**, R. R. Paepe, Geobound International Ltd. (Netherlands) [6694-51]

2:30 pm: **Limits of life and microbial extremophiles**, E. V. Pikuta, National Space Science and Technology Ctr.; R. B. Hoover, NASA Marshall Space Flight Ctr. [6694-52]

2:50 pm: **Raman spectra identifications of mineral and organic constituents**, B. Chen, C. R. Stoker, N. A. Cabrol, C. P. McKay, NASA Ames Research Ctr. [6694-53]

3:10 pm: **Co-evolution of cyanophage and cyanobacteria in Antarctic lakes: adaptive responses to high-UV flux and global warming**, M. C. Storrie-Lombardi, Kinohi Institute [6694-54]

Conference 6695 • Conv. Ctr. 26B

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6695

Optics and Photonics for Information Processing

Conference Chairs: **Abdul A. S. Awwal**, Lawrence Livermore National Lab.; **Khan M. Iftekharuddin**, Univ. of Memphis; **Bahram Javidi**, Univ. of Connecticut

Program Committee: **Henri H. Arsenault**, Univ. Laval (Canada); **George Barbastathis**, Massachusetts Institute of Technology; **Fred R. Beyette, Jr.**, Univ. of Cincinnati; **David P. Casasent**, Carnegie Mellon Univ.; **H. John Caulfield**, Diversified Research Corp.; **Yeshaiahu Fainman**, Univ. of California/San Diego; **Pietro Ferraro**, Istituto Nazionale di Ottica Applicata (Italy); **James G. Grote**, Air Force Research Lab.; **Laurence G. Hassebrook**, Univ. of Kentucky; **Kazuyoshi Itoh**, Osaka Univ. (Japan); **Mohammad A. Karim**, Old Dominion Univ.; **Yao Li**, Alliance Fiber Optic Products Inc.; **Robert Magnusson**, Univ. of Connecticut; **Abhijit Mahalanobis**, Lockheed Martin Missiles and Fire Control; **Manuel Martínez-Corral**, Univ. de València (Spain); **Osamu Matoba**, Kobe Univ. (Japan); **Alastair D. McAulay**, Lehigh Univ.; **Maria S. Millán García-Varela**, Univ. Politècnica de Catalunya (Spain); **Nasser M. Nasrabadi**, Army Research Lab.; **Thomas J. Naughton**, National Univ. of Ireland/Maynooth (Ireland); **Takanori Nomura**, Wakayama Univ. (Japan); **Elisabet Pérez-Cabré**, Univ. Politècnica de Catalunya (Spain); **Ting-Chung Poon**, Virginia Polytechnic Institute and State Univ.; **Philippe Réfrégier**, Institut Fresnel (France); **Nabeel A. Riza**, College of Optics & Photonics/Univ. of Central Florida; **Joseph Rosen**, Ben-Gurion Univ. of the Negev (Israel); **Firooz A. Sadjadi**, Lockheed Martin Corp.; **John T. Sheridan**, National Univ. of Ireland/Dublin (Ireland); **Jung-Young Son**, Hanyang Univ. (South Korea); **Clay J. Stanek**, DataPath, Inc.; **Enrique Tajahuerce**, Univ. Jaume I (Spain); **Jun Tanida**, Osaka Univ. (Japan); **Shyh-Lin Tsao**, National Taiwan Normal Univ. (Taiwan); **Kelvin H. Wagner**, Univ. of Colorado/Boulder; **Cardinal Warde**, Massachusetts Institute of Technology; **Frank Wyrowski**, Friedrich-Schiller-Univ. Jena (Germany); **Toyohiko Yatagai**, Univ. of Tsukuba (Japan); **Francis T. S. Yu**, The Pennsylvania State Univ.; **Maria J. Yzuel**, Univ. Autònoma de Barcelona (Spain)

Tuesday 28 August

SESSION 1

Conv. Ctr. 26B Tues. 1:30 to 3:20 pm

Switching and Interconnects

Chair: **Guoqiang Li**, College of Optical Sciences/The Univ. of Arizona

1:30 pm: **New active device design: routing wavelength switch based on 2x2 micro-ring resonators (Invited Paper)**, S. Tsao, H. Chang, C. Chu, National Taiwan Normal Univ. (Taiwan) [6695-01]

2:00 pm: **All-optical switching triode based on negative feedback optical amplification effect in semiconductor optical amplifiers**, J. Huh, Toyota Technological Institute (Japan) [6695-02]

2:20 pm: **Active linear phase bandpass filter for DWDM systems with slanted gratings**, B. Stelzig, U. Barabas, Univ. der Bundeswehr München (Germany) [6695-03]

2:40 pm: **Optimization of optical switching with a ferroelectric liquid crystal modulator**, I. S. Moreno, M. M. Sanchez-Lopez, P. Velásquez, Univ. Miguel Hernández de Elche (Spain) [6695-04]

3:00 pm: **Surface plasmon resonance-based optical sensor design using spatial filtering**, A. K. Ghosh, Univ. of Oklahoma; V. Siddharth, Indian Institute of Technology Kanpur (India) [6695-05]

Coffee Break 3:20 to 3:50 pm

SESSION 2

Conv. Ctr. 26B Tues. 3:50 to 5:00 pm

Digital Optical Computing I

Chair: **Shyh-Lin Tsao**, National Taiwan Normal Univ. (Taiwan)

3:50 pm: **All optical delay of images using slow light (Invited Paper)**, J. C. Howell, R. M. Camacho, C. Broadbent, I. Ali Khan, Univ. of Rochester [6695-06]

4:20 pm: **Optoelectronic logic gates based on synthesized diffracting phase gratings**, R. L. Kobzareno, H. L. Lysenko, Vinnytsia National Technical Univ. (Ukraine) [6695-07]

4:40 pm: **Design of half and full optical binary adders using the polarization optical processor architecture**, Y. A. Zaghoul, ITR Technologies Inc.; A. R. M. Zaghoul, Georgia Institute of Technology [6695-09]

Wednesday 29 August

Image and Signal Processing Plenary Presentation

Conv. Ctr. Ballroom 20A Wed. 8:30 to 9:15 am

3D Home Theatre Systems, K. M. Johnson, Duke Univ. [6695-01]

See pg. 20 for presentation overviews.

SESSION 3

Conv. Ctr. 26B Wed. 10:30 to 11:40 am

Digital Optical Computing II

Chair: **Mohammad A. Matin**, Univ. of Denver

10:30 am: **Polarization optical processor, binary optical gates, wave polarization, thin films, and ellipsometry (Invited Paper)**, A. R. M. Zaghoul, Georgia Institute of Technology; Y. A. Zaghoul, ITR Technologies Inc. [6695-10]

11:00 am: **A method for factorization by means of digital optical computing and image compression**, K. Nitta, Y. Tado, O. Matoba, T. Yoshimura, Kobe Univ. (Japan) [6695-11]

11:20 am: **Optical coherence photorefractive holographic imaging at 1.03- μ m wavelength**, G. Li, J. Thomas, N. N. Peyghambarian, College of Optical Sciences/The Univ. of Arizona [6695-12]

Lunch/Exhibition Break 11:40 am to 1:30 pm

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SESSION 4

Conv. Ctr. 26B Wed. 1:30 to 3:10 pm

3D Display

Chair: Kouichi Nitta, Kobe Univ. (Japan)

- 1:30 pm: **Three-dimensional image acquisition with novel time-of-flight range camera and real-time processing of the 3D data**, B. Koenig, P. Mengel, L. Listl, Siemens AG (Germany); B. Hosticka, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme (Germany) [6695-15]
- 1:50 pm: **Multiviewing angle display and touch-panel interface system for collaborative task surrounding round table**, K. Sakamoto, A. Tanaka, M. Adachi, Shimane Univ. (Japan) [6695-16]
- 2:10 pm: **Three-dimensional information acquisition using a compound imaging system**, R. Horisaki, S. Irie, Y. Ogura, J. Tanida, Osaka Univ. (Japan) [6695-17]
- 2:30 pm: **Virtual display: mirror image of dual-views display and interface system for extension of screen region**, H. Morimoto, A. Tanaka, K. Sakamoto, Shimane Univ. (Japan) [6695-18]
- 2:50 pm: **Light refraction modeling for computational Schlieren imaging in symmetrical flows**, I. V. Ershov, Y. D. Babichev, Central Research Institute of Machine Building (Russia) [6695-19]
- Coffee Break 3:10 to 3:40 pm

SESSION 5

Conv. Ctr. 26B Wed. 3:40 to 5:30 pm

Fourier Optics

Chair: Abdul R. Alsamman, Univ. of New Orleans

- 3:40 pm: **Using Matlab to help teach Fourier optics (Invited Paper)**, S. M. Schultz, Brigham Young Univ. [6695-20]
- 4:10 pm: **Estimation bias from using nonlinear Fourier plane correlators for subpixel image shift measurement and implications for the binary joint transform correlator**, T. J. Grycewicz, C. J. Florio, The Aerospace Corp.; G. A. Franz, R. E. Robinson, The Aerospace Corp. and Rochester Institute of Technology [6695-21]
- 4:30 pm: **Reduction of multipath interference in a few mode fibers using spatial filters**, H. Wang, S. Kumar, McMaster Univ. (Canada) [6695-22]
- 4:50 pm: **Fast computation of computer-generated holography using reduced look-up table**, E. S. Kim, S. Kim, Kwangwoon Univ. (South Korea) [6695-23]
- 5:10 pm: **Fractional representation of generalized ambiguity function and its application in optical systems**, Y. M. Kozlovskii, Institute for Condensed Matter Physics (Ukraine) [6695-24]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

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- ✓ **Polarization beam splitter for two-dimensional photonic crystal self-collimation devices**, R. Chen, H. Wei, Lunghwa Univ. of Science and Technology (Taiwan) [6695-41]
- ✓ **Using optical properties of semiconductor structures for transparency realization**, I. V. Mialkivska, H. L. Lysenko, Vinnytsia National Technical Univ. (Ukraine) [6695-42]
- ✓ **Revolving lantern display using holographic 3D images with 1/f fluctuation**, K. Sakamoto, K. Uchida, H. Fukuda, Shimane Univ. (Japan) [6695-43]

- ✓ **Three-dimensional reconstruction using integral imaging technique of captured images by holographic method**, E. S. Kim, S. Kim, P. Shukhbat, Kwangwoon Univ. (South Korea) [6695-44]
- ✓ **Electroholographic display with SLM**, C. Dai, Shanghai Univ. (China) [6695-45]
- ✓ **Optical encryption in single shot digital holography**, C. Lin, National Central Univ. (Taiwan); G. L. Chen, M. K. Kuo, National Defense Univ. (Taiwan); C. C. Chang, Ming Dao Univ. (Taiwan) [6695-46]
- ✓ **A whole smart scheme in adaptive target detection for complex practical application**, H. Jia, M. Xie, Univ. of Electronic Science and Technology of China (China) [6695-47]
- ✓ **Application of digital signal processing in interferometry**, X. Ding, Z. Zhao, Nanjing Univ. of Aeronautics and Astronautics (China) [6695-48]
- ✓ **Micro-lens array design and interactive simulation technique for practical integral imaging system**, E. S. Kim, S. Kim, J. Lee, Kwangwoon Univ. (South Korea) [6695-49]
- ✓ **Generation of diffracted free fields and dark hollow beams using spatial filtering**, G. C. Martinez-Niconoff, J. L. Munoz-Lopez, G. Hernandez-Orduna, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6695-50]
- ✓ **Illumination-invariant adaptive joint transform correlator**, V. H. Diaz, V. Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico) [6695-51]
- ✓ **Recording multiple holograms by one beam in LiNbO₃ crystal**, C. Lin, National Central Univ. (Taiwan); W. Yang, W. Wu, L. Tang, National Defense Univ. (Taiwan); C. Chang, Ming Dao Univ. (Taiwan) [6695-52]
- ✓ **Performance comparisons of amplitude object and phase object recording in LiNbO₃ crystal**, C. Lin, M. Wu, National Central Univ. (Taiwan); J. Liu, Feng-Chia Univ. (Taiwan); H. Yau, National Central Univ. (Taiwan) [6695-53]
- ✓ **An improved quantum key distribution protocol**, T. Wu, G. Wu, South China Univ. of Technology (China) [6695-54]
- ✓ **Identification of THz absorption spectra of chemicals**, J. Shen, Y. Jia, Capital Normal Univ. (China) [6695-55]
- ✓ **Based on the CMOS image sensor image gathering system design**, Y. Hou, Z. Zhao, Nanjing Univ. of Aeronautics and Astronautics (China) [6695-56]
- ✓ **A model of a perceptron based on optoelectronic elements**, T. B. Martyniuk, I. V. Moroz, R. L. Kobzarenko, Vinnytsia National Technical Univ. (Ukraine) [6695-57]
- ✓ **Study of photorefractive recording in Ce:Cu:LiNbO₃ on the wavelengths dependence**, W. Liu, Shanghai Univ. (China) [6695-58]
- ✓ **Effect of geometry on thermoelastic damping in MEMS**, H. Tang, Y. Yi, M. A. Matin, Univ. of Denver [6695-60]
- ✓ **MEMS sensors for hearing aid application**, H. Tang, Y. Yi, M. A. Matin, Univ. of Denver [6695-59]

Thursday 30 August

SESSION 6

Conv. Ctr. 26B Thurs. 9:00 to 10:00 am

Algorithms for Image Processing I

Chair: Abhijit Mahalanobis, Lockheed Martin Missiles and Fire Control

- 9:00 am: **Multi-reference pseudo-random phase-encoded**, A. R. Alsamman, Univ. of New Orleans [6695-26]
- 9:20 am: **A biologically inspired neural network model to transformation invariant object recognition**, K. M. Iftekharruddin, Y. Li, F. Siddiqui, The Univ. of Memphis [6695-27]
- 9:40 am: **Optical electronic systems for face recognition on the base of adaptive image moments features**, V. L. Perju, Technical Univ. of Moldova (Moldova); D. P. Casasent, Carnegie Mellon Univ.; A. Crivat, Technical Univ. of Moldova (Moldova) [6695-28]
- Coffee Break 10:00 to 10:30 am

SESSION 7

Conv. Ctr. 26B Thurs. 10:30 am to 12:20 pm

Algorithms for Image Processing II

Chair: Yusuke Ogura, Osaka Univ. (Japan)

10:30 am: **Key-space analysis of double random phase encryption algorithm (Invited Paper)**, D. S. Monaghan, G. Situ, J. P. Ryle, U. Gopinathan, National Univ. of Ireland/Dublin (Ireland); T. J. Naughton, National Univ. of Ireland/Dublin (Ireland); J. T. Sheridan, National Univ. of Ireland/Dublin (Ireland) [6695-29]

11:00 am: **Uncertainty detection for NIF normal pointing images**, A. A. S. Awwal, C. Law, S. W. Ferguson, Lawrence Livermore National Lab. . . [6695-30]

11:20 am: **Color digital holography using wavelength-tunable three-color lasers**, Y. Ishii, J. Sato, Tokyo Univ. of Science (Japan); T. Takahashi, R. Onodera, Univ. of Industrial Technology (Japan) [6695-31]

11:40 am: **Pattern recognition of multiple objects using adaptive filters**, M. I. Pinedo, V. I. Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico) [6695-32]

12:00 pm: **Failure prediction in monitoring and control systems using Bayesian networks**, S. Bottone, DataPath, Inc.; C. J. Stanek, Datapath, Inc. [6695-33]

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

SESSION 8

Conv. Ctr. 26B Thurs. 1:40 to 3:40 pm

EO Devices

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

1:40 pm: **Pulse amplitude equalization of RHMLFL with nonlinear parameter consideration**, S. Tsao, N. Liu, L. Hu, National Taiwan Normal Univ. (Taiwan) [6695-34]

2:00 pm: **Applying a two-phonon light scattering in crystals to the spectrum analysis of radio signals**, A. S. Shcherbakov, S. E. Balderas-Mata, E. Tepichin-Rodriguez, A. Luna Castellanos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); J. Maximov, Molecular Technology GmbH (Germany) [6695-35]

2:20 pm: **Adaptive single crystal holographic interferometer and applications**, G. E. Dovgalenko, ITT Technical Institute; A. Dagdanova, Eastern Virginia Medical School [6695-36]

2:40 pm: **A CPW-fed broadband two-way electro-optic probe**, S. Tsao, Y. Kuo, National Taiwan Normal Univ. (Taiwan) [6695-37]

3:00 pm: **Verification of interferometric synthetic aperture microscopy with optical coherence microscopy**, T. S. Ralston, D. L. Marks, S. A. Boppart, P. S. Carney, Univ. of Illinois at Urbana-Champaign [6695-38]

3:20 pm: **Optoisolators simplify amplifier design**, J. W. Ting, Institute of Atomic and Molecular Sciences (Taiwan) [6695-39]

Course of Related Interest

See SPIE Cashier for information.

SC017 Principles of Fourier Optics and Diffraction (Gaskill) Tuesday
28, 8:30 am - 5:30 pm

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Applications of Digital Image Processing XXX

Conference Chair: **Andrew G. Tescher**, AGT Associates

Program Committee: **Bernard V. Brower**, Eastman Kodak Co.; **Wo L. Chang**, National Institute of Standards and Technology; **Touradj Ebrahimi**, École Polytechnique Fédérale de Lausanne (Switzerland) and Emitall S.A. (Switzerland); **Ali Habibi**, The Aerospace Corp.; **T. Russell Hsing**, Telcordia Technologies, Inc.; **Chun-Chien J. Kuo**, Univ. of Southern California; **Catherine Lambert-Nebout**, Ctr. National d'Études Spatiales (France); **Andre J. Oosterlinck**, Katholieke Univ. Leuven (Belgium); **Sethuraman Panchanathan**, Arizona State Univ.; **John A. Saghri**, California Polytechnic State Univ.; **Peter Schelkens**, Vrije Univ. Brussel (Belgium); **Pankaj Topiwala**, FastVDO LLC; **Mihaela van der Schaar**, Univ. of California/Los Angeles; **Bhaskaran Vasudev**, Marvell Semiconductor, Inc.

Tuesday 28 August

SESSION 1

Conv. Ctr. 26A Tues. 8:30 am to 12:00 pm

Video and Image Technologies

Chair: **Andrew G. Tescher**, AGT Associates

8:30 am: **A comparative study of JPEG2000, H.264/AVC, and HD photo**, T. Ebrahimi, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and Emitall S.A. (Switzerland); A. G. Tescher, AGT Associates; F. Dufaux, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and Emitall S.A. (Switzerland); M. Ouaret, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [6696-01]

8:50 am: **Complexity modeling for context-based adaptive binary arithmetic coding (CABAC) in H.264/AVC decoder**, S. Lee, C. C. J. Kuo, Univ. of Southern California [6696-02]

9:10 am: **Low-complexity MPEG-2 to H.264 transcoding**, J. Lievens, Vrije Univ. Brussel (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); D. Van de Walle, J. De Cock, Univ. Gent (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); J. Barbarien, Vrije Univ. Brussel (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); R. Van de Walle, Univ. Gent (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); P. Schelkens, Vrije Univ. Brussel (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium) [6696-03]

9:30 am: **PixonVision real-time video processor**, R. C. Puetter, Pixon LLC; R. G. Hier, DigiVision, Inc. [6696-04]

9:50 am: **Performance evaluation of H.264/AVC decoders using the GPU**, B. Pieters, D. Van Rijsselbergen, W. M. De Neve, R. Van de Walle, Univ. Gent (Belgium) [6696-05]

Coffee Break 10:10 to 10:40 am

10:40 am: **Performance analysis of outer and inner boundary matching algorithm in H.264 video coding**, T. Thaipanich, P. Wu, C. C. J. Kuo, Univ. of Southern California [6696-06]

11:00 am: **New quality metrics for digital image resizing**, H. Kim, S. Kumara, The Pennsylvania State Univ. [6696-07]

11:20 am: **Compressed-domain motion detection for efficient and error-resilient MPEG-2 to H.264 transcoding**, J. Lievens, Vrije Univ. Brussel (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); P. Lambert, D. Van de Walle, Univ. Gent (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); F. Dawoud, J. Barbarien, Vrije Univ. Brussel (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); R. Van de Walle, Univ. Gent (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium); P. Schelkens, Vrije Univ. Brussel (Belgium) and Interdisciplinary Institute for Broadband Technology (Belgium) [6696-08]

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

SESSION 2

Conv. Ctr. 26A Tues. 1:00 to 5:30 pm

Processing and Implementation Technologies I

Chair: **Touradj Ebrahimi**, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and Emitall S.A. (Switzerland)

1:00 pm: **An EO surveillance system for harbor security**, K. Thyagarajan, R. Patterson, Micro USA, Inc. [6696-09]

1:20 pm: **Image analysis for the identification of coherent structures in plasma**, N. S. Love, C. Kamath, Lawrence Livermore National Lab. . . [6696-10]

1:40 pm: **Real-time detection of targets in hyperspectral images using radial basis neural network filtering**, T. G. Thomas, Univ. of South Alabama [6696-11]

2:00 pm: **PixonVision real-time deblurring, anisoplanaticism corrector (DAC)**, R. G. Hier, DigiVision, Inc.; R. C. Puetter, Pixon LLC [6696-12]

2:20 pm: **ATR for 3D medical imaging**, T. P. Jansson, A. A. Koszowski, P. Paki-Amouzou, Physical Optics Corp. [6696-13]

2:40 pm: **Studies of image enhancement methods for the visually impaired**, O. Bogillo, U. Efron, Ben-Gurion Univ. of the Negev (Israel) [6696-14]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **An efficient method of noise suppression in security systems**, K. Fliegel, J. Svihlik II, Czech Technical Univ. in Prague (Czech Republic) [6696-15]

3:50 pm: **Toward a tongue-based task triggering interface for computer interaction**, L. R. Sapaico, S. Saito, Tokyo Institute of Technology (Japan); M. Nakajima, Tokyo Institute of Technology (Japan) and National Institute of Informatics (Japan) [6696-16]

4:10 pm: **Iris recognition using directional energy**, R. W. Ives, L. Kennell, R. Broussard, D. Soldan, U.S. Naval Academy [6696-17]

4:30 pm: **APE phasing signal analysis**, I. Surdej, N. Yaitskova, European Southern Observatory (Germany) [6696-18]

4:50 pm: **Exploitation of hyperspectral imagery using adaptive resonance theory methods**, R. S. Rand, U.S. Army Engineer Research and Development Ctr. [6696-19]

5:10 pm: **Forest species classification using hyperspectral remote sensing data and singular spectrum analysis**, B. Hu, Q. Li, York Univ. (Canada) [6696-20]

Wednesday 29 August

Image and Signal Processing Plenary Presentation

Conv. Ctr. Ballroom 20A Wed. 8:30 to 9:15 am

3D Home Theatre Systems, K. M. Johnson, Duke Univ. [6695-01]

See pg. 20 for presentation overviews.

SESSION 3

Conv. Ctr. 26A Wed. 9:30 to 11:40 am

Interaction Between Image Processing, Optics, and Photonics

Chair: Peter Schelkens, Vrije Univ. Brussel (Belgium)

9:30 am: **Wavelet-based denoising for 3D OCT images**, V. Zlokolica, L. Jovanov, A. Pizurica, W. Philips, Univ. Gent (Belgium) [6696-21]

9:55 am: **Improved invariant optical correlations for 3D target detection**, P. García-Martínez, J. J. Vallés, J. García-Monreal, C. Ferreira, Univ. de València (Spain) [6696-22]

Coffee Break 10:20 to 10:50 am

10:50 am: **Multidimensional illumination and image processing techniques in the W-band for recognition of concealed objects**, J. Stiens, L. Zhang, A. Elhawil, I. Jaeger, G. Koers, H. Sahli, P. Schelkens, Vrije Univ. Brussel (Belgium) [6696-24]

11:15 am: **Object specific compressed sensing**, A. Mahalanobis, R. R. Muise, Lockheed Martin Missiles and Fire Control [6696-25]

Lunch/Exhibition Break 11:40 am to 1:30 pm

SESSION 4

Conv. Ctr. 26A Wed. 1:30 to 5:20 pm

Mobile Video

Chair: Bhaskaran Vasudev, Marvell Semiconductor, Inc.

1:30 pm: **Sparse directional transforms for superresolution reconstruction of mobile video**, S. Kanumuri, O. G. Guleryuz, DoCoMo Communications Labs. USA, Inc. [6696-26]

1:55 pm: **Superresolution mobile video based on fractal theory and post-processing techniques**, J. J. Young, C. J. Kuo, Univ. of Southern California [6696-27]

2:20 pm: **Stochastic classification/regression framework for single-image superresolution**, K. Ni, T. Q. Nguyen, Univ. of California/San Diego [6696-28]

2:45 pm: **The intensity reduction of ground shadow to deliver better viewing experiences of soccer videos**, J. Ko, J. Lee, C. Kim, Information and Communications Univ. (South Korea); B. Vasudev, Marvell Semiconductor, Inc. [6696-29]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **Real-time H.264 HD video decode on the graphics processing unit**, W. Chen, J. C. Arevalo Baeza, D. Dinu, Microsoft Corp. [6696-30]

4:05 pm: **A cross-layer adaptive handoff algorithm in wireless multimedia environments**, T. N. Lin, L. Chen, C. Wang, National Taiwan Univ. (Taiwan) [6696-32]

4:30 pm: **Improving error resilience of wireless streaming through transcoding**, W. Tan, A. J. Patti, B. Shen, Hewlett-Packard Labs. [6696-33]

4:55 pm: **Coding and optimization of a fully scalable motion model**, M. Kao, T. Q. Nguyen, Univ. of California/San Diego [6696-34]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Optical resources for highly secure remote object authentication**, M. S. Millán García-Varela, E. Pérez-Cabré, Univ. Politècnica de Catalunya (Spain); B. Javid, Univ. of Connecticut [6696-23]
- ✓ **Morphology based iris localization scheme**, F. Gui, Hua Qiao Univ. (China) [6696-54]
- ✓ **Bayesian approach to the thermally generated charge elimination**, J. Svihlik II, Czech Technical Univ. in Prague (Czech Republic) [6696-57]
- ✓ **Make it easy: automatic pictogram generation system enables everybody to design illustrations by computer-aided technology**, K. Sakamoto, M. Adachi, T. Ishihara, Shimane Univ. (Japan) [6696-58]
- ✓ **Development of air touch interface for floating 3D image in the air**, K. Sakamoto, H. Fukuda, H. Morimoto, Shimane Univ. (Japan) [6696-59]
- ✓ **Video viewing browser enables to playback movie contents reproduced by using scene scenario in real-time**, K. Sakamoto, T. Ishihara, K. Uchida, Shimane Univ. (Japan) [6696-60]
- ✓ **Pattern recognition with an adaptive generalized SDF filter**, E. M. Ramos Michel, V. I. Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico) [6696-61]
- ✓ **Research of the camera calibration based on digital image processing**, L. Gu, S. Guo, R. Ren, Jilin Univ. (China) [6696-62]
- ✓ **Research of the application of ESPI in NDT of small components**, H. Chen, Z. Zhao, Nanjing Univ. of Aeronautics and Astronautics (China) [6696-64]
- ✓ **The new methods for registration and integration of range images**, X. L. Liu, A. M. Li, P. D. Gao, J. D. Tian, X. Peng, Shenzhen Univ. (China) [6696-65]
- ✓ **Pattern recognition with adaptive nonlinear filters**, S. Martínez-Díaz, V. Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico) [6696-66]
- ✓ **Color component cross-talk pixel SNR correction method for color imagers**, B. McCleary, Raytheon Co. [6696-67]
- ✓ **Holographic projection system for 3D shape reconstruction using temporal phase unwrapping**, C. A. Gonzalez, A. Davila, G. Garnica, Ctr. de Investigaciones en Óptica (Mexico) [6696-68]
- ✓ **Image derived modulation transfer function and its applications for underwater imaging**, W. Hou, A. D. Weidemann, D. J. Gray, Naval Research Lab.; G. R. Fournier, Defence R&D Canada/Valcartier (Canada) . . . [6696-69]
- ✓ **Local adaptive image processing in a sliding transform domain**, J. Gomez-Agis, V. Kober, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico) [6696-70]
- ✓ **Compressed domain statistical snake segmentation for real-time tracking of objects in airborne videos**, S. Zhang, College of Staten Island/CUNY; M. Chen, Binghamton Univ. [6696-71]
- ✓ **Hyperspectral end-member detection based on strong lattice independence**, J. C. Valdiviezo-Navarro, G. Urcid-Serrano, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6696-72]
- ✓ **Comparison of different illumination arrangements on capillary image quality in nail-fold**, C. Wu, K. Lin, B. Chung, Chung Yuan Christian Univ. (Taiwan) [6696-73]
- ✓ **Removing foreground objects by using depth information in multiview camera system**, J. Lee, C. Kim, Information and Communications Univ. (South Korea) [6696-74]
- ✓ **Still image compression using cubic spline interpolation with bit-plane compensation**, T. Lin, I-Shou Univ. (Taiwan); S. Chen, Shu-Te Univ. (Taiwan); T. Truong, I-Shou Univ. (Taiwan) [6696-75]

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- ✓ **Blind image quality assessment considering blur, noise, and JPEG compression distortions**, E. Cohen, Y. Yitzhaky, Ben-Gurion Univ. of the Negev (Israel) [6696-76]
- ✓ **2D to 3D stereoscopic conversion: depth-map estimation in a 2D single-view image**, J. Ko, Information and Communications Univ. (South Korea); M. Kim, Kangwon National Univ. (South Korea); C. Kim, Information and Communications Univ. (South Korea) [6696-77]
- ✓ **Contribution of image analysis to the definition of explosibility of fine particles resulting from waste recycling process**, F. La Marca, V. Gente, Univ. degli Studi di Roma La Sapienza (Italy) [6696-78]
- ✓ **Watershed data aggregation for mean-shift video segmentation**, N. I. Petrovic, J. De Bock, A. Pizurica, W. Philips, Univ. Gent (Belgium) [6696-79]
- ✓ **Image blur analysis for the subpixel-level measurement of in-plane vibration parameters of MEMS resonators**, H. V. Le, Vietnam National Univ. (Vietnam) and Univ. Paris-Sud II (France); B. Zavidovique, A. Bosseboeuf, M. Gouiffes, F. Parrain, Univ. Paris-Sud II (France) . . . [6696-81]
- ✓ **Image segmentation based on fractal features extracting and neural network**, F. Gui, Hua Qiao Univ. (China) [6696-82]
- ✓ **Validation of training set approaches to hyperparameter estimation for Bayesian tomography**, S. Lee, Paichai Univ. (South Korea) . . . [6696-83]
- ✓ **Local bivariate Cauchy distribution for video denoising in 3D complex wavelet domain**, H. Rabbani, Amirkabir Univ. of Technology (Iran) [6696-84]
- ✓ **Local area signal-to-noise ratio (LASNR) algorithm for image segmentation**, L. M. Kegelmeyer, P. Fong, S. M. Glenn, J. A. Liebman, Lawrence Livermore National Lab. [6696-85]
- ✓ **Recovery of data from damaged CD/DVD**, D. E. Tamir, W. P. Davis, Texas State Univ. San Marcos; R. McNiece, L. Wolfe, Lucere Data Inc. . . [6696-86]
- ✓ **Application of digital image processing method for fish age estimation**, T. Wu, J. Hong, South China Univ. of Technology (China) [6696-88]

Thursday 30 August

SESSION 5

Conv. Ctr. 26A Thurs. 8:40 am to 12:10 pm

Special Session: IDCT

Chair: Pankaj Topiwala, FastVDO LLC

- 8:40 am: **Standardization of IDCT approximation behavior for video compression: the history and the new MPEG-C parts 1 and 2 standards**, G. J. Sullivan, Microsoft Corp. [6696-35]
- 9:00 am: **From 16-bits to high accuracy: fruits of single-architecture affiliation**, T. Tran, L. Liu, P. Topiwala, FastVDO LLC [6696-36]
- 9:20 am: **Analysis and encoder prevention techniques for pathological IDCT drift accumulation in static video scenes**, G. J. Sullivan, Microsoft Corp. [6696-37]
- 9:40 am: **Drift analyses for integer IDCT**, Z. Ni, L. Yu, Zhejiang Univ. (China) [6696-38]
- Coffee Break 10:00 to 10:30 am
- 10:30 am: **Multiplierless approximation of the IDCT/DCT with low complexity and high accuracy**, C. Zhang, Zhejiang Univ. (China) and Tampere Univ. of Technology (Finland); L. Yu, Zhejiang Univ. (China) [6696-39]
- 10:50 am: **An accurate fixed-point 8x8 IDCT algorithm based on 2D**, I. Amer, W. Badawy, V. S. Dimitrov, G. A. Jullien, Univ. of Calgary (Canada) . . [6696-40]
- 11:10 am: **Efficient fixed-point approximation of 8x8 inverse discrete cosine transform**, Y. A. Reznik, Qualcomm, Inc.; A. T. Hinds, IBM Corp.; C. Zhang, L. Yu, Z. Ni, Zhejiang Univ. (China) [6696-41]
- 11:30 am: **A full 2D IDCT with extremely low complexity**, A. Navarro, A. Silva, Univ. de Aveiro (Portugal); Y. A. Reznik, Qualcomm, Inc. [6696-42]
- 11:50 am: **A low-complexity 16-bit architecture**, L. M. Bivolarski, Bright Scale [6696-43]
- Lunch/Exhibition Break 12:10 to 1:40 pm

SESSION 6

Conv. Ctr. 26A Thurs. 1:40 to 5:10 pm

Processing and Implementation Technologies II

Chair: John A. Saghri, California Polytechnic State Univ.

- 1:40 pm: **Regularization for designing spectral matched filter target detectors**, N. M. Nasrabadi, Army Research Lab. [6696-44]
- 2:00 pm: **SAR ATR using least squared rectangular box fit and Bayesian multifeature fusion/matching**, J. A. Saghri, D. A. Cary, California Polytechnic State Univ. [6696-46]
- 2:20 pm: **Ship detection and classification from overhead imagery**, H. Buck, E. Sharghi, K. Bromley, T. Cheng, Space and Naval Warfare Systems Ctr., San Diego [6696-89]
- 2:40 pm: **Identification of degraded fingerprints using PCA and ICA-based features**, M. Mehrübeoglu, Texas A&M Univ.-Corpus Christi; L. McLaughlan, Texas A&M Univ.-Kingsville [6696-47]
- 3:00 pm: **Using human body gestures as inputs for gaming through depth analysis**, Y. Wang, L. Shi, Z. Li, Motorola, Inc.; T. Yu, Univ. of Illinois at Urbana-Champaign [6696-48]
- Coffee Break 3:20 to 3:50 pm
- 3:50 pm: **Building verification from geometrical and photometric cues**, C. Beumier, Royal Belgian Military Academy (Belgium) [6696-49]
- 4:10 pm: **Automatic license plate identification**, M. S. Alam, M. M. Islam, Univ. of South Alabama [6696-50]
- 4:30 pm: **Exploiting sub-pixel edge detection methods with high density sampling to provide .001 pixels rigid target localization**, J. F. Gray, Univ. of New Orleans [6696-51]
- 4:50 pm: **Speckle removal from digital holograms by simulating temporal incoherence**, B. M. Hennelly, J. Maycock IV, J. McDonald, T. J. Naughton, National Univ. of Ireland/Maynooth (Ireland); D. P. Kelly, Jr., Technische Univ. Wien (Austria) [6696-52]

Courses of Related Interest

See SPIE Cashier for information.

SC017 Principles of Fourier Optics and Diffraction (Gaskill) Tuesday 28, 8:30 am - 5:30 pm

SC661 Advanced Image Processing and Applications (Iftekharruddin) Monday 27, 8:30 am - 5:30 pm

SC728 Network Centric Target Tracking and Classification (Drummond) Monday 27, 8:30 am - 5:30 pm

Conference 6697 • Conv. Ctr. 25C

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6697

Advanced Signal Processing Algorithms, Architectures, and Implementations XVII

Conference Chair: **Franklin T. Luk**, Hong Kong Baptist Univ. (Hong Kong China)

Program Committee: **Daniela Calvetti**, Case Western Reserve Univ.; **Leon Cohen**, Hunter College/CUNY; **W. Randolph Franklin**, Rensselaer Polytechnic Institute; **Graham A. Jullien**, Univ. of Calgary (Canada); **Patrick J. Loughlin**, Univ. of Pittsburgh; **Alexandre F. Tenca**, Synopsys, Inc.; **William J. Williams**, Univ. of Michigan; **Kung Yao**, Univ. of California/Los Angeles

Sunday 26 August

SESSION 1

Conv. Ctr. 25C Sun. 1:40 to 3:00 pm

Scientific Computing

Chair: **Daniela Calvetti**, Case Western Reserve Univ.

1:40 pm: **On matrix-vector product based subquadratic arithmetic complexity schemes for field multiplication**, A. Hasan, Univ. of Waterloo (Canada) [6697-01]

2:00 pm: **Numerical properties of the LLL method**, F. T. Luk, Hong Kong Baptist Univ. (Hong Kong China); S. Qiao, McMaster Univ. (Canada) [6697-03]

2:20 pm: **Hyperpriors, Bayesian learning, and prior conditioners for signal and image processing**, D. Calvetti, Case Western Reserve Univ.; E. Somersalo, Helsinki Univ. of Technology (Finland) [6697-04]

2:40 pm: **Face recognition algorithm in hyperspectral imagery by employing the K-means clustering method and the Mahalanobis distance**, M. I. Elbakary, M. S. Alam, M. S. Aslan, Univ. of South Alabama [6697-05]

Coffee Break 3:00 to 3:40 pm

SESSION 2

Conv. Ctr. 25C Sun. 3:30 to 5:30 pm

Time Frequency

Chair: **Leon Cohen**, Hunter College/CUNY

3:30 pm: **Rapid transient superresolution frequency tracking via generalized ESPRIT**, R. M. Nickel, The Pennsylvania State Univ. ... [6697-06]

3:50 pm: **An exact time-varying noise model**, L. Cohen, Hunter College/CUNY [6697-07]

4:10 pm: **A scale cross-ambiguity function for Doppler and delay estimation**, D. C. Smith, U.S. Dept. of Defense; D. J. Nelson, National Security Agency [6697-08]

4:30 pm: **High-resolution correlation**, D. J. Nelson, National Security Agency [6697-09]

4:50 pm: **Time-varying spectral analysis in exercise and sport science**, B. A. Frishberg, South Carolina State Univ.; L. Galleani, Politecnico di Torino (Italy); L. Cohen, Hunter College/CUNY [6697-10]

5:10 pm: **Construction of time-frequency representations from moments**, P. J. Loughlin, Univ. of Pittsburgh; K. L. Davidson, Univ. of Washington; L. Cohen, Hunter College/CUNY [6697-11]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 3

Conv. Ctr. 25C Mon. 8:30 to 10:10 am

Imaging

Chair: **W. Randolph Franklin**, Rensselaer Polytechnic Institute

8:30 am: **High-resolution imaging through strong turbulence**, D. A. Hope, S. M. Jefferies, C. Giebienk, Univ. of Hawaii [6697-12]

8:50 am: **Refocusing of defocused images using SAR2 algorithm**, J. Burki, C. F. Barnes, Georgia Institute of Technology [6697-13]

9:10 am: **A comparative evaluation of image background subtraction techniques**, A. K. Jain, D. V. Rabinin, MIT Lincoln Lab. [6697-14]

9:30 am: **Surface compression using over-determined Laplacian approximation**, Z. Xie, W. R. Franklin, M. Inanc, Rensselaer Polytechnic Institute [6697-15]

9:50 am: **Path planning on lossily compressed terrain**, D. Tracy, W. R. Franklin, Rensselaer Polytechnic Institute [6697-16]

Coffee Break 10:10 to 10:40 am

SESSION 4

Conv. Ctr. 25C Mon. 10:40 am to 12:20 pm

Sensor Networks

Chair: **Kung Yao**, Univ. of California/Los Angeles

10:40 am: **Seismic-array signal processing for moving source localization**, J. Stafstudd, R. E. Hudson, E. Tacioglu, K. Yao, Univ. of California/Los Angeles [6697-17]

11:00 am: **Theoretical and experimental study of DOA estimation using AML algorithm for an isotropic and non-isotropic 3D array**, S. Asgari, A. Ali, T. C. Collier, Y. Yao, R. E. Hudson, K. Yao, C. E. Taylor, Univ. of California/Los Angeles [6697-18]

11:20 am: **Optimal location of feedback handler under receiver contention schemes for routing in wireless networks**, P. Huang, B. Krishnamachari, Univ. of Southern California [6697-19]

11:40 am: **Joint design of scheduling and routing based on connected coverage for optimal sensor network lifetime**, T. Zhao, Q. Zhao, Univ. of California/Davis [6697-20]

12:00 pm: **Optical infrared flame detection with neural networks**, J. J. Huseynov, Univ. of California/Irvine; S. B. Baliga, General Monitors, Inc. [6697-21]

Lunch Break 12:20 to 1:30 pm

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SESSION 5

Conv. Ctr. 25C Mon. 1:30 to 3:10 pm

Computer Arithmetic

Chair: Graham A. Jullien, Univ. of Calgary (Canada)

- 1:30 pm: **An improved reciprocal approximation algorithm for a Newton Raphson divider**, G. Agrawal, A. Khandelwal, E. E. Swartzlander, Jr., The Univ. of Texas at Austin [6697-22]
- 1:50 pm: **A library for prototyping the computer arithmetic level in elliptic curve cryptography**, L. Imbert, A. Peirera, A. Tisserand, Univ. Montpellier II (France) [6697-23]
- 2:10 pm: **Pairing in cryptography: an arithmetic point of view**, J. Bajard, N. El Mrabet, Univ. Montpellier II (France) [6697-24]
- 2:30 pm: **Double base numbers in computer arithmetic optimization**, A. J. Zakaluzny, Univ. of Calgary (Canada) [6697-25]
- 2:50 pm: **Fast numerical algorithm for ultrashort THz pulse diffraction**, D. P. Kelly, Jr., Technische Univ. Wien (Austria); B. M. Hennelly, National Univ. of Ireland/Maynooth (Ireland); J. Darmo, K. Unterrainer, Technische Univ. Wien (Austria) [6697-26]
- Coffee Break 3:10 to 3:40 pm

SESSION 6

Conv. Ctr. 25C Mon. 3:40 to 5:20 pm

Computer Arithmetic II

Chair: Alexandre F. Tenca, Synopsys, Inc.

- 3:40 pm: **FPGA implementation of limited precision soft-decision LDPC decoding**, R. Moberly, M. O'Sullivan, K. Waheed, San Diego State Univ. [6697-27]
- 4:00 pm: **Complex multiply add and other related operators**, M. D. Ercegovic, Univ. of California/Los Angeles; J. Muller, Ecole normale supérieure de Lyon (France) [6697-28]
- 4:20 pm: **ISA extensions for high-radix online floating-point addition**, P. Dormiani, M. D. Ercegovic, Univ. of California/Los Angeles; O. Colavin, STMicroelectronics [6697-29]
- 4:40 pm: **Carry length distribution analysis for self-timed asynchronous adders**, A. A. Liddicoat, L. A. Slivovsky, A. Clarkson, California Polytechnic State Univ. [6697-30]
- 5:00 pm: **Decimal floating-point arithmetic units**, M. J. Schulte, L. Wang, S. C. Tsen, Jr., Univ. of Wisconsin/Madison; S. G. Navarro, Univ. de Malaga (Spain) [6697-31]



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Conference 6698 • Conv. Ctr. 26B

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6698

Photonic Fiber and Crystal Devices: Advances in Materials and Innovations in Device Applications

Conference Chairs: **Ruyan Guo**, The Pennsylvania State Univ.; **Shizhuo S. Yin**, The Pennsylvania State Univ.; **Francis T. S. Yu**, The Pennsylvania State Univ.

Program Committee: **Partha P. Banerjee**, Univ. of Dayton; **Kung-Li Deng**, GE Global Research; **Joseph Grant**, NASA Stennis Space Ctr.; **Ken Y. Hsu**, National Chiao Tung Univ. (Taiwan); **Tracy D. Hudson**, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.; **Suganda Jutamulia**, Consultant (China); **Eckhard Kratzig**, Univ. Osnabrück (Germany); **John S. Kruger**, U.S. Army Research Office; **Nickolai V. Kukhtarev**, Alabama A&M Univ.; **Ravindra B. Lal**, Alabama A&M Univ.; **Byoung-ho Lee**, Seoul National Univ. (South Korea); **Sergei F. Lyuksyutov**, Univ. of Akron; **Karl M. Reichard**, The Pennsylvania State Univ.; **Gérald Roosen**, Institut d'Optique (France); **Paul B. Ruffin**, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.; **Ching-Cherng Sun**, National Central Univ. (Taiwan)

Sunday 26 August

SESSION 1

Conv. Ctr. 26B Sun. 8:30 to 10:20 am

Advances in Materials Synthesis, Property, and Characterization I

Chair: **Ruyan Guo**, The Pennsylvania State Univ.

8:30 am: **Pyroelectric and ferroelectric semiconductors: dynamic holographic grating recording and x-ray and neutron generation (Invited Paper)**, N. V. Kukhtarev, T. V. Kukhtareva, P. P. Land, J. Wang, Alabama A&M Univ. [6698-01]

9:00 am: **Evaluation and control of the dopant distribution in a Nd:LiNbO₃ fiber grown from the melt by the edge-defined film-fed growth (EFG) method**, L. Braescu, West Univ. of Timisoara (Romania); T. F. George, Univ. of Missouri-St. Louis; S. Balint, West Univ. of Timisoara (Romania) [6698-02]

9:20 am: **Mechanism of light-induced domain nucleation in LiNbO₃ crystals**, D. Liu, Y. Zhi, Z. Luan, A. Yan, L. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6698-03]

9:40 am: **Photo-EPR studies of photorefractive BaTiO₃ heavily doped with Cr³⁺: evidence of photoinduced dissociation of Cr³⁺ dimers**, S. R. R. A. Bairavarasu, M. E. Edwards, T. V. Kukhtareva, M. D. Sastry, Alabama A&M Univ.; D. D. Lianos, U.S. Army Space and Missile Defense Command; R. H. Hawrami, M. D. Aggarwal, Alabama A&M Univ. [6698-04]

10:00 am: **Photoluminescence, FTIR and laser-Raman spectroscopic studies of PMN-PT containing iron**, S. R. R. A. Bairavarasu, M. E. Edwards, M. D. Sastry, Alabama A&M Univ.; D. D. Lianos, U.S. Army Space and Missile Defense Command; P. R. Kommidi, B. R. Reddy, M. D. Aggarwal, Alabama A&M Univ. [6698-05]

Coffee Break 10:20 to 10:40 am

SESSION 2

Conv. Ctr. 26B Sun. 10:40 am to 12:10 pm

Advances in Materials Synthesis, Property, and Characterization II

Chair: **Ravindra B. Lal**, Alabama A&M Univ.

10:40 am: **Photopolymer materials for holographic data storage applications (Invited Paper)**, J. T. Sheridan, M. R. Gleeson, C. E. Close, D. Sabol, National Univ. of Ireland/Dublin (Ireland) [6698-06]

11:10 am: **High-power nonlinear optical materials: growth and characterization**, N. B. Singh, D. J. Knuteson, A. Berghmans, D. A. Kahler, B. Wagner, G. S. Kanner, M. L. Marable, K. A. Green, J. J. Hawkins, Northrop Grumman Corp. [6698-07]

11:30 am: **Femtosecond laser ablation of PbTe thin films**, E. Rodriguez, D. Silva, W. A. Pippo, L. C. Barbosa, C. L. César, A. Schrank, C. R. d. S. Filho, E. P. De Oliveira, Univ. Estadual de Campinas (Brazil) [6698-08]

11:50 am: **Nonlinear optical and electronic properties of PMMA:Fe:Ge waveguide for device applications**, A. M. Darwish, Dillard Univ.; B. D. Koplitz, Tulane Univ.; N. V. Kukhtarev, Alabama A&M Univ.; R. Robet Combs, Tulane Univ. [6698-09]

Lunch Break 12:10 to 1:20 pm

SESSION 3

Conv. Ctr. 26B Sun. 1:20 to 3:20 pm

Development in Component and Integrative Photonic Devices

Chair: **Abdalla M. Darwish**, Dillard Univ.

1:20 pm: **Gas sensitive colloid cladding on fused silica fiber for high-temperature CO gas sensing (Invited Paper)**, K. Deng, GE Global Research [6698-10]

1:50 pm: **Distributed feedback lasers from organic photonic crystals (Invited Paper)**, R. Jakubiak, Air Force Research Lab.; V. P. Tondiglia, L. V. Natarajan, R. L. Sutherland, Science Applications International Corp.; P. F. Lloyd, UES, Inc.; R. A. Vaia, T. J. Bunning, Air Force Research Lab. [6698-11]

2:20 pm: **Soft glass photonic crystal fiber for high current sensor**, E. F. Chillce, E. Rodriguez, C. L. César, L. C. Barbosa, Univ. Estadual de Campinas (Brazil) [6698-12]

2:40 pm: **Fiber optic photo-acoustic spectroscopy sensor for harsh environment gas detection**, J. Wu, General Electric Co. [6698-13]

3:00 pm: **Ultrafast pulsed laser inscribed large polarization mode separated fiber Bragg gratings and their applications**, C. Zhan, J. H. Kim, The Pennsylvania State Univ.; P. B. Ruffin, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.; S. S. Yin, The Pennsylvania State Univ. [6698-14]

Coffee Break 3:20 to 3:40 pm

SESSION 4

Conv. Ctr. 26B Sun. 3:40 to 5:40 pm

Development in Component and Integrative Photonic Devices II

Chair: **Narsingh B. Singh**, Northrop Grumman Corp.

3:40 pm: **A review of random phase encoding in volume holography and applications (Invited Paper)**, C. Sun, S. Ma, Y. Yu, National Central Univ. (Taiwan) [6698-15]

4:10 pm: **Development and testing of a packaged crossover free fiber optic gyroscope coil (Invited Paper)**, L. C. Heaton, Stanley Associates; A. Lompadó, Polaris Sensor Technologies, Inc.; P. B. Ruffin, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.; J. L. Williams, S. D. Kwon, Stanley Associates [6698-16]

4:40 pm: **Using an optimized high-index ITO overlay on a single resonant band LPG to enhance the tunable range while maintaining the resonant peak depth**, J. E. Lee, Q. Chen, Q. Zhang, K. M. Reichard, D. H. Ditto, J. S. Mazurowski, The Pennsylvania State Univ.; M. Hackert, Naval Air Systems Command; S. S. Yin, The Pennsylvania State Univ. [6698-17]

5:00 pm: **Optimal design of Fresnel lens for a lighting system with multiple LEDs**, C. Uang, I-Shou Univ. (Taiwan) [6698-18]

5:20 pm: **Speckles removal from 3D images by empirical mode decomposition**, W. Su, G. Chen, C. Kuo, National Sun Yat-Sen Univ. (Taiwan) [6698-19]

Conference 6698 • Conv. Ctr. 26B

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 5

Conv. Ctr. 26B Mon. 8:30 to 10:10 am

Novel Materials and Devices: Theoretical and Experimental Approaches I

Chair: Shizhuo S. Yin, The Pennsylvania State Univ.

8:30 am: **Metamaterials for integrated optoelectronic devices and sensing systems (Invited Paper)**, P. B. Catrysse, Stanford Univ. [6698-20]

9:00 am: **Dispersion relations for negative index materials and slow light (Invited Paper)**, P. P. Banerjee, G. T. Nehmetallah, P. Buranasiri, Univ. of Dayton [6698-21]

9:30 am: **Nanophotonic applications toward photonic microchip (Invited Paper)**, C. Chen, National Central Univ. (Taiwan) [6698-23]

9:50 am: **Design and usage of non-zero dispersion wideband transport (NZDWT) fiber**, S. Dutta, S. Kant, Sterlite Optical Technologies Ltd. (India) [6698-22]

Coffee Break 10:10 to 10:30 am

SESSION 6

Conv. Ctr. 26B Mon. 10:30 am to 12:20 pm

Novel Materials and Devices: Theoretical and Experimental Approaches II

Chair: Sergei F. Lyuksyutov, Univ. of Akron

10:30 am: **RGB generation by four-wave mixing in small-core holey fibers (Invited Paper)**, P. Horak, P. Dupriez, F. Poletti, M. N. Petrovich, Y. Jeong, J. Nilsson, D. J. Richardson, D. N. Payne, Univ. of Southampton (United Kingdom) [6698-24]

11:00 am: **Structural study of superprism phenomena in photonic crystals**, A. D. Varshney, R. K. Sinha, Delhi College of Engineering (India) [6698-25]

11:20 am: **Temporal evolution of holographic grating formation**, M. R. Gleeson, J. T. Sheridan, D. Sabol, C. E. Close, National Univ. of Ireland/Dublin (Ireland) [6698-26]

11:40 am: **The paraxial solution for the collinear holographic storage systems**, Y. Yu, S. Hsieh, M. Tsai, T. Teng, C. Sun, National Central Univ. (Taiwan) [6698-27]

12:00 pm: **Study of elastic nonlinearity of the crystals used to control optical beams**, S. V. Kulakov, V. V. Kludzin, St. Petersburg State Univ. of Aerospace Instrumentation (Russia); O. V. Shakin, A.F. Ioffe Physico-Technical Institute (Russia) [6698-28]

Lunch Break 12:20 to 1:30 pm

SESSION 7

Conv. Ctr. 26B Mon. 1:30 to 3:30 pm

Innovations in Optic and Photonic Applications I

Chair: Karl M. Reichard, The Pennsylvania State Univ.

1:30 pm: **Development of fiber biosensors based on surface enhanced Raman scattering (Invited Paper)**, C. Gu, Y. Zhang, C. Shi, L. Seballos, J. Z. Zhang, Univ. of California/Santa Cruz [6698-29]

2:00 pm: **A pyroelectric infrared biometric system for walker recognition**, K. Y. Hsu, J. Fang, National Chiao Tung Univ. (Taiwan); Q. Hao, D. J. Brady, B. D. Guenther, Duke Univ. [6698-30]

2:20 pm: **Time resolved profile measurements for ultra fast vibrating objects (Invited Paper)**, W. Su, C. Kuo, National Sun Yat-Sen Univ. (Taiwan) [6698-31]

2:50 pm: **Efficient red-shifted supercontinuum generation in GeO₂ doping fiber**, Y. Liu, M. T. Cicerone, National Institute of Standards and Technology [6698-32]

3:10 pm: **Planar monolithic integrated acoustooptic 1x4 waveguide switch**, J. Zhu, Oklahoma State Univ. [6698-33]

Coffee Break 3:30 to 3:50 pm

SESSION 8

Conv. Ctr. 26B Mon. 3:50 to 5:20 pm

Innovations in Optic and Photonic Applications II

Chair: Paul B. Ruffin, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.

3:50 pm: **Beam steering employing a phased array technique using coherent supercontinuum light source (Invited Paper)**, J. H. Kim, J. W. An, J. E. Lee, S. S. Yin, The Pennsylvania State Univ.; P. B. Ruffin, U.S. Army Aviation and Missile Research, Development and Engineering Ctr.; C. Luo, General Opto Solutions, LLC [6698-34]

4:20 pm: **Assembly of a nonmechanical optical beam steering using plano-convex MLAs in a triplet configuration**, L. C. Heaton, Stanley Associates; P. B. Ruffin, J. C. Holt, U.S. Army Aviation and Missile Research, Development and Engineering Ctr. [6698-35]

4:40 pm: **3D shape reconstruction using multiple projections: a method to eliminate shadowing for projected fringe profilometry**, W. Su, C. Kuo, National Sun Yat-Sen Univ. (Taiwan) [6698-36]

5:00 pm: **3D shape reconstruction using projected fringe profilometry for an image blurred by linear motion**, C. Kuo, C. Lee, W. Su, National Sun Yat-Sen Univ. (Taiwan) [6698-37]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Theoretical analysis on splice loss of photonic crystal fibers**, G. Fu, W. Bi, Yanshan Univ. (China) [6698-38]
- ✓ **Near infrared nonvolatile holographic recording in doubly doped LiNbO₃:Fe crystals**, D. Li, D. Liu, Y. Zhi, W. Lu, L. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6698-39]
- ✓ **Quasi-nonvolatile holographic storage in doubly-doped LiNb₃ crystals**, Z. Chai, East China Normal Univ. (China); D. Liu, L. Liu, Y. Zhi, D. Li, Shanghai Institute of Optics and Fine Mechanics (China) [6698-40]
- ✓ **Study of wavelength-dependent diffraction properties of photorefractive volume holographic lenses for optical beams conversion**, Z. Hu, Shanghai Normal Univ. (China); A. Yan, D. Liu, L. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6698-41]
- ✓ **The design of software for new fiber intelligent structure health monitoring**, W. Li, Z. Zhao, L. Guo, Nanjing Univ. of Aeronautics and Astronautics (China) [6698-42]
- ✓ **Mode confinement of light wave propagation in a new polymeric waveguide studied by the m-lines technique**, K. Sathiyamoorthy, P. A. Kurian, C. Vijayan, M. P. Kothiyal, Indian Institute of Technology Madras (India) [6698-43]
- ✓ **Crosstalk noise in speckle-based volume holographic multiplexing**, H. Liu, The Pennsylvania State Univ. [6698-45]
- ✓ **Laser heated pedestal growth and development of doped single-crystal ferroelectric fibers and devices**, M. Gu, H. Liu, Y. Lee, Z. Zhou, A. S. Bhalla, R. Guo, The Pennsylvania State Univ. [6698-46]
- ✓ **Optical interferometric evaluation of semiconducting piezoelectric zinc oxide microtubular crystals**, J. Y. Fu, P. Y. Liu, J. Cheng, R. Guo, The Pennsylvania State Univ. [6698-47]
- ✓ **Stoichiometric lithium niobate thin films preparation by sol-gel method**, A. R. Poghosyan, Institute for Physical Research (Armenia); R. Guo, The Pennsylvania State Univ.; A. Manukyan, S. Grigoryan, Institute for Physical Research (Armenia) [6698-48]
- ✓ **Sol-gel method of p-type zinc oxide films preparation**, A. R. Poghosyan, Institute for Physical Research (Armenia); X. Li, National Renewable Energy Lab.; A. Manukyan, S. Grigoryan, E. S. Vardanyan, Institute for Physical Research (Armenia) [6698-49]
- ✓ **Design of single-mode polarization splitter with a configuration of asymmetric Y-junction in two-dimensional honeycomb photonic crystal**, R. Chen, H. Wei, Lunghwa Univ. of Science and Technology (Taiwan) [6698-50]
- ✓ **Mid-infrared fibers, analysis of the features due to high level of propagated optical power**, T. V. Tulaikova, Institute of Geosphere's Dynamics (Russia); I. Khmyrova, Univ. of Aizu (Japan); S. Artijushenko, General Physics Institute (Russia) [6698-51]
- ✓ **Analysis of slanted transmission and reflection gratings**, D. Sabol, C. E. Close, M. R. Gleeson, J. T. Sheridan, National Univ. of Ireland/Dublin (Ireland) [6698-52]
- ✓ **Optical and magneto-optical properties of Bi_{1.8}Y_{1.2}Fe₄Ga₁O₁₂ nanoparticles**, S. Kang, C. Yang, M. Chen, S. S. Yin, The Pennsylvania State Univ. [6698-53]
- ✓ **Investigation of domain inversion and internal field in congruent lithium niobate by digital holographic interferometry**, Y. Zhi, D. Liu, W. Qu, Y. Zhou, Z. Luan, L. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6698-54]

- ✓ **Realization of broadband source by overlapping two separate supercontinuum sources pumped at two different wavelengths**, J. H. Kim, C. Zhan, S. S. Yin, The Pennsylvania State Univ. [6698-55]
- ✓ **Holographic fixing with modulated light in two-center holographic recording**, Y. Zhou, L. Liu, D. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6698-56]
- ✓ **The preparation of optical substrate of silica glasses under 10-nm particle size**, M. S. Hsu, National Cheng Kung Univ. (Taiwan); S. Cheng, Chinese Military Academy (Taiwan); S. Sheu, Nan Jeon Institute of Technology (Taiwan); Y. Ouyang, Chinese Military Academy (Taiwan); F. Yen, National Cheng Kung Univ. (Taiwan) [6698-57]
- ✓ **Implementation of optical WDM by anisotropic Bragg diffraction in photorefractive LiNbO₃ crystal**, X. Yan, Shanghai Univ. (China) [6698-58]
- ✓ **Fabrication micro-Bragg grating in glass by femtosecond laser irradiation**, X. Yan, Shanghai Univ. (China) [6698-59]
- ✓ **Laser emission from dye mixture doped polymer optical fiber**, S. M. Nambiar, T. Kannampuzha Jhony, R. Mandamparambil, N. Kumar, P. A. Cherian, N. P. N. Vadakedathu, P. Radhakrishnan, Cochin Univ. of Science & Technology (India) [6698-61]
- ✓ **Acousto-optically tunable laser**, S. V. Kulakov, St. Petersburg State Univ. of Aerospace Instrumentation (Russia); Y. M. Mokrushin, Y. G. Gradoboev, St.-Petersburg State Polytechnical Univ. (Russia); O. V. Shakin, A.F. Ioffe Physico-Technical Institute (Russia); V. V. Kludzin, St. Petersburg State Univ. of Aerospace Instrumentation (Russia) [6698-60]
- ✓ **Nanosecond electrical and optical pulses and self phase conjugation from photorefractive lithium niobate fibers and crystals**, N. V. Kukhtarev, T. V. Kukhtareva, M. J. Curley, Alabama A&M Univ.; M. Gu, Z. Zhou, R. Guo, The Pennsylvania State Univ. [6698-62]
- ✓ **Holographic imaging of dielectric breakdown**, H. Li, Q. Zhang, Z. Liu, The Pennsylvania State Univ. [6698-63]

Courses of Related Interest

See SPIE Cashier for information.

SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (Johnson) Tuesday 28, 1:30 - 5:30 pm

OPTICS

Conference 6699 • Conv. Ctr. 25C

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6699

Signal and Data Processing of Small Targets 2007

Conference Chair: **Oliver E. Drummond**, Consulting Engineer

Cochair: **Richard D. Teichgraber**, Lockheed Martin Aeronautics Co.

Program Committee: **Liyi Dai**, U.S. Army Research Office; **John R. Edwards**, SRS Technologies; **Lawrence E. Hoff**, Hoff Engineering; **Cornelius T. Leondes**, Univ. of California/Los Angeles; **Rabinder N. Madan**, Office of Naval Research; **Kachesh M. Pathak**, U.S. Army Space and Missile Defense Command; **Albert J. Perrella, Jr.**, Institute for Defense Analyses; **Juan R. Vasquez**, Air Force Institute of Technology; **Steven Waugh**, Missile Defense Agency

Luncheon Dialogues

Lunch breaks on Tuesday, Wednesday, and Thursday will provide an opportunity to meet in a small group with one or two distinguished individuals who will lead discussions on a topic of signal and data processing algorithms. Tables will be reserved for a no-host lunch. Make reservations at the entrance to the main conference room beginning Tuesday morning, 28 August.

Conference Location Will Alternate Each Year

In the year 2007, this conference is located in San Diego. Thereafter, it will alternate between San Diego in the Summer in odd years and Orlando in the Spring in even years.

Internet Web Posting

Program changes, workshop announcements, and the latest information about this conference will be posted on the Internet World Wide Web at: <http://home.att.net/~drummond/>

Tuesday 28 August

SESSION 1

Conv. Ctr. 25C Tues. 8:30 am to 12:00 pm

Small Target Signal Processing

Chairs: **Lawrence E. Hoff**, Hoff Engineering; **Richard D. Teichgraber**, Lockheed Martin Aeronautics Co.

8:30 am: **Beyond the resolution limit: subpixel resolution in animals and now in silicon**, M. J. Wilcox, U.S. Air Force Academy [6699-01]

8:55 am: **Target detection in hyperspectral imagery using one-dimensional extended maximum average correlation height filter**, M. S. Alam, Univ. of South Alabama [6699-02]

9:20 am: **Performance analysis of nonlinear detectors in generalized Rayleigh environment for space-time adaptive processing (STAP)**, X. Xu, Intelligent Automation, Inc.; R. Zheng, Univ. of Missouri-Rolla; G. Chen, Intelligent Automation, Inc.; E. Blasch, Air Force Research Lab. [6699-03]

9:45 am: **Tracking dim targets using integrated clutter estimation**, E. F. Brekke, Norwegian Univ. of Science and Technology (Norway) and Unik (Norway) and McMaster Univ. (Canada); R. Tharmarasa, T. Kirubarajan, McMaster Univ. (Canada) [6699-04]

Coffee Break 10:10 to 10:45 am

10:45 am: **Recognition of hidden pattern with background**, L. Kovacs, T. Szirányi, Computer and Automation Research Institute (Hungary) .. [6699-05]

11:10 am: **Detection and tracking of low SNR divers in a noisy background in the presence of an interfering sonar**, A. Rodningsby, Norwegian Univ. of Science and Technology (Norway); Y. Bar-Shalom, Univ. of Connecticut [6699-06]

11:35 am: **An efficient and effective low observable radar tracking system**, Y. Rong, H. C. Lai, G. W. Ng, DSO National Labs. (Singapore) [6699-07]

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

SESSION 2

Conv. Ctr. 25C Tues. 1:30 to 5:25 pm

Target Track Processing

Chairs: **John R. Edwards**, SRS Technologies; **Albert J. Perrella, Jr.**, Institute for Defense Analyses

1:30 pm: **Modeling ballistic target motion during boost for tracking**, V. P. Jilkov, X. Li, J. Ru, Univ. of New Orleans [6699-08]

1:55 pm: **Theory and practical application of out of sequence measurements with results for multi-static tracking**, D. R. Iny, Northrop Grumman Corp. [6699-09]

2:20 pm: **The effect of various filters on covariance consistency in the presence of a nonlinear tracking problem**, L. J. Ritter, B. Weir, G. Silberman, The Johns Hopkins Univ. Applied Physics Lab. [6699-10]

2:45 pm: **Differential geometry measures of nonlinearity for filtering with nonlinear dynamic and linear measurement models**, B. F. La Scala, The Univ. of Melbourne (Australia); M. K. Mallick, Toyon Research Corp.; S. Arulampalam, Defence Science and Technology Organisation (Australia) [6699-11]

Coffee Break 3:10 to 3:45 pm

3:45 pm: **Monitoring of sensor covariance consistency**, S. S. Krigman, M. L. Smith, B. E. Tipton, MIT Lincoln Lab. [6699-12]

4:10 pm: **Future prospects for algorithm development of tracker related processing**, O. E. Drummond, CyberRnD, Inc. [6699-13]

4:35 pm: **Map integration in tracking**, D. D. Sworder, Univ. of California/San Diego; J. E. Boyd, Cubic Defense Systems, Inc.; G. Hutchins, Naval Postgraduate School [6699-14]

5:00 pm: **Robust tracking for very long range radars**, X. Tian, Y. Bar-Shalom, Univ. of Connecticut [6699-15]

Demonstrations and

Open Discussion Tues. 8:00 to 10:00 pm

Signal and Data Processing

Wednesday 29 August

SESSION 3

Conv. Ctr. 25C **Wed. 8:30 am to 12:00 pm**

Multiple-Frame Data Association

Chairs: **Liyi Dai**, U.S. Army Research Office; **Juan R. Vasquez**, Air Force Institute of Technology

8:30 am: **Conference Overview (Presentation Only)**, O. E. Drummond, Consulting Engineer [6699-100]

8:55 am: **Consistent covariance estimation for PMHT**, W. R. Blanding, P. K. Willett, Univ. of Connecticut; R. L. Streit, Metron, Inc.; D. T. Dunham, Vectrass [6699-17]

9:20 am: **Multiple hypotheses feature-aided tracking of highly maneuvering air targets with multiframe data association**, M. K. Mallick, R. M. Wilkerson, P. Stieber, Toyon Research Corp. [6699-18]

9:45 am: **Computationally efficient assignment-based algorithms for data association for tracking with angle-only sensors**, T. Sathyan, A. Sinha, T. Kirubarajan, McMaster Univ. (Canada) [6699-19]

Coffee Break 10:10 to 10:45 am

10:45 am: **Evaluation of a posteriori probabilities of multi-frame data association hypotheses**, S. Mori, C. Chong, BAE Systems Advanced Information Technologies [6699-20]

11:10 am: **Improved multitarget tracking using fixed-lag probability hypothesis density smoothing**, N. Nandakumaran, K. Punithakumar, T. Kirubarajan, McMaster Univ. (Canada) [6699-21]

11:35 am: **Probability hypothesis density filtering for multitarget tracking using splines**, K. Punithakumar, T. Kirubarajan, McMaster Univ. (Canada) [6699-22]

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

SESSION 4

Conv. Ctr. 25C **Wed. 1:30 to 5:25 pm**

Multiple Sensors Data Processing

Chairs: **Cornelius T. Leondes**, Univ. of California/Los Angeles; **Oliver E. Drummond**, Consulting Engineer

1:30 pm: **Track-to-track association with informative prior associations**, D. G. Danu, McMaster Univ. (Canada) and Array Systems Computing Inc. (Canada); A. Sinha, T. Kirubarajan, McMaster Univ. (Canada) [6699-23]

1:55 pm: **Centralized multiple-hypothesis correlation and feedback with applications to video data**, K. M. Tarplee, D. J. Trawick, S. M. Herman, Numerica Corp. [6699-24]

2:20 pm: **Mitigation of biases using the Schmidt-Kalman filter**, R. C. Paffenroth, R. Y. Novoselov, S. Danford, M. Teixeira, S. Chan, A. Poore, Numerica Corp. [6699-25]

2:45 pm: **Flow-rate control for managing communications in tracking and surveillance networks**, S. A. Miller, Numerica Corp.; E. K. P. Chong, Colorado State Univ. [6699-26]

Coffee Break 3:10 to 3:45 pm

3:45 pm: **Comparing optical flow to a Kalman filter to remove the effects of parallax for multitarget tracking in persistent video**, B. R. Secrest, J. R. Vasquez, Air Force Institute of Technology [6699-27]

4:10 pm: **Comparison of bias removal algorithms in track-to-track association**, C. Chong, S. Mori, BAE Systems Advanced Information Technologies [6699-28]

4:35 pm: **Improved observable operator model for target classification**, S. Sutharsan, T. Kirubarajan, McMaster Univ. (Canada) [6699-29]

5:00 pm: **Adaptive horizon sensor management with application to UAV trajectory planning**, M. L. Hernandez, QinetiQ Ltd. (United Kingdom) [6699-30]

Posters/Oral Standby Presentations

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D **Wed. 5:30 to 7:00 pm**

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

Posted presented poster papers will be included in the conference Proceedings and may also be presented orally if circumstances permit.

✓ **Spectral unmixing of agents on surface for the Joint Contaminated Surface Detector (JCS-D)**, M. M. Slamani, T. H. Chyba, H. LaValley, ITT Industries, Inc.; D. K. Emge, U.S. Army Edgewood Chemical Biological Ctr. [6699-46]

✓ **MHT tracking for crossing sonar targets**, P. K. Willett, Univ. of Connecticut; T. E. Luginbuhl, E. H. Giannopoulos, Naval Undersea Warfare Ctr. [6699-47]

✓ **Simulation assessment of RCS-aided multiple target tracking**, D. T. Dunham, Vectrass; L. M. Ehrman, W. D. Blair, Georgia Tech Research Institute; S. A. Frost, Vectrass [6699-48]

✓ **Concurrent bias estimation and data association**, A. Poore, S. Danford, Numerica Corp. [6699-49]

✓ **Bias estimation using targets of opportunity**, B. D. Kragel, A. Poore, S. M. Herman, S. Danford, Numerica Corp. [6699-50]

✓ **A survey of maneuvering target tracking, part VIa: exact density-based nonlinear filtering**, X. Li, V. P. Jilkov, Univ. of New Orleans [6699-51]

✓ **A survey of maneuvering target tracking, part VIb: approximate density-based nonlinear filters**, X. Li, V. P. Jilkov, Univ. of New Orleans [6699-52]

✓ **Simulation of signal and data processing for a pair of GEO IR sensors**, K. Keil, W. J. Hupfer, EADS Astrium GmbH (Germany) [6699-54]

✓ Poster-Wednesday

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

✓ **1D measurement of fluid speed by laser Doppler anemometry**, A. Osorio, Sr., E. Solarte, Sr., Univ. del Valle (Colombia) [6699-53]

Conference 6699 • Conv. Ctr. 25C

Thursday 30 August

SESSION 5

Conv. Ctr. 25C Thurs. 8:30 am to 12:00 pm

Sensor Data Fusion

Chairs: **Rabinder N. Madan**, Office of Naval Research; **Juan R. Vasquez**, Air Force Institute of Technology

8:30 am: **Data fusion handoff within a federation of fusion systems**, P. J. Shea, B. Roskamp, Black River Systems Co. [6699-31]

8:55 am: **A comparison of two methods for computing track-to-track assignment probabilities**, M. A. Horsley, MIT Lincoln Lab. [6699-32]

9:20 am: **Distributed fusion using video sensors on multiple unmanned aerial vehicles**, K. Chang, George Mason Univ.; M. K. Mallick, Toyon Research Corp. [6699-33]

9:45 am: **Collaborative sensor management for decentralized asynchronous sensor networks**, R. Tharmarasa, T. Kirubarajan, McMaster Univ. (Canada) [6699-34]

Coffee Break 10:10 to 10:45 am

10:45 am: **Track-to-track association using intrinsic statistical properties**, P. F. Singer, Raytheon Co. [6699-35]

11:10 am: **Optimization based hybrid radar signal fusion for unresolved target detection**, N. Nandakumaran, T. Kirubarajan, McMaster Univ. (Canada) [6699-36]

11:35 am: **Collaborative distributed sensor management for multitarget tracking using hierarchical Markov decision processes**, D. Akselrod, A. Sinha, T. Kirubarajan, McMaster Univ. (Canada) [6699-37]

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

SESSION 6

Conv. Ctr. 25C Thurs. 1:30 to 5:25 pm

Track and Fusion Processing

Chairs: **Oliver E. Drummond**, Consulting Engineer; **Albert J. Perrella, Jr.**, Institute for Defense Analyses

1:30 pm: **Optimal PHD filter for single-target detection and tracking**, R. P. Mahler, Lockheed Martin Co. [6699-38]

1:55 pm: **Generalized solution to the sensor fusion problem in the presence of arbitrarily correlated sensor-to-sensor errors**, D. H. McCabe, Naval Surface Warfare Ctr. [6699-39]

2:20 pm: **Concurrent bias estimation and data association: simulations**, A. Poore, S. Danford, Numerica Corp. [6699-40]

2:45 pm: **Metrics for evaluating track covariance consistency**, O. E. Drummond, T. L. Ogle, CyberRnD, Inc.; S. Waugh, Missile Defense Agency [6699-41]

Coffee Break 3:10 to 3:45 pm

3:45 pm: **The PMHT: solutions for some of its problems**, M. Wieneke, W. Koch, FGAN-FKIE (Germany) [6699-42]

4:10 pm: **Anti-particle filters with log-homotopy**, F. E. Daum, J. Huang, Raytheon Co. [6699-43]

4:35 pm: **IMM/MHT tracking with an unscented particle filter with application to ground targets**, J. A. Lancaster, S. S. Blackman, L. Yu, Raytheon Space and Airborne Systems [6699-44]

5:00 pm: **A multiple model filter approach for impact point prediction**, V. C. Ravindra, Y. Bar-Shalom, P. K. Willett, Univ. of Connecticut [6699-45]

Courses of Related Interest

See SPIE Cashier for information.

SC661 Advanced Image Processing and Applications
(Iftekharruddin) Monday 27, 8:30 am - 5:30 pm

SC728 Network Centric Target Tracking and Classification
(Drummond) Monday 27, 8:30 am - 5:30 pm

Conference 6700 • Conv. Ctr. 26A

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6700

Mathematics of Data/Image Pattern Recognition, Compression, Coding, and Encryption X, with Applications

Conference Chairs: **Gerhard X. Ritter**, Univ. of Florida; **Mark S. Schmalz**, Univ. of Florida; **Junior Barrera**, Univ. de São Paulo (Brazil); **Jaakko T. Astola**, Tampere Univ. of Technology (Finland)

Program Committee: **Stefano Baronti**, Istituto di Fisica Applicata Nello Carrara (Italy); **Mark L. Fowler**, Binghamton Univ.; **Victoria T. Franques**, U.S. Dept. of Energy; **Andrea Garzelli**, Univ. degli Studi di Siena (Italy); **Abdelsalam A. Helal**, Univ. of Florida; **Lifford McLauchlan**, Texas A&M Univ.; **Daniel S. Myers**, Sandia National Labs.; **James F. Scholl**, College of Optical Sciences/The Univ. of Arizona

Sunday 26 August

Introductory Remarks

Conv. Ctr. 26A Sun. 1:30 to 1:35 pm

Chair: **Mark S. Schmalz**, Univ. of Florida

SESSION 1

Conv. Ctr. 26A Sun. 1:35 to 3:15 pm

Compression

Chair: **Lifford McLauchlan**, Texas A&M Univ.

1:35 pm: **Model-based compression of the calibration matrix for hyperspectral imaging systems**, J. F. Scholl, College of Optical Sciences/The Univ. of Arizona; E. K. Hege, MKS Imaging Technology, LLC; D. G. O'Connell, Oceanit Labs., Inc.; E. L. Dereniak, College of Optical Sciences/The Univ. of Arizona [6700-01]

2:00 pm: **Optimization of a lossless object-based compression embedded on GAIA, a next-generation space telescope**, E. Oseret, C. Timsit, Univ. de Versailles Saint-Quentin-en Yvelines (France) [6700-02]

2:25 pm: **Design of object based compression algorithms for video imagery**, M. S. Schmalz, Univ. of Florida [6700-03]

2:50 pm: **Design of multichannel filter banks for subband coding of audio signals**, A. Goel, R. K. Baghel, L. Gupta, Maulana Azad National Institute of Technology (India) [6700-04]

Coffee Break 3:15 to 3:40 pm

SESSION 2

Conv. Ctr. 26A Sun. 3:40 to 4:55 pm

Image Quality and Error Analysis

Chair: **Mark S. Schmalz**, Univ. of Florida

3:40 pm: **The optimum running-type approximation for time-limited worst-case measures of error based on Fredholm integral equation using Pincherle-Goursat kernel**, Y. Kida, Ohu Univ. (Japan); T. Kida, Nihon Univ. (Japan) [6700-05]

4:05 pm: **Mesh-free multiresolution solver for PDEs with large gradients**, H. C. Morris, San José State Univ.; A. Limon, Claremont Graduate Univ. [6700-06]

4:30 pm: **Perceptual assessment of image quality in multimedia technology**, K. Fliegel, Czech Technical Univ. in Prague (Czech Republic) [6700-07]

Monday 27 August

Introductory Remarks

Conv. Ctr. 26A Mon. 8:55 to 9:00 am

Chair: **Junior Barrera**, Univ. de São Paulo (Brazil)

SESSION 3

Conv. Ctr. 26A Mon. 9:00 to 9:50 am

Watermarking and Security

Chair: **James F. Scholl**, College of Optical Sciences/The Univ. of Arizona

9:00 am: **Adaptive model and neural network based watermark identification**, L. McLauchlan, Texas A&M Univ.; M. Mehrubeoglu, Texas A&M Univ.-Corpus Christi [6700-08]

9:25 am: **Compressed versus uncompressed domain video watermarking**, S. A. Duta, M. P. Mitrea, F. Prêteux, Institut National des Télécommunications (France) [6700-09]

Coffee Break 9:50 to 10:25 am

SESSION 4

Conv. Ctr. 26A Mon. 10:25 am to 12:05 pm

Pattern Recognition and Analysis

Chair: **Junior Barrera**, Univ. de São Paulo (Brazil)

10:25 am: **Multiresolution training of Kohonen neural networks**, D. E. Tamir, Texas State Univ. San Marcos [6700-11]

10:50 am: **Generation of lattice independent vector sets for pattern recognition applications**, G. Urcid-Serrano, J. C. Valdiviezo-Navarro, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [6700-12]

11:15 am: **The validity of pyramid K-means**, D. E. Tamir, Texas State Univ. San Marcos; C. Y. Park, Kwandong University (South Korea); W. Yoo, Gannon Univ. [6700-13]

11:40 am: **Two evolutionary algorithms optimize clusters and automate feature selection in multispectral images**, G. H. Burgin, D. B. Fogel, W. Porto, Natural Selection, Inc.; J. C. Jafolla, Surface Optics Corp.; P. Kagey, Lockheed Martin Orincon [6700-14]

Lunch Break 12:05 to 2:00 pm

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6700 • Conv. Ctr. 26A

SESSION 5

Conv. Ctr. 26A Mon. 2:00 to 3:15 pm

Image Analysis in Medicine

Chair: Gerhard X. Ritter, Univ. of Florida

2:00 pm: **Real-time analysis of biomolecular interactions in SPR imaging**, N. François, C. I. Fetita, Institut National des Télécommunications (France); M. Mucchielli, Institut de Chimie des Substances Naturelles (France); F. Prêteux, Institut National des Télécommunications (France); H. Delacroix, Institut de Chimie des Substances Naturelles (France) [6700-15]

2:25 pm: **Automated diagnosis of interstitial lung diseases (ILD) and emphysema in MDCT imaging**, C. I. Fetita, K. Chang Chien, Institut National des Télécommunications (France); P. Brillet, Avicenne Hospital (France); F. Prêteux, Institut National des Télécommunications (France) [6700-16]

2:50 pm: **Robust discriminant wavelet packets for meningioma image classification**, H. A. Qureshi, N. M. Rajpoot, Univ. of Warwick (United Kingdom); T. W. Nattkemper, Univ. Bielefeld (Germany); V. Hans, Evangelisches Krankenhaus Bielefeld GmbH (Germany) [6700-17]

Coffee Break 3:15 to 3:45 pm

SESSION 6

Conv. Ctr. 26A Mon. 3:45 to 5:00 pm

Pattern Recognition and Multimedia

Chair: Jaakko T. Astola, Tampere Univ. of Technology (Finland)

3:45 pm: **Recognition of photon patterns in advanced Compton telescopes**, A. Zoglauer, Univ. of California/Berkeley; R. Andritschke, G. Kanbach, Max-Planck-Institut für extraterrestrische Physik (Germany); S. E. Boggs, Univ. of California/Berkeley [6700-18]

4:10 pm: **Interactive TV on parliament session**, J. Royer, Institut National des Télécommunications (France); H. Nguyen, Alcatel (France); M. Preda, F. Prêteux, Institut National des Télécommunications (France); O. Martinot, Alcatel (France) [6700-19]

4:35 pm: **A crop identification model from remote sensing image**, A. Qiong, B. Yang, Chinese Academy of Agricultural Sciences (China); Y. He, Ministry of Agriculture of the People's Republic of China (China) [6700-20]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **Parallel hierarchical method in networks**, O. V. Malinochka, L. I. Timchenko, Kiev Univ. of Economy and Transport Technology (Ukraine) [6700-21]
- ✓ **A novel watermark image scrambling algorithm**, R. Cao, F. Gui, Hua Qiao Univ. (China) [6700-25]
- ✓ **Digital audio watermarking using moment-preserving (MP) in time domain**, D. S. Choi, H. Jung, H. Choi, T. Kim, Seoul National Univ. of Technology (South Korea) [6700-26]

Course of Related Interest

See SPIE Cashier for information.

SC661 Advanced Image Processing and Applications (Iftexharuddin)
Monday 27, 8:30 am - 5:30 pm

Conference 6701 • Conv. Ctr. 25B

Sunday-Wednesday 26-29 August 2007 • Proceedings of SPIE Vol. 6701

Wavelets XII

Conference Chairs: **Dimitri Van De Ville**, École Polytechnique Fédérale de Lausanne (Switzerland); **Vivek K. Goyal**, Massachusetts Institute of Technology; **Manos Papadakis**, Univ. of Houston

Program Committee: **Akram Aldroubi**, Vanderbilt Univ.; **Radu V. Balan**, Siemens Corporate Research; **John J. Benedetto**, Univ. of Maryland/College Park; **Emmanuel J. Candes**, California Institute of Technology; **Peter G. Casazza**, Univ. of Missouri/Columbia; **Minh N. Do**, Univ. of Illinois at Urbana-Champaign; **Pier L. Dragotti**, Imperial College London (United Kingdom); **Jalal M. Fadili**, Ctr. National de la Recherche Scientifique (France); **Hans G. Feichtinger**, Univ. Vienna (Austria); **C. Sinan Güntürk**, New York Univ.; **Christopher E. Heil**, Georgia Institute of Technology; **Jelena Kovacevic**, Carnegie Mellon Univ.; **Ilya Krishtal**, Northern Illinois Univ.; **Andrew F. Laine**, Columbia Univ.; **Michael Liebling**, California Institute of Technology; **Raghu Machiraju**, The Ohio State Univ.; **François G. Meyer**, Univ. of Colorado/Boulder; **Torsten Möller**, Simon Fraser Univ. (Canada); **Truong-Thao Nguyen**, City College/CUNY; **Jean-Christophe Olivo-Marin**, Institut Pasteur (France); **Ilya Pollak**, Purdue Univ.; **Alexander M. Powell**, Vanderbilt Univ.; **Naoki Saito**, Univ. of California/Davis; **Ivan W. Selesnick**, Polytechnic Univ.; **Jean-Luc Starck**, CEA Saclay (France); **Thomas Strohmer**, Univ. of California/Davis; **Michael A. Unser**, École Polytechnique Fédérale de Lausanne (Switzerland); **Pierre Vandergheynst**, École Polytechnique Fédérale de Lausanne (Switzerland); **Yves Wiaux**, École Polytechnique Fédérale de Lausanne (Switzerland); **Ozgun Yilmaz**, Univ. of British Columbia (Canada)

Sunday 26 August

Opening Remarks

Conv. Ctr. 25B **Sun. 9:00 to 9:10 pm**

Dimitri Van De Ville, École Polytechnique Fédérale de Lausanne (Switzerland)

Keynote Presentation **9:10 to 9:50 am**

Sparse and redundant representations: recent advances (Keynote), M. Elad, Technion-Israel Institute of Technology (Israel) [6701-01]

Coffee Break 9:50 to 10:20 am

SESSION 2

Conv. Ctr. 25B **Sun. 10:20 am to 12:20 pm**

Special Session on Frames and Coarse Quantization

Chairs: **Truong-Thao Nguyen**, City College/CUNY; **C. Sinan Güntürk**, New York Univ.; **Alexander M. Powell**, Vanderbilt Univ.; **Ozgun Yilmaz**, Univ. of British Columbia (Canada)

10:20 am: **Random rounding in redundant representations**, B. G. Bodmann, S. P. Lipshitz, Univ. of Waterloo (Canada) [6701-02]

10:40 am: **Sigma-delta quantization for compressive sensing applications**, P. T. Boufounos, R. G. Baraniuk, Rice Univ. [6701-03]

11:00 am: **An improved family of exponentially accurate sigma-delta quantization schemes**, F. Krahmer, New York Univ. [6701-04]

11:20 am: **The tiling phenomenon of sigma-delta modulators with time-varying inputs**, N. T. Thao, City College/CUNY [6701-05]

11:40 am: **The beta\alpha-encoder**, Y. Wang, D. Jimenez, Georgia Institute of Technology [6701-06]

12:00 pm: **On quantization of finite frame expansions: sigma-delta schemes of arbitrary order**, M. C. Lammers, Univ. of North Carolina Wilmington; A. M. Powell, Vanderbilt Univ.; O. Yilmaz, Univ. of British Columbia (Canada) [6701-07]

Lunch Break 12:20 to 2:00 pm

SESSION 3

Conv. Ctr. 25B **Sun. 2:00 to 3:20 pm**

Wavelets: New Designs

Chair: **Thomas Strohmer**, Univ. of California/Davis

2:00 pm: **Complex B-splines in R^n** , P. Massopust, Technische Univ. München (Germany) [6701-08]

2:20 pm: **Multiscale representation for data on the sphere and applications to geopotential data**, M. Shahram, D. L. Donoho, Stanford Univ.; J. Starck, Commissariat à l'Énergie Atomique (France) [6701-09]

2:40 pm: **A new family of rotation-covariant wavelets on the hexagonal lattice**, L. Condat, B. Forster-Heinlein, Forschungszentrum für Umwelt und Gesundheit, GmbH (Germany); D. Van De Ville, École Polytechnique Fédérale de Lausanne (Switzerland) [6701-11]

3:00 pm: **An M-channel directional filter bank compatible with the contourlet and shearlet frequency tiling**, G. R. Easley, System Planning Corp.; V. Patel, D. M. Healy, Jr., Univ. of Maryland/College Park [6701-12]

Coffee Break 3:20 to 3:40 pm

SESSION 4

Conv. Ctr. 25B **Sun. 3:40 to 5:40 pm**

Special Session on Wavelets in Bio-Imaging

Chairs: **Jelena Kovacevic**, Carnegie Mellon Univ.; **Jean-Christophe Olivo-Marin**, Institut Pasteur (France)

3:40 pm: **A fast iterative thresholding algorithm for wavelet-regularized deconvolution**, C. R. Vonesch, M. A. Unser, École Polytechnique Fédérale de Lausanne (Switzerland) [6701-13]

4:00 pm: **Wavelet-based restoration methods: application to 3D confocal microscopy images**, C. Chaux, Institut National de Recherche en Informatique et en Automatique (France); L. Blanc-Féraud, Univ. de Nice Sophia Antipolis (France); J. B. Zerubia, Institut National de Recherche en Informatique et en Automatique (France) [6701-14]

4:20 pm: **Some uses of wavelets for restoring and analysing the three-dimensional motion patterns of live cochlear structures**, J. H. R. Boutet de Monvel, Karolinska Institute (Sweden) [6701-15]

4:40 pm: **Multiresolution techniques for the classification of biometric and bioimage datasets**, A. Chebira, J. Kovacevic, Carnegie Mellon Univ. [6701-16]

5:00 pm: **Detection of curvilinear objects in biological noisy image using feature-adapted fast slant stack**, S. Berlemont, Institut Pasteur (France) and Genomic Vision (France) and Univ. of Paris V (France); A. Bensimon, Genomic Vision (France); J. Olivo-Marin, Institut Pasteur (France) [6701-17]

5:20 pm: **Active contour-based multiresolution transforms for the segmentation of fluorescence microscope images**, G. Srinivasa, Carnegie Mellon Univ.; M. C. Fickus, Air Force Institute of Technology; J. Kovacevic, Carnegie Mellon Univ. [6701-18]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A **Sun. 6:00 to 7:30 pm**

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Conference 6701 • Conv. Ctr. 25B

Monday 27 August

SESSION 5

Conv. Ctr. 25B Mon. 8:30 to 10:10 am

Special Session on Geometrical X-lets and Nonseparable Bases

Chair: Minh N. Do, Univ. of Illinois at Urbana-Champaign

8:30 am: **Curvelets and wave atoms for mirror-extended images**, L. Demanet, Stanford Univ.; L. Ying, The Univ. of Texas at Austin [6701-19]

8:50 am: **Video processing using the surfacelet transform: construction and applications**, Y. M. Lu, M. N. Do, Univ. of Illinois at Urbana-Champaign [6701-20]

9:10 am: **Minimum total variation synthesis using shearlets**, D. Labate, North Carolina State Univ.; K. Guo, Missouri State Univ.; W. Lim, Lehigh Univ. [6701-21]

9:30 am: **Geometric estimation with orthogonal bandlet bases**, G. Peyré, Univ. Paris Dauphine (France); E. Le Pennec, Univ. Paris 7-Denis Diderot (France); C. Dossal, Univ. Bordeaux I (France) [6701-22]

9:50 am: **Image representation and compression using directionlets**, V. Velisavljevic, Deutsche Telekom Labs. (Germany); B. Beferull-Lozano, Univ. de València (Spain); M. Vetterli, École Polytechnique Fédérale de Lausanne (Switzerland) and Univ. of California/Berkeley; P. L. Dragotti, Imperial College London (United Kingdom) [6701-23]

Coffee Break 10:10 to 10:40 am

SESSION 6

Conv. Ctr. 25B Mon. 10:40 am to 12:00 pm

Special Session on Sampling and Operator Theory I

Chairs: Akram Aldroubi, Vanderbilt Univ.; Ilya Krishtal, Northern Illinois Univ.

10:40 am: **Reconstructing functions in shift-invariant spaces from their average sample values**, E. Acosta Reyes, Vanderbilt Univ. [6701-24]

11:00 am: **The redundancy of localized frames and superframes**, R. V. Balan, Siemens Corporate Research; Z. Landau, City College/CUNY [6701-25]

11:20 am: **On slanted matrices, frames and sampling**, A. Aldroubi, Vanderbilt Univ.; A. G. Baskakov, Voronezh State Univ. (Russia); I. Krishtal, Northern Illinois Univ. [6701-26]

11:40 am: **Localized operators and the construction of localized frames**, F. Futamura, Southwestern Univ.; A. Aldroubi, Vanderbilt Univ. [6701-27]

Lunch Break 12:00 am to 2:00 pm

SESSION 7

Conv. Ctr. 25B Mon. 2:00 to 3:20 pm

Special Session on Sampling and Operator Theory II

Chairs: Akram Aldroubi, Vanderbilt Univ.; Ilya Krishtal, Northern Illinois Univ.

2:00 pm: **Operator-like wavelets**, I. Khalidov, D. Van De Ville, T. Blu, M. A. Unser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) ... [6701-28]

2:20 pm: **Operator sampling, MIMO channel identification, and recovery of matrices with sparse representations**, G. E. Pfander, Jacobs Univ. Bremen (Germany); D. F. Walnut, George Mason Univ. [6701-29]

2:40 pm: **Estimation algorithms with noisy frame coefficients**, A. M. Powell, Vanderbilt Univ. [6701-30]

3:00 pm: **The unreasonable effectiveness of Banach algebras in numerical analysis**, T. Strohmer, Univ. of California/Davis [6701-31]

Coffee Break 3:20 to 4:00 pm

SESSION 8

Conv. Ctr. 25B Mon. 4:00 to 5:00 pm

Special Session on Wavelets in Neuro-Imaging

Chair: Jalal M. Fadili, Ctr. National de la Recherche Scientifique (France)

4:00 pm: **Low-distortion embeddings of neuroimaging datasets**, F. G. Meyer, X. Shen, Univ. of Colorado/Boulder [6701-32]

4:20 pm: **Bayesian fMRI data analysis with sparse spatial basis function priors**, G. Flandin, NeuroSpin (France) and Wellcome Trust Ctr. for Neuroimaging (United Kingdom) and Institut Fédératif de Recherche n49 (France); W. D. Penny, Wellcome Trust Ctr. for Neuroimaging (United Kingdom) [6701-34]

4:40 pm: **Activelets and sparsity: a new way to detect brain activation from fMRI data**, I. Khalidov, D. Van De Ville, Ecole Polytechnique Fédérale de Lausanne (Switzerland); J. M. Fadili, Ecole Nationale Supérieure d'Ingénieurs de Caen (France); M. A. Unser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [6701-35]

Keynote Presentation 5:00 to 5:40 pm

Wavelets, operators, and invariance principles (Keynote), M. A. Unser, École Polytechnique Fédérale de Lausanne (Switzerland) [6701-36]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

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✓ **Discrete unitary transforms generated by moving waves**, A. M. Grigoryan, The Univ. of Texas at San Antonio; M. M. Grigoryan, Yerevan State Univ. (Armenia) [6701-78]

✓ **New discrete unitary Haar-type heap transforms**, A. M. Grigoryan, The Univ. of Texas at San Antonio; M. M. Grigoryan, Yerevan State Univ. (Armenia) [6701-79]

✓ **High-dimensional data compression via PHLCT**, Z. Zhang, N. Saito, Univ. of California/Davis [6701-81]

✓ **Stability of the multifractal spectra by transformations of discrete series: tests of MF and algorithms improvement**, Á. Corvalán, Univ. de Buenos Aires (Argentina); E. P. Serrano, Univ. de San Martín (Argentina) [6701-82]

✓ **Wavelet packets frames in multiresolution structures**, E. P. Serrano, Univ. de San Martín (Argentina); R. A. Cardo, A. M. Figliola, Univ. Nacional de General Sarmiento (Argentina) [6701-83]

✓ **Wavelet-based stereo images reconstruction using depth images**, L. Jovanov, A. Pizurica, W. Philips, Univ. Gent (Belgium) [6701-84]

✓ **Estimation of chirp rates of music-adapted prolate spheroidal atoms using reassignment**, B. A. Mesz, Univ. de San Martín (Argentina) [6701-85]

✓ **Colon tissue biopsy classification using wavelet transform**, K. Masood, N. M. Rajpoot, Univ. of Warwick (United Kingdom) [6701-86]

✓ **Affine scaling transformation algorithms for harmonic retrieval in a compressive sampling framework**, S. D. Cabrera, A. Yousefi, J. G. Rosiles, The Univ. of Texas at El Paso; A. Brito, Xerox Corp. [6701-87]

✓ **Short-term spectral analysis and synthesis improvements with optimized oversampled inverse filter banks**, J. Gauthier, L. C. Duval, Institut Français du Pétrole (France); J. Pesquet, Univ. de Marne-la-Vallée (France) [6701-88]

- ✓ **Tight frame wavelets with equal norms highpass and bandpass filters**, F. Abdelnour, United States Patent and Trademark Office [6701-89]
- ✓ **Wavelet noise reduction based on energy features**, S. A. Hojjatoleslami, Univ. of Kent (United Kingdom) [6701-90]
- ✓ **Video denoising based on a Laplace distribution with local variance in 3D complex wavelet domain**, H. Rabbani, Amirkabir Univ. of Technology (Iran); I. W. Selesnick, Polytechnic Univ. [6701-91]
- ✓ **Modeling statistical properties of wavelets using a mixture of bivariate Cauchy models and its application for image denoising in complex wavelet domain**, H. Rabbani, Amirkabir Univ. of Technology (Iran); I. W. Selesnick, Polytechnic Univ.; M. Vafadust, Amirkabir Univ. of Technology (Iran) [6701-92]
- ✓ **Fast and sparse algorithm for seismic-wave equations using curvelets**, J. Ma, Tsinghua Univ. (China) [6701-93]

Tuesday 28 August

SESSION 10

Conv. Ctr. 25B Tues. 8:00 to 11:50 am

Special Session on Wavelets in Physics

Chairs: **Pierre Vandergheynst**, École Polytechnique Fédérale de Lausanne (Switzerland); **Yves Wiaux**, École Polytechnique Fédérale de Lausanne (Switzerland)

- 8:00 am: **Regularization of inverse problems with adaptive discrepancy terms: application to multispectral data**, S. Anthoine, Univ. de Nice Sophia Antipolis (France) [6701-37]
- 8:20 am: **Modeling images of the quiet sun in the extreme UV**, P. Chainais, Univ. Blaise Pascal (France); V. Delouille, J. Hochedez, Royal Observatory of Belgium (Belgium) [6701-38]
- 8:40 am: **Chains of chirplets for the detection of gravitational wave chirps**, E. Chassande-Mottin, Ctr. National de la Recherche Scientifique (France) and Observatoire de la Côte d'Azur (France); A. Pai, Max-Planck-Institut für Gravitationsphysik (Germany); O. Rabaste, Ctr. National de la Recherche Scientifique (France) [6701-39]
- 9:00 am: **Beta-lattice multiresolution of quasicrystalline Bragg peaks**, J. P. Gazeau, Univ. Paris 7-Denis Diderot (France) and Ctr. National de la Recherche Scientifique (France); A. El Kharrat, Univ. Paris 7-Denis Diderot (France) [6701-40]
- 9:20 am: **Frames of Poisson wavelets on the sphere and their application in geophysical modeling**, M. Holschneider, B. Minchev, Univ. Potsdam (Germany); I. Panet, Geographical Survey Institute (Japan); A. Chambodut, Ecole et Observatoire des Sciences de la Terre (France); M. Mandea, GeoForschungsZentrum Potsdam e.V. (Germany) [6701-41]
- 9:40 am: **Detecting dark energy with wavelets on the sphere**, J. McEwen, Univ. of Cambridge (United Kingdom) [6701-42]
- Coffee Break 10:00 to 10:30 am
- 10:30 am: **CMB data analysis and inpainting on the sphere**, Y. Moudou, P. Abrial, J. Starck, Commissariat à l'Energie Atomique (France); J. M. Fadili, Ctr. National de la Recherche Scientifique (France); J. Bobin, Commissariat à l'Energie Atomique (France) [6701-43]
- 10:50 am: **A spatio-spectral localization approach to estimating potential fields on the surface of a sphere from noisy incomplete data taken at satellite altitudes**, F. J. Simons, F. A. Dahlen, Princeton Univ. [6701-44]
- 11:10 am: **Time-frequency multipliers for sound synthesis**, P. Depalle, McGill Univ. (Canada); R. Kronland-Martinet, Ctr. National de la Recherche Scientifique (France); B. Torrèsani, Univ. de Provence (France) [6701-45]
- 11:30 am: **Probing the Gaussianity and the statistical isotropy of the CMB with spherical wavelets**, P. Vielva, Instituto de Física de Cantabria (Spain) [6701-46]
- Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 11

Conv. Ctr. 25B Tues. 1:30 to 2:30 pm

Wavelets and Filterbank Designs

Chair: **Michael Liebling**, California Institute of Technology

- 1:30 pm: **Extending Vaidyanathan's procedure to improve the performance of unitary filter banks with a fixed lowpass by using additional elementary building blocks**, P. Steffen, W. Brandhuber, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [6701-47]
- 1:50 pm: **Hilbert-like tight frame wavelets with symmetric envelope**, F. Abdelnour, United States Patent and Trademark Office [6701-48]
- 2:10 pm: **Distributed video coding based on sampling of signals with finite rate of innovation**, V. Chaisinthop, P. L. Dragotti, Imperial College London (United Kingdom) [6701-49]

SESSION 12

Conv. Ctr. 25B Tues. 2:30 to 5:40 pm

Special Session on Wavelets for Denoising and Restoration

Chair: **Ivan W. Selesnick**, Polytechnic Univ.

- 2:30 pm: **Image sequence denoising via sparse and redundant representations**, M. Protter, M. Elad, Technion-Israel Institute of Technology (Israel) [6701-50]
- 2:50 pm: **Predictive compression and denoising with overcomplete decompositions: a simple way to reject structured "noise"**, O. G. Guleryuz, DoCoMo Communications Labs. USA, Inc. [6701-51]
- 3:10 pm: **Image restoration using adaptive Gaussian scale mixtures in overcomplete pyramids**, J. Portilla, Consejo Superior de Investigaciones Científicas (Spain); J. A. Guerrero-Colón, Univ. de Granada (Spain) . [6701-52]
- Coffee Break 3:30 to 4:00 pm
- 4:00 pm: **Video denoising in the wavelet domain using a Bayesian algorithm**, N. Gupta, E. I. Plotkin, M. N. S. Swamy, Concordia Univ. (Canada) [6701-53]
- 4:20 pm: **SURE-based interscale-intercolor wavelet thresholding for color image denoising**, F. Luisier, T. Blu, École Polytechnique Fédérale de Lausanne (Switzerland) [6701-54]
- 4:40 pm: **Signal-dependent noise characterization in Haar wavelets domain**, K. Hirakawa, Harvard Univ. [6701-55]
- 5:00 pm: **Double-density complex wavelet cartoon-texture decomposition**, G. A. Hower, W. Kuo, G. Hanson, Naval Air Warfare Ctr. [6701-56]
- 5:20 pm: **Wavelet-based signal denoising via estimation of elliptically contoured multivariate Laplace vectors**, I. W. Selesnick, Polytechnic Univ. [6701-57]

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Wednesday 29 August

SESSION 13

Conv. Ctr. 25B Wed. 8:00 to 10:00 am

Special Session on Finite-Dimensional Frames, Time-Frequency Analysis, and Applications

Chairs: **Radu V. Balan**, Siemens Corporate Research; **Peter G. Casazza**, Univ. of Missouri/Columbia

8:00 am: **Algorithms for doing signal reconstruction without phase**, P. G. Casazza, Univ. of Missouri/Columbia; R. V. Balan, Siemens Corporate Research; D. Edidin, Univ. of Missouri/Columbia; B. G. Bodmann, Univ. of Houston [6701-58]

8:20 am: **Modeling sensor networks with fusion frames**, G. Kutyniok, Princeton Univ.; P. G. Casazza, Univ. of Missouri/Columbia; S. Li, San Francisco State Univ.; C. J. Rozell, Rice Univ. [6701-59]

8:40 am: **Multiscale moment transforms over the integer lattice**, M. C. Fickus, G. S. Seetharaman, M. E. Oxley, Air Force Institute of Technology [6701-60]

9:00 am: **Redundancy for infinite frames and localization for finite ones.**, R. V. Balan, Siemens Corporate Research; Z. Landau, City College/CUNY; R. Vershynin, Univ. of California/Davis [6701-61]

9:20 am: **Burst erasures and the mean square error for cyclic frames**, B. G. Bodmann, Univ. of Waterloo (Canada) [6701-62]

9:40 am: **Some B-spline Riesz sequences of translates can have a sampling property**, S. Li, San Francisco State Univ. [6701-63]

Coffee Break 10:00 to 10:30 am

SESSION 14

Conv. Ctr. 25B Wed. 10:30 to 11:10 am

Special Session on Wavelets in Medical Imaging

Chairs: **François G. Meyer**, Univ. of Colorado/Boulder; **Andrew F. Laine**, Columbia Univ.

10:30 am: **Wavelets and Bayesian priors as latent signal models in hierarchical sparse component analysis: applications to medical imaging**, E. Roussos, Princeton Univ. [6701-65]

10:50 am: **Isotropic multiresolution analysis for texture identification and applications in 3D biomedical images**, M. Papadakis, S. K. Alexander, R. Azencott, S. Baid, X. Li, J. R. Romero, Univ. of Houston [6701-10]

SESSION 15

Conv. Ctr. 25B Wed. 11:10 am to 12:30 pm

Emerging Applications

Chair: **Thomas Strohmer**, Univ. of California/Davis

11:10 am: **Learning adapted dictionaries for geometry and texture separation**, G. Peyré, Univ. Paris Dauphine (France); J. M. Fadili, Ctr. National de la Recherche Scientifique (France); J. Starck, Commissariat à l'Energie Atomique (France) [6701-66]

11:30 am: **Morphological diversity and sparsity: new insights into multivariate data analysis**, J. Bobin, Commissariat à l'Energie Atomique (France); J. M. Fadili, Ctr. National de la Recherche Scientifique (France); J. Starck, Y. Moudden, Commissariat à l'Energie Atomique (France) .. [6701-67]

11:50 am: **Automated discrimination of shapes in high dimensions**, L. H. Lieu, N. Saito, Univ. of California/Davis [6701-68]

12:10 pm: **Coherent noise removal in seismic data with dual-tree M-band wavelets**, L. C. Duval, Institut Français du Pétrole (France); C. Chaux, Institut National de Recherche en Informatique et en Automatique (France); S. Ker, Institut Français du Pétrole (France) [6701-69]

Lunch/Exhibition Break 12:30 to 2:00 pm

SESSION 16

Conv. Ctr. 25B Wed. 2:00 to 4:50 pm

Special Session on Sparsity and Compressed Sampling

Chair: **Pier L. Dragotti**, Imperial College London (United Kingdom)

2:00 pm: **Average case analysis of multichannel sparse approximations using p-thresholding**, P. Vandergheynst, École Polytechnique Fédérale de Lausanne (Switzerland) [6701-70]

2:20 pm: **Analytic sensing: reconstructing pointwise sources from boundary Laplace measurements**, D. Kandaswamy, D. Van De Ville, M. A. Unser, T. Blu, École Polytechnique Fédérale de Lausanne (Switzerland)[6701-71]

2:40 pm: **L0-based sparse approximations**, J. de la Portilla Muelas, Instituto de Optica (Spain); L. Mancera Pascual, Univ. de Granada (Spain) .. [6701-72]

3:00 pm: **Sparsity-based imaging**, M. L. Moravec, Rice Univ.; J. K. Romberg, Georgia Institute of Technology; R. G. Baraniuk, Rice Univ. [6701-73]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Annihilating filter-based decoding in the compressed sensing framework**, A. Hormati, M. Vetterli, École Polytechnique Fédérale de Lausanne (Switzerland) [6701-74]

4:10 pm: **Sampling signals from a union of subspaces**, Y. M. Lu, M. N. Do, Univ. of Illinois at Urbana-Champaign [6701-75]

4:30 pm: **Geometric wavelets based nonlinear reaction-diffusion equation for texture-preserving denoising**, J. Ma, Tsinghua Univ. (China) .. [6701-76]

Keynote Presentation 4:50 to 5:30 pm

Self-consistency: a general recipe for wavelet estimation with irregularly spaced and/or incomplete data (Keynote), X. Meng, Harvard Univ. [6701-77]

Closing Remarks

Conv. Ctr. 25B Wed. 5:30 to 5:40 pm

Vivek K. Goyal, Massachusetts Institute of Technology

Courses of Related Interest

See SPIE Cashier for information.

SC661 Advanced Image Processing and Applications
(Iftekharuddin) Monday 27, 8:30 am - 5:30 pm

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Soft X-Ray Lasers and Applications VII

Conference Chairs: **Gregory J. Tallents**, The Univ. of York (United Kingdom); **James Dunn**, Lawrence Livermore National Lab.

Program Committee: **Ernst E. Fill**, Max-Planck-Institut für Quantenoptik (Germany); **Sylvie Jacquemot**, École Polytechnique (France); **Gerard Jamelot**, Univ. Paris-Sud II (France); **Yoshiaki Kato**, Japan Atomic Energy Agency (Japan); **Ciaran L. S. Lewis**, Queen's Univ. Belfast (United Kingdom); **Peter-Viktor Nickles**, Max-Born-Institut (Germany); **Joseph Nilsen**, Lawrence Livermore National Lab.; **Geoffrey J. Pert**, The Univ. of York (United Kingdom); **Jorge J. G. Rocca**, Colorado State Univ.; **Szymon Suckewer**, Princeton Univ.; **Alexander V. Vinogradov**, P.N. Lebedev Physical Institute (Russia)

Tuesday 28 August

X-Ray/UV Optics Technical Event
Marriott Mission Hills 8:00 to 10:00 pm

Chair: **Forbes R. Powell**, Luxel Corp.

Please see page 23 for details.

Wednesday 29 August

SESSION 1

Conv. Ctr. 30B Wed. 8:30 to 10:10 am

Laser Development and Applications

Chair: **James Dunn**, Lawrence Livermore National Lab.

8:30 am: **High-brightness tabletop soft x-ray lasers at high repetition rate: injection-seeding of dense plasma amplifiers and other developments (Invited Paper)**, J. J. G. Rocca, Y. Wang, B. M. Luther, E. Granados, M. A. Berrill, M. A. Larotonda, D. A. Alessi, D. H. Martz, D. Patel, F. Pedaci, C. S. Menoni, Colorado State Univ.; V. N. Shlyaptsev, Lawrence Livermore National Lab. [6702-01]

9:00 am: **New results at the Bern X-ray Laser Facility (Invited Paper)**, J. E. Balmer, M. Gruenig, C. Imesch, F. Staub, Univ. Bern (Switzerland) .. [6702-02]

9:30 am: **Plasma interactions in laser irradiated cavities studied with soft x-ray: interferometry using a capillary discharge laser**, M. A. Purvis, J. Grava, J. Filevich, M. C. Marconi, J. J. G. Rocca, Colorado State Univ.; J. Dunn, S. J. Moon, J. Nilsen, V. N. Shlyaptsev, Lawrence Livermore National Lab.; E. Jankowska, Colorado State Univ. [6702-03]

9:50 am: **Characterization of the nickel-like molybdenum x-ray laser emission**, M. H. Edwards, N. Booth, Z. Zhai, G. J. Tallents, The Univ. of York (United Kingdom); T. Dzelzainis, C. L. S. Lewis, Queen's Univ. (United Kingdom) [6702-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 30B Wed. 10:40 am to 12:00 pm

OFI and Toward Shorter Wavelengths

Chair: **Gregory J. Tallents**, The Univ. of York (United Kingdom)

10:40 am: **Ultrashort pulse-driven optical-field-ionization x-ray lasers (Invited Paper)**, J. Lin, National Chung Cheng Univ. (Taiwan); M. Chou, P. Lin, Institute of Atomic and Molecular Sciences (Taiwan); C. Lin, National Chung Cheng Univ. (Taiwan); S. Chen, J. Wang, Institute of Atomic and Molecular Sciences (Taiwan) [6702-05]

11:10 am: **Dramatic enhancement of optical-field-ionization collisional-excitation x-ray lasing by an optically preformed plasma waveguide**, M. Chou, Institute of Atomic and Molecular Sciences (Taiwan) and National Chung Cheng Univ. (Taiwan); P. Lin, Institute of Atomic and Molecular Sciences (Taiwan); C. Lin, J. Lin, National Chung Cheng Univ. (Taiwan); J. Wang, S. Chen, Institute of Atomic and Molecular Sciences (Taiwan) [6702-06]

11:30 am: **The practicality of x-ray lasers using exploding foils for the sub-5-nm wavelength range (Invited Paper)**, G. J. Pert, The Univ. of York (United Kingdom) [6702-07]

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

SESSION 3

Conv. Ctr. 30B Wed. 1:30 to 3:00 pm

Seeded Lasers

Chair: **Joseph Nilsen**, Lawrence Livermore National Lab.

1:30 pm: **Characterization of an OFI seeded soft x-ray laser (Invited Paper)**, S. Sebban, École Nationale Supérieure de Techniques Avancées (France) [6702-08]

2:00 pm: **Full characterization of a GRIP Ni-like Ag amplifier for seeding with high harmonics at 13.9 nm (Invited Paper)**, K. A. Janulewicz, J. Tuemmler, P. Nickles, Max-Born-Institut (Germany); H. T. Kim, I. W. Choi, C. Kim, D. Ko, J. Lee, Kwangju Institute of Science and Technology (South Korea) [6702-09]

2:30 pm: **Development of a high-repetition-rate seeded x-ray laser (Invited Paper)**, A. Klisnick, Univ. Paris-Sud II (France) [6702-10]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 30B Wed. 3:30 to 5:00 pm

Free Electron Lasers and Synchrotron Sources

Chair: **Geoffrey J. Pert**, The Univ. of York (United Kingdom)

3:30 pm: **Ultrafast coherent diffractive imaging with x-ray free-electron lasers (Invited Paper)**, H. N. Chapman, Lawrence Livermore National Lab. [6702-11]

4:00 pm: **Applications of the FLASH FEL for high-energy density science**, R. W. Lee, Univ. of California/Berkeley; J. S. Wark, B. Nagler, Univ. of Oxford (United Kingdom); A. J. Nelson, Lawrence Livermore National Lab.; P. A. Heimann, Lawrence Berkeley National Lab.; F. Khattak, D. Riley, T. Dzelzainis, Queen's Univ. (United Kingdom); T. Whitcher, Univ. of Oxford (United Kingdom); T. Tschentscher, S. Toleikis, R. Faeustlin, Deutsches Elektronen-Synchrotron (Germany); M. Fajardo, Instituto Superior Técnico (Portugal); M. Kozlová, Fyzikální Ústav (Czech Republic); P. Zeitoun, École Nationale Supérieure de Techniques Avancées (France); P. Mercere, Synchrotron SOLEIL (France); S. Moon, H. Chung, H. A. Scott, Lawrence Livermore National Lab.; D. H. Schneider, T. Schenkel, Lawrence Berkeley National Lab.; H. N. Chapman, S. Bajt, Lawrence Livermore National Lab. [6702-12]

4:20 pm: **Relativistic Thomson scattering in compact linacs and storage rings: a route to quasi-monochromatic tunable laboratory-scale x-ray sources**, A. V. Vinogradov, M. V. Gorbunkov, Y. Y. Maslova, P.N. Lebedev Physical Institute (Russia) [6702-13]

4:40 pm: **Inverse Compton backscattering source driven by the multi 10-TW laser installed at Daresbury**, G. Priebe, Council for the Central Lab. of the Research Councils (United Kingdom); S. P. Malton, Univ. College London (United Kingdom) and Council for the Central Lab. of the Research Councils (United Kingdom); M. A. MacDonald, D. Laundry, G. P. Diakun, L. B. Jones, D. J. Holder, G. J. Hirst, S. L. Smith, E. A. Seddon, Council for the Central Lab. of the Research Councils (United Kingdom) [6702-14]

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✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Optimization of nitrogen filled capillary pinch for soft x-ray laser recombination pumping**, P. Vrba, Institute of Plasma Physics (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); M. Vrbova, Czech Technical Univ. in Prague (Czech Republic) [6702-32]
- ✓ **Development of ultrafast soft x-ray beamline at PALS and surface modification of solids by high-order harmonics**, K. Jakubczak, T. Mocek, J. Polan, P. Homer, B. Rus, Fyzikální Ústav (Czech Republic); I. J. Kim, C. M. Kim, G. H. Lee, C. H. Nam, Korea Advanced Institute of Science and Technology (South Korea); V. Hajkova, J. Chalupsky, L. Juha, Fyzikální Ústav (Czech Republic) [6702-33]
- ✓ **Optical-field-ionization argon x-ray lasing in an optically preformed plasma waveguide**, P. Lin, Institute of Atomic and Molecular Sciences (Taiwan) and National Taiwan Univ. (Taiwan); M. Chou, Institute of Atomic and Molecular Sciences (Taiwan) and National Chung Cheng Univ. (Taiwan); C. Lin, National Chung Cheng Univ. (Taiwan) and National Chung Cheng Univ. (Taiwan); H. Yang, Institute of Atomic and Molecular Sciences (Taiwan) and National Taiwan Normal Univ. (Taiwan); J. Lin, National Chung Cheng Univ. (Taiwan); J. Wang, Institute of Atomic and Molecular Sciences (Taiwan) and National Taiwan Univ. (Taiwan) and National Central Univ. (Taiwan); S. Chen, Institute of Atomic and Molecular Sciences (Taiwan) and National Central Univ. (Taiwan) [6702-34]
- ✓ **Gallium-based avalanche photon counter with picosecond timing resolution for X to visible range**, J. Blazej, I. Prochazka, Czech Technical Univ. in Prague (Czech Republic) [6702-35]
- ✓ **Target delivery system for high-repetition-rate lasers**, J. Polan, T. Havlicek, B. Rus, Fyzikální Ústav (Czech Republic) [6702-36]
- ✓ **Measurements of x-ray laser wavefront profile using PDI technique**, P. Homer, B. Rus, J. Polan, J. Kosikova, Institute of Physics (Czech Republic) [6702-37]

Thursday 30 August

SESSION 5

Conv. Ctr. 30B Thurs. 8:30 to 10:00 am

X-Ray Lasers Applications I

Chair: **Peter-Viktor Nickles**, Max-Born-Institut (Germany)

8:30 am: **Development of soft x-ray lasers at PALS and their applications in dense plasma physics (Invited Paper)**, B. Rus, T. Mocek, M. Kozlová, J. Polan, P. Homer, M. Stupka, Fyzikální Ústav (Czech Republic); G. J. Tallents, M. H. Edwards, The Univ. of York (United Kingdom); J. Dunn, A. J. Nelson, Lawrence Livermore National Lab.; L. Juha, Fyzikální Ústav (Czech Republic); M. Fajardo, Instituto Superior Tecnico (Portugal); P. Zeitoun, École Nationale Supérieure de Techniques Avancées (France); N. Booth, Z. Zhai, The Univ. of York (United Kingdom); M. E. Foord, R. L. Shepherd, Lawrence Livermore National Lab.; W. Rozmus, Univ. of Alberta (Canada); H. A. Baldis, Univ. of California/Davis; J. Feldhaus, H. Wabnitz, Deutsches Elektronen-Synchrotron (Germany) [6702-15]

9:00 am: **X-ray lasers as probes to measure plasma ablation rates**, G. J. Tallents, M. H. Edwards, D. S. Whittaker, P. Mistry, G. J. Pert, The Univ. of York (United Kingdom); B. Rus, T. Mocek, Fyzikální Ústav (Czech Republic) [6702-16]

9:20 am: **Interferometric lithography with sub-100-nm resolution using a tabletop 46.9-nm laser**, M. C. Marconi, P. Wachulak, D. Patel, Colorado State Univ.; M. G. Capeluto, Univ. de Buenos Aires (Argentina); C. S. Menoni, J. J. G. Rocca, Colorado State Univ. [6702-17]

9:40 am: **Tabletop EUV holography with sub-200-nm spatial resolution**, P. Wachulak, M. C. Marconi, R. A. Bartels, C. S. Menoni, J. J. G. Rocca, Colorado State Univ. [6702-18]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 30B Thurs. 10:30 am to 12:20 pm

X-Ray Lasers Applications II

Chair: **Sylvie Jacquemot**, École Polytechnique (France)

10:30 am: **Neutral nanocluster structure and chemistry studied by soft x-ray laser single-photon ionization (Invited Paper)**, E. R. Bernstein, F. Dong, S. C. Heinbuch, J. J. G. Rocca, Colorado State Univ. [6702-19]

11:00 am: **Nanoscale ablation with soft x-ray lasers**, F. Brizuela, H. Bravo, M. A. Berrill, B. Langdon, G. O. Vaschenko, C. S. Menoni, J. J. G. Rocca, Colorado State Univ.; O. E. Hemberg, B. H. Frazer, JMAR Technologies, Inc.; W. Chao, Univ. of California/Berkeley; E. H. Anderson, Lawrence Berkeley National Lab.; D. T. Attwood, Jr., Univ. of California/Berkeley [6702-20]

11:20 am: **Compact 70-nm spatial resolution microscope using a desktop-size soft x-ray laser**, C. A. Brewer, F. Brizuela, D. H. Martz, M. C. Marconi, J. J. G. Rocca, C. S. Menoni, Colorado State Univ.; W. Chao, Univ. of California/Berkeley; E. H. Anderson, Lawrence Berkeley National Lab.; D. T. Attwood, Jr., Univ. of California/Berkeley; A. V. Vinogradov, I. A. Artiukov, P.N. Lebedev Physical Institute (Russia); Y. P. Pershyn, V. Kondratenko, Kharkov Polytechnical Institute (Ukraine) [6702-21]

11:40 am: **Searching for plasmas with anomalous dispersion in the soft x-ray regime**, J. Nilsen, Lawrence Livermore National Lab. [6702-22]

12:00 pm: **21-nm x-ray laser Thomson scattering of laser-heated exploding foil plasmas**, J. Dunn, Lawrence Livermore National Lab.; B. Rus, T. Mocek, Fyzikální Ústav (Czech Republic); A. J. Nelson, M. E. Foord, Lawrence Livermore National Lab.; W. Rozmus, Univ. of Alberta (Canada); H. A. Baldis, Univ. of California/Davis; R. L. Shepherd, Lawrence Livermore National Lab.; M. Kozlová, J. Polan, P. Homer, M. Stupka, Fyzikální Ústav (Czech Republic) [6702-23]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 7

Conv. Ctr. 30B Thurs. 1:50 to 3:20 pm

Overviews

Chair: **Jorge J. G. Rocca**, Colorado State Univ.

1:50 pm: **Recent progress on x-ray laser source development and application activities at JAEA (Invited Paper)**, M. Kishimoto, Japan Atomic Energy Agency (Japan) [6702-24]

2:20 pm: **LASERIX: a high-repetition-rate laser facility for performing intense XUV sources**, D. R. Ros, Univ. Paris-Sud XI (France) [6702-25]

2:40 pm: **EUV lasers on low-inductive capillary discharges**, V. A. Burtsev, E. P. Bolshakov, N. V. Kalinin, V. A. Kubasov, V. I. Chernobrovin, D. V. Efremov Scientific Research Institute of Electrophysical Apparatus (Russia) . . . [6702-26]

3:00 pm: **Research into energy and temporal characteristics of x-ray emission from solid state cathode medium of high-current glow discharge**, A. B. Karabut, State Scientific-Industrial Association (Russia) [6702-27]

Coffee Break 3:20 to 3:50 pm

SESSION 8

Conv. Ctr. 30B Thurs. 3:50 to 4:50 pm

X-Ray Optics

Chair: **Alexander V. Vinogradov**, P.N. Lebedev Physical Institute (Russia)

3:50 pm: **Multilayer mirror as a K-alpha x-ray spectrometer from 20-70 keV at the Titan Laser Facility**, B. R. Maddox, H. Park, S. Bajt, B. A. Remington, M. A. McKernan, Lawrence Livermore National Lab. [6702-28]

4:10 pm: **Structural transformations in multilayers and bulk materials irradiated by EUV lasers**, D. L. Voronov, Lawrence Berkeley National Lab.; E. N. Zubarev, Y. P. Pershyn, V. A. Sevryukova, V. V. Kondratenko, Kharkov Polytechnical Institute (Ukraine); A. V. Vinogradov, I. A. Artioukov, Y. A. Uspenskiy, P.N. Lebedev Physical Institute (Russia); M. E. Grisham, Colorado State Univ.; G. O. Vaschenko, Cymer, Inc.; C. S. Menoni, J. J. G. Rocca, Colorado State Univ. [6702-29]

4:30 pm: **Advances in short-wavelength x-ray multilayer optics: toward high-throughput multimirror systems for the wavelengths <10 nm**, I. A. Artioukov, P.N. Lebedev Physical Institute (Russia); Y. A. Bugaev, O. Y. Devizenko, Kharkov Polytechnical Institute (Ukraine); R. M. Feschenko, P.N. Lebedev Physical Institute (Russia); V. V. Kondratenko, Kharkov Polytechnical Institute (Ukraine); Y. A. Uspenski, A. V. Vinogradov, P.N. Lebedev Physical Institute (Russia) [6702-30]



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Conference 6703 • Conv. Ctr. 30D

Sunday-Monday 26-27 August 2007 • Proceedings of SPIE Vol. 6703

Ultrafast X-Ray Sources and Detectors

Conference Chairs: **Zenghu Chang**, Kansas State Univ.; **George A. Kyrala**, Los Alamos National Lab.; **Jean-Claude Kieffer**, Institut National de la Recherche Scientifique (Canada)

Program Committee: **Bernhard W. Adams**, Argonne National Lab.; **Fred Bijkerk**, FOM-Institute for Plasma Physics Rijnhuizen (Netherlands); **Paul B. Corkum**, National Research Council Canada (Canada); **Anatoly Y. Faenov**, Institute for High Temperatures (Russia); **Roger W. Falcone**, Univ. of California/Berkeley; **Henryk Fiedorowicz**, Wojskowa Akademia Techniczna (Poland); **Philip A. Heimann**, Lawrence Berkeley National Lab.; **Xun Hou**, Xi'an Institute of Optics and Precision Mechanics (China); **Paul A. Jaanimagi**, Univ. of Rochester; **Victor L. Kantsyrev**, Univ. of Nevada/Reno; **Ronnie L. Shepherd**, Lawrence Livermore National Lab.; **Jin Wang**, Argonne National Lab.

Sunday 26 August

SESSION 1

Conv. Ctr. 30D Sun. 9:00 am to 12:00 pm

X-Ray Generation and Application

Chair: **Victor L. Kantsyrev**, Univ. of Nevada/Reno

9:00 am: **Some 10-fs x-ray emission switches (Invited Paper)**, F. B. Rosmej, Univ. de Provence (France) [6703-01]

9:30 am: **Ultra-intense laser produced high-Z backlighters for Compton radiography**, R. Tommasini, H. Park, P. K. Patel, B. R. Maddox, S. Le Pape, S. P. Hatchett II, B. A. Remington, M. H. Key, N. Izumi, M. Tabak, J. A. Koch, O. L. Landen, Lawrence Livermore National Lab.; J. F. Seely, G. E. Holland, Naval Research Lab.; L. T. Hudson, National Institute of Standards and Technology [6703-02]

9:50 am: **Applications of laser-produced betatron radiation**, A. Rousse, K. Ta Phuoc, R. Fitour, S. Corde, F. Albert, École Nationale Supérieure de Techniques Avancées (France) [6703-03]

Coffee Break 10:10 to 10:40 am

10:40 am: **LASERIX: a European versatile high-repetition-rate x-ray facility for applications in the XUV range**, D. R. Ros, Univ. Paris-Sud II (France) [6703-04]

11:00 am: **Spatially resolved x-ray spectroscopy for heavy ion beam interaction with solid matter investigations**, S. A. Pikuz, Jr., Institute for High Energy Densities (Russia); O. Rosmej, Gesellschaft für Schwerionenforschung mbH (Germany); A. Y. Faenov, I. Y. Skobelev, Institute for High Temperatures (Russia); S. Korostiy, A. Blazevic, Gesellschaft für Schwerionenforschung mbH (Germany); A. D. Fertman, Institute for Theoretical and Experimental Physics (Russia); V. P. Efremov, Institute for High Energy Densities (Russia); D. H. H. Hoffmann, Technische Univ. Darmstadt (Germany) [6703-05]

11:20 am: **Modern x-ray sources based on university-scale 1-MA z-pinch generators**, V. L. Kantsyrev, Univ. of Nevada/Reno [6703-06]

11:40 am: **Progress report on a 14.4-nm micro-exposure tool based on a laser-produced-plasma: debris mitigation system results and other issues**, S. Bollanti, D. Amodio, ENEA (Italy); A. Conti, Cilea (Italy); P. Di Lazzaro, F. Flora, L. Mezi, D. Murra, A. Torre, ENEA (Italy); C. E. Zheng, EL. EN. S.p.A. (Italy) [6703-26]

Lunch Break 12:00 to 1:30 pm

SESSION 2

Conv. Ctr. 30D Sun. 1:30 to 3:10 pm

EUV X-Ray Sources and Applications

Chair: **Henryk Fiedorowicz**, Wojskowa Akademia Techniczna (Poland)

1:30 pm: **CO₂ laser-produced Sn plasma as the solution for high-volume manufacturing EUV lithography**, A. Endo, T. Abe, Y. Ueno, T. Asayama, H. Komori, G. Soumagne, H. Mizoguchi, A. Sumitani, K. Toyoda, Extreme Ultraviolet Lithography System Development Association (Japan) ... [6703-07]

1:50 pm: **Dynamics of laser-produced Sn-based plasmas for a monochromatic 13.5-nm extreme ultraviolet source**, Y. Tao, M. S. Tillack, K. L. Sequoia, R. Burdt, F. Najmabadi, Univ. of California/San Diego ... [6703-08]

2:10 pm: **Theoretical and experimental investigation of soft x-rays emitted from TIN plasmas for lithographic application**, P. Demir, Middle East Technical Univ. (Turkey); E. Kacar, E. Akman, Kocaeli Univ. (Turkey); S. K. Bilikmen, Middle East Technical Univ. (Turkey); A. Demir, Kocaeli Univ. (Turkey) [6703-09]

2:30 pm: **Micro and nanoprocessing of organic polymers using a compact laser plasma EUV source equipped with EUV optical systems**, H. Fiedorowicz, A. S. Bartnik, R. Jarocki, J. Kostecki, R. Rakowski, A. Szczurek, M. Szczurek, Wojskowa Akademia Techniczna (Poland) [6703-10]

2:50 pm: **New 100-Hz repetition rate soft x-ray laser plasma source for ultrafast XANES applications**, S. Fourmaux, L. Lecherbourg, M. Harmand, M. Servol, J. Kieffer, Institut National de la Recherche Scientifique (Canada) [6703-11]

Coffee Break 3:10 to 3:40 pm

SESSION 3

Conv. Ctr. 30D Sun. 3:40 to 5:20 pm

Attosecond Pulse and High Harmonic Generation

Chair: **Jean-Claude Kieffer**, Institut National de la Recherche Scientifique (Canada)

Keynote Presentation 3:40 to 4:20 pm

3:40 pm: **Probing molecules through high harmonics generation with long-wavelength laser fields (Keynote)**, D. Comtois, H. C. Bandulet, H. Pépin, Institut National de la Recherche Scientifique (Canada); P. B. Corkum, National Research Council Canada (Canada); J. Kieffer, Institut National de la Recherche Scientifique (Canada); D. M. Villeneuve, National Research Council Canada (Canada) [6703-12]

4:20 pm: **Measurement of attosecond XUV pulses generated with polarization gating**, S. Ghimire, X. Feng, Z. Chang, Kansas State Univ. [6703-13]

4:40 pm: **Dispersive broadband multilayer XUV optics for attosecond pulses**, U. Kleineberg, Ludwig-Maximilians-Univ. München (Germany); E. Goulielmakis, Max-Planck-Institut für Quantenoptik (Germany); M. Hofstetter, Ludwig-Maximilians-Univ. München (Germany); M. Schultze, Max-Planck-Institut für Quantenoptik (Germany); M. Uiberacker, V. S. Yakovlev, Ludwig-Maximilians-Univ. München (Germany); F. Krausz, Max-Planck-Institut für Quantenoptik (Germany) [6703-14]

5:00 pm: **Carrier envelope phase effects on polarization gated attosecond spectra**, Z. Chang, Kansas State Univ. [6703-15]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Thomas Feist, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 4

Conv. Ctr. 30D Mon. 8:30 to 11:50 am

Ultrafast Detectors and Applications

Chairs: **Philip A. Heimann**, Lawrence Berkeley National Lab.; **Jin Wang**, Argonne National Lab.

8:30 am: **Ultrafast x-ray streak camera development at the Advanced Light Source Facility (Invited Paper)**, J. Feng, Lawrence Berkeley National Lab. [6703-16]

9:00 am: **Ultrafast x-ray imaging of highly transient multiphase sprays and flows (Invited Paper)**, J. Wang, Argonne National Lab. [6703-17]

9:20 am: **New streak cameras performances investigation at the Advanced Laser Light Source Facility**, S. Fourmaux, C. Martel, L. Lecherbourg, Institut National de la Recherche Scientifique (Canada); S. Magnan, C. Y. Coté, Axis Photonique Inc. (Canada); J. Kieffer, Institut National de la Recherche Scientifique (Canada) [6703-18]

9:40 am: **Space charge effects in the axis PX1 x-ray streak camera**, M. H. Edwards, N. Booth, Z. Zhai, G. J. Tallents, The Univ. of York (United Kingdom); T. Dzelzainis, C. L. S. Lewis, Queen's Univ. Belfast (United Kingdom) [6703-19]

Coffee Break 10:00 to 10:30 am

10:30 am: **Calibration of gated MCP responses in the x-ray region: spatial gain variations**, G. A. Kyrala, S. C. Evans, T. Archuleta, J. Cowan, J. A. Oertel, P. Sanchez, Los Alamos National Lab. [6703-20]

10:50 am: **Front and back side processed unintentionally doped GaAs Scottky detectors for x-ray detection**, A. F. Semendy, Army Research Lab.; S. Singh, Prime Circuits Inc.; M. S. Litz, P. S. Wijewarnasuriya, K. Blaine, N. K. Dhar, Army Research Lab. [6703-21]

11:10 am: **Pixel array detector for the capture of femtosecond duration x-ray images**, H. T. Philipp, L. J. Koerner, M. Pouchet, M. W. Tate, S. M. Gruner, Cornell Univ. [6703-22]

11:30 am: **Dose-rate-dependent soft x-ray radiation damage in CsI photocathodes**, K. Opachich, C. E. Coleman-Smith, H. A. Padmore, Lawrence Berkeley National Lab. [6703-25]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

✓ **Study of 2D plasma evolution based on similarity equations**, T. Cheng, Institute of Physics (China) [6703-24]

Conference 6704 • Conv. Ctr. 31A

Thursday 30 August 2007 • Proceedings of SPIE Vol. 6704

Advances in Metrology for X-Ray and EUV Optics II

Conference Chairs: **Lahsen Assoufid**, Argonne National Lab.; **Peter Z. Takacs**, Brookhaven National Lab.; **Masaru Ohtsuka**, Canon Inc. (Japan)

Program Committee: **Daniele Cocco**, Sincrotrone Trieste S.C.p.A. (Italy); **Leslie L. Deck**, Zygo Corp.; **Jean-Jacques Fermé**, Société Européenne De Systèmes Optiques (France); **Klaus R. Freischlad**, ADE Phase Shift; **Ralf D. Geckeler**, Physikalisch-Technische Bundesanstalt (Germany); **Olivier Hignette**, European Synchrotron Radiation Facility (France); **Wayne R. McKinney**, Lawrence Berkeley National Lab.; **Paul E. Murphy**, QED Technologies Inc.; **Francois A. Polack**, LURE/Univ. Paris-Sud (France); **Seungyu Rah**, Pohang Univ. of Science and Technology (South Korea); **Kawal J. S. Sawhney**, Diamond Light Source Ltd. (United Kingdom); **Frank Siewert**, BESSY GmbH (Germany); **Kazuto Yamauchi**, Osaka Univ. (Japan); **Valeriy V. Yashchuk**, Lawrence Berkeley National Lab.

Thursday 30 August

SESSION 1

Conv. Ctr. 31A Thurs. 8:30 to 10:10 am

Session 1

Chairs: **Masaru Ohtsuka**, Canon Inc. (Japan); **Ralf D. Geckeler**, Physikalisch-Technische Bundesanstalt (Germany)

8:30 am: **Suppressing vibration errors in phase shifting interferometry**, L. L. Deck, Zygo Corp. [6704-01]

8:50 am: **High-order-harmonics wavefront measurement and optimization**, J. Gautier, A. Morlens, P. Zeitoun, G. Rey, J. P. Goddet, S. Sebban, École Nationale Supérieure de Techniques Avancées (France); G. Dollivaire, X. Levecq, S. Bucourt, Imagine Optic (France) [6704-02]

9:10 am: **Hard x-ray wavefront measurement and control for hard x-ray nanofocusing**, S. Handa, H. Mimura, T. Kimura, H. Yumoto, S. Matsuyama, Y. Sano, Osaka Univ. (Japan); K. Tamasaku, Y. Nishino, The Institute of Physical and Chemical Research (RIKEN) (Japan); M. Yabashi, Japan Synchrotron Radiation Research Institute (Japan); T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan); K. Yamauchi, Osaka Univ. (Japan) [6704-03]

9:30 am: **Microstitching interferometer and relative angle determinable stitching interferometer for half-a-meter-long x-ray mirror**, H. Ohashi, Japan Synchrotron Radiation Research Institute (Japan); T. Tsumura, H. Okada, JTEC Corp. (Japan); H. Mimura, Osaka Univ. (Japan); T. Masunaga, JTEC Corp. (Japan); Y. Senba, S. Goto, Japan Synchrotron Radiation Research Institute (Japan); K. Yamauchi, Osaka Univ. (Japan); T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) [6704-04]

9:50 am: **Microstitching tool for evaluating the surface profile of nanofocusing x-ray K-B mirrors**, L. Assoufid, A. T. Macrander, C. M. Kewish, J. Qian, C. Liu, R. Conley, Jr., Argonne National Lab.; D. A. Lindley, C. E. Saxer, KLA-Tencor Corp. [6704-05]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 31A Thurs. 10:40 am to 12:00 pm

Session 2

Chairs: **Wayne R. McKinney**, Lawrence Berkeley National Lab.; **Leslie L. Deck**, Zygo Corp.

10:40 am: **Optimized use and calibration of autocollimators in deflectometry**, R. D. Geckeler, A. Just, Physikalisch-Technische Bundesanstalt (Germany) [6704-06]

11:00 am: **Binary pseudo-random grating as a standard test surface for measurement of modulation transfer function of interferometric microscopes**, V. V. Yashchuk, W. R. McKinney, Lawrence Berkeley National Lab.; P. Z. Takacs, Brookhaven National Lab. [6704-07]

11:20 am: **Precision tiltmeter as a reference for slope measuring instruments**, J. L. Kirschman, E. E. Domning, G. Y. Morrison, B. V. Smith, V. V. Yashchuk, Lawrence Berkeley National Lab. [6704-08]

11:40 am: **Proposal for a universal test mirror for characterization of slope measuring instruments**, V. V. Yashchuk, W. R. McKinney, A. Warwick, Lawrence Berkeley National Lab.; T. Noll, F. Siewert, T. Zeschke, BESSY GmbH (Germany); R. D. Geckeler, Physikalisch-Technische Bundesanstalt (Germany) [6704-09]

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

SESSION 3

Conv. Ctr. 31A Thurs. 1:30 to 3:00 pm

Session 3

Chairs: **Lahsen Assoufid**, Argonne National Lab.; **Haruhiko Ohashi**, Japan Synchrotron Radiation Research Institute (Japan)

1:30 pm: **Results of the second metrology round-robin measurements between the APS, ESRF, and Spring-8 Laboratories focused on spherical and aspheric x-ray mirrors**, A. Rommeveaux, European Synchrotron Radiation Facility (France); L. Assoufid, Argonne National Lab.; H. Ohashi, Japan Synchrotron Radiation Research Institute (Japan); H. Mimura, K. Yamauchi, Osaka Univ. (Japan); J. Qian, Argonne National Lab.; T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan); C. Morawe, European Synchrotron Radiation Facility (France); A. T. Macrander, A. M. Khounsary, Argonne National Lab.; S. Goto, Japan Synchrotron Radiation Research Institute (Japan) [6704-10]

2:00 pm: **Comparison of surface slope errors acquired with a long trace profiler and a Fizeau interferometer**, J. Qian, L. Assoufid, A. T. Macrander, Argonne National Lab. [6704-11]

2:20 pm: **Surface gradient integrated profiler for x-ray and EUV optics**, Y. Higashi, High Energy Accelerator Research Organization (Japan) ... [6704-12]

2:40 pm: **Progress in the x-ray optics and metrology lab at Diamond Light Source**, S. G. Alcock, K. J. S. Sawhney, Diamond Light Source Ltd. (United Kingdom) [6704-13]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 31A Thurs. 3:30 to 5:10 pm

Session 4

Chairs: **Peter Z. Takacs**, Brookhaven National Lab.; **Valeriy V. Yashchuk**, Lawrence Berkeley National Lab.

3:30 pm: **Recent developments on the Daresbury Laboratory long trace profiler**, A. J. Gleeson, Council for the Central Lab. of the Research Councils (United Kingdom) [6704-14]

3:50 pm: **New procedures for the adjustment of elliptically bent mirrors with the long trace profiler**, W. R. McKinney, S. C. Irick, J. L. Kirschman, A. A. MacDowell, A. Warwick, V. V. Yashchuk, Lawrence Berkeley National Lab. [6704-15]

4:10 pm: **Performance and calibration of long trace profilometer**, A. K. Saxena, Indian Institute of Astrophysics (India); R. Mukund, Bhabha Atomic Research Ctr. (India) [6704-16]

4:30 pm: **Systematic error reduction: non-tilting reference beam method for long trace profiler**, S. Qian, K. Qian, Brookhaven National Lab.; Y. Hong, L. Sheng, National Synchrotron Radiation Lab. (China); P. Z. Takacs, Brookhaven National Lab. [6704-17]

4:50 pm: **Flat-field calibration of CCD detector for long trace profilers**, J. L. Kirschman, E. E. Domning, S. C. Irick, A. A. MacDowell, W. R. McKinney, G. Y. Morrison, B. V. Smith, A. Warwick, V. V. Yashchuk, Lawrence Berkeley National Lab. [6704-18]

Conference 6705 • Conv. Ctr. 30A

Monday-Tuesday 27-28 August 2007 • Proceedings of SPIE Vol. 6705

Advances in X-Ray/EUV Optics and Components II

Conference Chairs: **Ali M. Khounsary**, Argonne National Lab.; **Christian Morawe**, European Synchrotron Radiation Facility (France); **Shunji Goto**, Japan Synchrotron Radiation Research Institute (Japan)

Program Committee: **Lahsen Assoufid**, Argonne National Lab.; **Sasa Bajt**, Lawrence Livermore National Lab.; **Stefan Braun**, Fraunhofer-Institut für Werkstoff- und Strahltechnik (Germany); **Sultan B. Dabagov**, Istituto Nazionale di Fisica Nucleare (Italy); **Hans M. Hertz**, Kungliga Tekniska Högskolan (Sweden); **Olivier Hignette**, European Synchrotron Radiation Facility (France); **Werner H. Jark**, Sincrotrone Trieste S.C.p.A. (Italy); **Igor V. Kozhevnikov**, A.V. Shubnikov Institute of Crystallography (Russia); **George A. Kyrala**, Los Alamos National Lab.; **Carolyn A. MacDonald**, SUNY/Univ. at Albany; **Howard A. Padmore**, Lawrence Berkeley National Lab.; **Ladislav Pina**, Czech Technical Univ. (France); **Yuriy Y. Platonov**, Rigaku/MSI, Inc.; **Kawal J. S. Sawhney**, Diamond Light Source Ltd. (United Kingdom); **Anatoly A. Snigirev**, European Synchrotron Radiation Facility (France); **Peter Z. Takacs**, Brookhaven National Lab.; **John S. Taylor**, Lawrence Livermore National Lab.; **Edmond I. C. Turcu**, Rutherford Appleton Lab. (United Kingdom); **Kazuto Yamauchi**, Osaka Univ. (Japan)

Monday 27 August

SESSION 1

Conv. Ctr. 30A Mon. 8:50 to 10:10 am

Optics Development Facilities

Chairs: **Shunji Goto**, Japan Synchrotron Radiation Research Institute (Japan); **Hans M. Hertz**, Kungliga Tekniska Högskolan (Sweden)

8:50 am: **Active microstructured arrays for x-ray optics**, A. G. Michette, King's College London (United Kingdom); T. W. Button, The Univ. of Birmingham (United Kingdom); C. C. Dunare, Univ. of Edinburgh (United Kingdom); C. Feldman, Univ. of Leicester (United Kingdom); M. Folkard, Mount Vernon Hospital (United Kingdom); C. McFaul, G. R. Morrison, King's College London (United Kingdom); W. Parkes, Univ. of Edinburgh (United Kingdom); S. J. Pfauntsch, A. K. Powell, S. Sahraei, King's College London (United Kingdom); J. T. M. Stevenson, The Univ. of Edinburgh (United Kingdom); R. Willingale, Univ. of Leicester (United Kingdom); D. Zhang, The Univ. of Birmingham (United Kingdom) [6705-01]

9:10 am: **Hard x-ray focusing by single bounce capillary**, A. A. Snigirev, European Synchrotron Radiation Facility (France); A. A. Bjeoumikhov, Institut für Geraetebau GmbH (Germany); A. I. Erko, BESSY GbmH (Germany); I. I. Snigireva, European Synchrotron Radiation Facility (France); M. V. Grigoriev, V. Yunkin, Institute of Microelectronics Technology and High Purity Materials (Russia); M. Erko, S. Bjeoumikhova, Institut für Geraetebau GmbH (Germany) [6705-02]

9:30 am: **The new ESRF multilayer deposition facility**, C. Morawe, C. Borel, J. Peffen, European Synchrotron Radiation Facility (France) [6705-03]

9:50 am: **Multilayer growth in the APS rotary deposition system**, R. Conley, Jr., C. Liu, C. M. Kewish, A. T. Macrander, Argonne National Lab.; C. Morawe, European Synchrotron Research Facility (France) [6705-04]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 30A Mon. 10:40 am to 12:00 pm

X-Ray Lenses and Applications

Chairs: **Ali M. Khounsary**, Argonne National Lab.; **Howard A. Padmore**, Lawrence Berkeley National Lab.

10:40 am: **Silicon planar lenses for high-energy x-ray nanofocusing**, A. A. Snigirev, European Synchrotron Radiation Facility (France); M. V. Grigoriev, Institute of Microelectronics Technology (Russia); M. Di Michiel, I. I. Snigireva, European Synchrotron Radiation Facility (France); V. Yunkin, Institute of Microelectronics Technology (Russia); S. Kuznetsov, Institute of Microelectronics Technology and High Purity Materials (Russia); G. Vaughan, P. Van Vaerenbergh, European Synchrotron Radiation Facility (France) [6705-05]

11:00 am: **Development of refractive focusing optics at Diamond**, L. Alianelli, K. J. S. Sawhney, Diamond Light Source Ltd. (United Kingdom); I. M. Loader, D. W. Jenkins, R. Stevens, Rutherford Appleton Lab. (United Kingdom); A. A. Snigirev, I. I. Snigireva, European Synchrotron Radiation Facility (France) [6705-06]

11:20 am: **Nanopositioning of the silicon planar lenses used**, P. Van Vaerenbergh, A. A. Snigirev, M. A. Nicola, I. I. Snigireva, European Synchrotron Radiation Facility (France); M. V. Grigoriev, Institute of Microelectronics Technology and High Purity Materials (Russia); G. Vaughan, European Synchrotron Radiation Facility (France) [6705-07]

11:40 am: **Projection-type x-ray microscope based on a spherical compound refractive x-ray lens**, Y. I. Dudchik, Belarusian State Univ. (Belarus); C. K. Gary, H. Park, Adelphi Technology, Inc.; R. H. Pantell, Stanford Univ.; M. A. Piestrup, Adelphi Technology, Inc. [6705-08]

Lunch Break 12:00 to 2:00 pm

Conference 6705 • Conv. Ctr. 30A

SESSION 3

Conv. Ctr. 30A Mon. 2:00 to 4:10 pm

Multilayer Optics

Chairs: **Christian Morawe**, European Synchrotron Radiation Facility (France); **Yuriy Y. Platonov**, Rigaku/MSI, Inc.

2:00 pm: **Deposition and analysis of a small d-spacing depth graded multilayer structure**, D. M. Broadway, Y. Y. Platonov, Rigaku/MSI, Inc.; R. C. Mancini, Univ. of Nevada/Reno; R. Tommasini, Lawrence Livermore National Lab. [6705-09]

2:20 pm: **Influence of impurities on structure and performance of Cr/Sc multilayer mirrors**, N. Ghafoor, F. Eriksson, Linköpings Univ. (Sweden); U. Kreißig, Forschungszentrum Dresden-Rossendorf (Germany); J. Birch, Linköpings Univ. (Sweden) [6705-10]

2:40 pm: **XUV optics for attosecond applications**, G. Julien, A. Morlens, P. Zeitoun, G. Rey, J. P. Goddet, S. Sebban, École Nationale Supérieure de Techniques Avancées (France); F. Delmotte, M. Ravet-Krill, F. Bridou, Institut d'Optique (France) [6705-11]

3:00 pm: **Metrology design for micro-mirrors with replicated multilayers**, L. Sveda, Czech Technical Univ. in Prague (Czech Republic) and REFLEX s.r.o. (Czech Republic); A. J. Inneman, V. Semencova, REFLEX s.r.o. (Czech Republic); L. Pina, REFLEX s.r.o. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); R. Hudec, REFLEX s.r.o. (Czech Republic); R. Havlikova, Czech Technical Univ. in Prague (Czech Republic) [6705-12]

Coffee Break 3:20 to 3:50 pm

3:50 pm: **Development of an ultrahigh-resolution diffraction grating for soft x-rays**, D. L. Voronov, R. Cambie, Lawrence Berkeley National Lab.; R. M. Feshchenko, P.N. Lebedev Physical Institute (Russia); E. M. Gullikson, H. A. Padmore, Lawrence Berkeley National Lab.; A. V. Vinogradov, P.N. Lebedev Physical Institute (Russia); V. V. Yashchuk, Lawrence Berkeley National Lab. [6705-13]

SESSION 4

Conv. Ctr. 30A Mon. 4:10 to 4:50 pm

Zone Plates and Applications

Chairs: **John S. Taylor**, Lawrence Livermore National Lab.; **Anatoly A. Snigirev**, European Synchrotron Radiation Facility (France)

4:10 pm: **Laboratory-scale arrangement for soft x-ray zone plate efficiency measurements**, M. C. Bertilson, P. A. Takman, A. Holmberg, U. Vogt, H. M. Hertz, Kungliga Tekniska Högskolan (Sweden) [6705-14]

4:30 pm: **Focusing high-energy x-rays with stacked Fresnel zone plates**, I. I. Snigireva, A. A. Snigirev, European Synchrotron Radiation Facility (France); V. G. Kohn, Russian Research Ctr. Kurchatov Institute (Russia); V. Yunkin, M. V. Grigoriev, S. Kuznetsov, Institute of Microelectronics Technology and High Purity Materials (Russia); G. Vaughan, M. Di Michiel, European Synchrotron Radiation Facility (France) [6705-15]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

- ✓ **EUV remote sensing by a newly developed Mg/SiC mirror on a small satellite**, I. Yoshikawa, G. Murakami, K. Yoshioka, The Univ. of Tokyo (Japan) [6705-31]
- ✓ **Study of optical properties of x-ray system based on two zone plates**, A. Kuyumchyan, Institute of Microelectronics Technology and High Purity Materials (Russia); V. G. Kohn, Russian Research Ctr. Kurchatov Institute (Russia); I. I. Snigireva, A. A. Snigirev, European Synchrotron Radiation Facility (France); A. A. Isoyan, A. S. Kuznetsov, E. V. Shulakov, V. V. Aristov, Institute of Microelectronics Technology and High Purity Materials (Russia) . [6705-32]
- ✓ **Experimental study of Kumakhov polycapillary optics for hard x-ray microfocusing**, O. V. Mikhin, S. V. Nikitina, A. A. Priladyshev, Institute for Roentgen Optics (Russia); A. A. Snigirev, I. I. Snigireva, European Synchrotron Radiation Facility (France) [6705-33]
- ✓ **High-performance multilayer coatings for 105 nm**, E. Y. Taracheva, S. A. Yulin, T. Feigl, N. Kaiser, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [6705-34]
- ✓ **X-ray transfocator based on al parabolic refractive lenses for high energy x-ray focusing and collimation**, M. Rossat, G. Vaughan, J. Wright, I. I. Snigireva, A. A. Snigirev, A. Bytchkov, C. Curfs, European Synchrotron Radiation Facility (France) [6705-35]
- ✓ **X-ray collimators based on compound refractive lenses**, S. Kuznetsov, Institute of Microelectronics Technology and High Purity Materials (Russia); G. Vaughan, J. Wright, I. I. Snigireva, A. A. Snigirev, European Synchrotron Radiation Facility (France); M. V. Grigoriev, V. Yunkin, Institute of Microelectronics Technology and High Purity Materials (Russia) . [6705-36]
- ✓ **Micro-optics test bench at the ESRF**, A. A. Snigirev, R. Hustache, J. Massonnat, L. Claustre, I. I. Snigireva, European Synchrotron Radiation Facility (France); M. V. Grigoriev, Institute of Microelectronics Technology (Russia); P. Duboc, European Synchrotron Radiation Facility (France) [6705-37]
- ✓ **High-energy-resolution monochromator for nuclear resonant scattering of synchrotron radiation by Te-125 at 35.49 keV**, Y. Imai, Japan Synchrotron Radiation Research Institute (Japan) and Japan Science and Technology Agency (Japan); M. Seto, Kyoto Univ. and Japan Science and Technology Agency (Japan); Y. Yoda, Japan Synchrotron Radiation Research Institute (Japan) and Japan Science and Technology Agency (Japan); S. Kitao, R. Masuda, S. Higashitaniguchi, C. Inaba, Kyoto Univ. and Japan Science and Technology Agency (Japan) [6705-38]
- ✓ **Measurements of the optical constants of niobium in the 25-1300-eV range**, F. J. Dollar, A. L. Aquila, F. H. Salmassi, E. M. Gullikson, Lawrence Berkeley National Lab. [6705-39]

Tuesday 28 August

SESSION 5

Conv. Ctr. 30A Tues. 8:40 to 10:00 am

Optics and Beam Coherence

Chairs: **Christian Morawe**, European Synchrotron Radiation Facility (France); **Howard A. Padmore**, Lawrence Berkeley National Lab.

8:40 am: **Characterization of beryllium and CVD diamond for synchrotron radiation beamline windows and x-ray beam monitor**, S. Goto, S. Takahashi, T. Kudo, Japan Synchrotron Radiation Research Institute (Japan); M. Yabashi, K. Tamasaku, Y. Nishino, T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) [6705-17]

9:00 am: **Simulation of partially coherent image formation in x-ray microscopy**, O. von Hofsten, P. A. Takman, U. Vogt, Kungliga Tekniska Högskolan (Sweden) [6705-18]

9:20 am: **Perfect-crystal x-ray optics to utilize x-ray coherence**, H. Yamazaki, Japan Synchrotron Radiation Research Institute (Japan); T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) .. [6705-19]

9:40 am: **Diamonds for x-ray optical applications at 3rd and 4th generation x-ray sources**, J. W. Hartwig, P. Van Vaerenbergh, F. Masiello, A. Rommeveaux, A. I. Chumakov, G. Carbone, European Synchrotron Radiation Facility (France); S. H. Connell, D. Dube, R. Setshedi, M. Rebak, Univ. of the Witwatersrand (South Africa); R. C. Burns, J. O. Hansen, Element Six Technologies (South Africa) [6705-20]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 30A Tues. 10:30 am to 12:10 pm

Mirrors and Applications

Chair: **Shunji Goto**, Japan Synchrotron Radiation Research Institute (Japan)

10:30 am: **Reflective optics for sub-10-nm hard x-ray focusing**, H. Mimura, S. Matsuyama, H. Yumoto, S. Handa, T. Kimura, Y. Sano, Osaka Univ. (Japan); K. Tamasaku, Y. Nishino, The Institute of Physical and Chemical Research (RIKEN) (Japan); M. Yabashi, Japan Synchrotron Radiation Research Institute (Japan); T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan); K. Yamauchi, Osaka Univ. (Japan) [6705-21]

10:50 am: **Large thin adaptive x-ray mirrors**, P. Doel, C. Atkins, D. Brooks, Univ. College London (United Kingdom); T. W. Button, The Univ. of Birmingham (United Kingdom); C. Feldman, R. Willingale, Univ. of Leicester (United Kingdom); J. Yao, Univ. College London (United Kingdom); D. Zhang, The Univ. of Birmingham (United Kingdom) [6705-22]

11:10 am: **Effect of x-ray beamline optics on x-ray photon correlation spectroscopy experiments**, A. R. Sandy, S. Narayanan, M. S. Sprung, Argonne National Lab. [6705-23]

11:30 am: **Soft x-ray mirrors for the LCLS**, M. J. Pivovarov, R. M. Bionta, Lawrence Livermore National Lab.; P. M. Stefan, SSRL Beam Line Development Group; R. Soufli, Lawrence Livermore National Lab. [6705-24]

11:50 am: **Beam-splitting mirrors for an APS beamline**, A. M. Khounsary, I. McNulty, Argonne National Lab. [6705-25]

Lunch/Exhibition Break 12:10 to 2:00 pm

SESSION 7

Conv. Ctr. 30A Tues. 2:00 to 3:20 pm

Thermal Issues and Prospects in EUV and X-Ray Optics

Chairs: **Ali M. Khounsary**, Argonne National Lab.; **Kazuto Yamauchi**, Osaka Univ. (Japan)

2:00 pm: **Direct water-cooled crystal development for SPring-8 bending magnet beamlines**, K. Takeshita, S. Goto, Japan Synchrotron Radiation Research Institute (Japan); T. Ishikawa, The Institute of Physical and Chemical Research (RIKEN) (Japan) [6705-26]

2:20 pm: **Multilayer optics under CHESS A2 wiggler beam**, A. Y. Kazimirov, P. Revesz, Cornell Univ. [6705-27]

2:40 pm: **Interdiffusion studies of Cr/Sc soft x-ray multilayer mirrors**, F. Eriksson, N. Ghafoor, J. Birch, Linköpings Univ. (Sweden) [6705-28]

3:00 pm: **Measurement of thermal contact conductance of SPring-8 beamline components**, T. Mochizuki, H. Ohashi, S. Goto, M. Sano, S. Takahashi, Japan Synchrotron Radiation Research Institute (Japan) . [6705-29]

X-Ray/UV Optics Technical Event

Marriott Mission Hills 8:00 to 10:00 pm

Chair: **Forbes R. Powell**, Luxel Corp.

Please see page 23 for details.

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Conference 6706 • Conv. Ctr. 29D

Monday-Wednesday 27-29 August 2007 • Proceedings of SPIE Vol. 6706

Hard X-Ray and Gamma-Ray Detector Physics IX

Conference Chairs: **Ralph B. James**, Brookhaven National Lab.; **Arnold Burger**, Fisk Univ.; **Larry A. Franks**, Consultant

Program Committee: **Toru Aoki**, Shizuoka Univ. (Japan); **H. Bradford Barber**, The Univ. of Arizona; **Zane W. Bell**, Oak Ridge National Lab.; **Lynn A. Boatner**, Oak Ridge National Lab.; **Aleksey E. Bolotnikov**, Brookhaven National Lab.; **Muren Chu**, Consultant; **F. Patrick Doty**, Sandia National Labs.; **Michael Fiederle**, Albert-Ludwigs-Univ. Freiburg (Germany); **Jonathan E. Grindlay**, Harvard-Smithsonian Ctr. for Astrophysics; **Yoshinori Hatanaka**, Aichi Univ. of Technology (Japan); **Zhong He**, Univ. of Michigan; **Alan Janos**, U.S. Dept. of Homeland Security; **Warnick J. Kernan**, National Security Technologies, LLC; **Glenn F. Knoll**, Univ. of Michigan; **Henric S. Krawczynski**, Washington Univ. in St. Louis; **Longxia Li**, Yinnel Tech, Inc.; **Paul N. Luke**, Lawrence Berkeley National Lab.; **Kelvin G. Lynn**, Washington State Univ.; **Krishna C. Mandal**, EIC Labs., Inc.; **Jim L. Matteson**, Univ. of California/San Diego; **Douglas S. McGregor**, Kansas State Univ.; **Robert D. McLaren**, Consultant; **Richard W. Olsen**, Consultant; **Alan Owens**, European Space Agency (Netherlands); **Ann M. Parsons**, NASA Goddard Space Flight Ctr.; **Bradley E. Patt**, Gamma Medica-Ideas, Inc.; **Eugenio Perillo**, Univ. degli Studi di Napoli Federico II (Italy); **Raulf M. Polichar**, Science Applications International Corp.; **James M. Ryan**, Univ. of New Hampshire; **Eiichi Sato**, Iwate Medical Univ. (Japan); **Michael M. Schieber**, The Hebrew Univ. of Jerusalem (Israel); **Paul Siffert**, Ctr. National de la Recherche Scientifique (France); **Michael R. Squillante**, Radiation Monitoring Devices, Inc.; **Csaba Szeles**, eV Products, Inc.; **Gary C. Tepper**, Virginia Commonwealth Univ.; **Jacob I. Trombka**, NASA Goddard Space Flight Ctr.; **Tümay O. Tümer**, Nova R&D, Inc.; **Sergey E. Ulin**, Moscow Engineering Physics Institute (Russia); **Lodewijk van Den Berg**, Constellation Technology Corp.; **Peter E. Vanier**, Brookhaven National Lab.; **Nikolay B. Zaltaev**, Orion Research and Production Association (Russia); **Klaus Ziock**, Lawrence Livermore National Lab.

Monday 27 August

Introduction and Welcome

Conv. Ctr. 29D Mon. 8:30 to 8:40 am

Ralph B. James, Brookhaven National Lab.; **Arnold Burger**, Fisk Univ.; **Larry A. Franks**, Consultant

SESSION 1

Conv. Ctr. 29D Mon. 8:40 to 10:20 am

CZT I and CdTe

Chair: **Alan Janos**, U.S. Department of Homeland Security

8:40 am: **Recent developments of large-volume cadmium zinc telluride high-resolution radiation detectors (Invited Paper)**, H. Chen, S. A. Awadalla, P. Lu, A. MacDonald, J. M. MacKenzie, T. Hasanen, W. Chen, R. F. Redden, G. K. Bindley, Redlen Technologies (Canada); A. E. Bolotnikov, G. S. Camarda, Y. Cui, A. Hossain, R. B. James, Brookhaven National Lab. [6706-01]

9:10 am: **Optimization of virtual Frisch-grid CdZnTe detector designs for imaging and spectroscopy of gamma rays (Invited Paper)**, A. E. Bolotnikov, G. S. Camarda, Y. Cui, A. Hossain, R. B. James, Brookhaven National Lab. [6706-02]

9:40 am: **Growth of detector-grade thick films CdTe from the vapor phase**, M. Fiederle, R. Sorgenfrei, K. Bachem, A. Ehler, Albert-Ludwigs-Univ. Freiburg (Germany) [6706-03]

10:00 am: **Defects studies and electric-field distribution in CdZnTe detectors**, G. S. Camarda, A. E. Bolotnikov, Y. Cui, A. Hossain, Brookhaven National Lab.; A. Burger, M. Groza, Fisk Univ.; R. B. James, Brookhaven National Lab. [6706-04]

Coffee Break 10:20 to 10:40 am

SESSION 2

Conv. Ctr. 29D Mon. 10:40 am to 12:10 pm

CZT II

Chair: **Robert D. McLaren**, Consultant

10:40 am: **Crystal growth and characterization of Cd_{1-x}Zn_xTe radiation detectors (Invited Paper)**, K. G. Lynn, K. A. Jones, G. Ciampi, R. Soundararajan, Washington State Univ. [6706-05]

11:10 am: **Vertical Bridgman growth of Cd_{1-x}Zn_xTe room temperature radiation detectors**, K. A. Jones, G. Ciampi, K. G. Lynn, R. Soundararajan, Washington State Univ. [6706-06]

11:30 am: **In situ characterization of crystal growth and heat treatment for semiconductor materials**, D. W. Akers, Idaho National Lab. [6706-07]

11:50 am: **Differential aperture x-ray microscopy near Te precipitates in CdZnTe**, E. A. Miller, M. Toloczko, C. E. Seifert, A. Seifert, Pacific Northwest National Lab.; W. Liu, Argonne National Lab.; M. Bliss, Pacific Northwest National Lab. [6706-08]

Lunch Break 12:10 to 1:40 pm

SESSION 3

Conv. Ctr. 29D Mon. 1:40 to 3:10 pm

Applications I

Chair: **Nerine J. Cherepy**, Lawrence Livermore National Lab.

1:40 pm: **Gamma-ray/neutron/cosmic ray spectrometers for future planetary resource and scientific exploration (Invited Paper)**, J. I. Trombka, NASA Goddard Space Flight Ctr. [6706-09]

2:10 pm: **Wide-field hard x-ray survey telescope: ProtoEXIST**, J. S. Hong, J. E. Grindlay, A. Copete, Harvard-Smithsonian Ctr. for Astrophysics; R. G. Baker, S. D. Barthelmy, N. A. Gehrels, NASA Goddard Space Flight Ctr.; A. B. Garson III, H. S. Krawczynski, Washington Univ. in St. Louis [6706-10]

2:30 pm: **Application of CdTe photon-counting x-ray imager to material discriminated x-ray CT**, T. Aoki, Y. Takahashi, A. Koike, H. Morii, T. Nakashima, H. Mimura, Shizuoka Univ. (Japan) [6706-11]

2:50 pm: **Background simulations for the energetic x-ray imaging survey telescope EXIST and the balloon-borne prototype experiment ProtoEXIST**, A. B. Garson III, Washington Univ. in St. Louis; J. E. Grindlay, J. S. Hong, Harvard-Smithsonian Ctr. for Astrophysics; I. V. Jung, H. S. Krawczynski, Washington Univ. in St. Louis; E. I. Novikova, Naval Research Lab.; G. Weidenspointer, Ctr. d'Etude Spatiale des Rayonnements (France) . [6706-12]

Coffee Break 3:10 to 3:40 pm

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SESSION 4

Conv. Ctr. 29D Mon. 3:40 to 5:40 pm

Other Materials I

Chair: Michael M. Schieber, The Hebrew Univ. of Jerusalem (Israel)

3:40 pm: **GaSe and GaTe anisotropic layered semiconductors for radiation detectors**, K. C. Mandal, M. Choi, S. H. Kang, R. D. Rauh, EIC Labs., Inc.; J. Wei, H. Zhang, L. Zheng, Stony Brook Univ.; U. N. Roy, Y. Cui, M. Groza, A. Burger, Fisk Univ. [6706-13]

4:00 pm: **X-ray and gamma-ray detectors based on synthetic diamond**, N. B. Zaletaev, Orion Research and Production Association (Russia); A. G. Alekseyev, Troitsk Institute for Innovation and Fusion Research (Russia); V. S. Khrunov, Institute for Physico-Technical Problems (Russia); A. V. Kostyaev, Joint-Stock Co. (Russia); V. P. Nikiforova, Orion Research and Production Association (Russia) [6706-14]

4:20 pm: **Mercuric iodide photocell technology for room-temperature readout of scintillators**, W. J. Kernan, National Security Technologies, LLC; L. A. Franks, Consultant; A. Burger, M. Groza, Fisk Univ. [6706-15]

4:40 pm: **Fabrication and characterization of amorphous selenium-based nuclear detectors**, K. C. Mandal, S. H. Kang, M. Choi, A. G. Smirnov, EIC Labs., Inc. [6706-16]

5:00 pm: **Deconvolution of complex gamma-ray pulse height spectra separating the continuum and discrete lines**, T. P. McClanahan, J. I. Trombka, NASA Goddard Space Flight Ctr.; M. H. Lowe, The George Washington Univ. [6706-17]

5:20 pm: **Fabrication and performance of mercuric iodide pixellated detectors**, L. van den Berg, L. F. Bastian, Constellation Technology Corp.; Z. Feng, Univ. of Michigan; M. A. Capote, Aguila Technologies, Inc. [6706-18]

Tuesday 28 August

SESSION 5

Conv. Ctr. 29D Tues. 8:40 to 10:00 am

CZT III and CdTe

Chair: Douglas S. McGregor, Kansas State Univ.

8:40 am: **Large volume 3D CZT gamma-ray imaging spectrometers (Invited Paper)**, Z. He, F. Zhang, Univ. of Michigan; H. S. Krawczynski, Washington Univ. in St. Louis [6706-19]

9:10 am: **Material dependence of bulk leakage current in CdZnTe detectors (Invited Paper)**, M. S. Amman, P. N. Luke, J. S. Lee, Lawrence Berkeley National Lab. [6706-20]

9:40 am: **Performance measurements of Al/CdTe/Pt pixel diode detectors**, S. Ishikawa, S. Watanabe, S. Takeda, K. Nakazawa, T. Takahashi, Japan Aerospace Exploration Agency (Japan) [6706-21]

Coffee Break 10:00 to 10:30 am

SESSION 6

Conv. Ctr. 29D Tues. 10:30 am to 12:00 pm

Other Materials II

Chair: Lodewijk van Den Berg, Constellation Technology Corp.

10:30 am: **Present status of perforated semiconductor neutron detectors (Invited Paper)**, D. S. McGregor, S. Bellinger, D. Bruno, W. J. McNeil, E. Patterson, J. K. Shultis, C. J. Solomon, T. Unruh, Kansas State Univ. [6706-56]

11:00 am: **First principles calculation of bulk semiconductor mobilities for radiation detection application**, V. Lordi, D. Aberg, A. J. Williamson, K. J. Wu, Lawrence Livermore National Lab. [6706-23]

11:20 am: **X-ray detection by epitaxial CVD diamond for medical radiology applications**, C. Manfredotti, E. Vittone, A. Lo Giudice, Univ. degli Studi di Torino (Italy) [6706-24]

11:40 am: **Signal processing versus adaptive grids for identification of Compton scattering within single pixels of a planar germanium detector and the resulting SPECT images**, D. P. Scraggs, A. J. Boston, H. C. Boston, R. J. Cooper, A. N. Grint, P. J. Nolan, D. C. Oxley, The Univ. of Liverpool (United Kingdom); A. Berry, T. Beveridge, J. Gillam, C. J. Hall, R. A. Lewis, Monash Univ. (Australia) [6706-25]

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

SESSION 7

Conv. Ctr. 29D Tues. 1:30 to 3:10 pm

Applications II

Chair: Warnick J. Kernan, National Security Technologies, LLC

1:30 pm: **Current progress in non-scanning x-ray backscattering inspection system**, M. Gertsenshteyn, V. Grubsky, T. P. Jansson, K. Shoemaker, Physical Optics Corp. [6706-26]

1:50 pm: **A new Si/CdTe semiconductor Compton camera developed for high-angular resolution**, S. Takeda, S. Ishikawa, S. Watanabe, H. Odaka, K. Nakazawa, T. Takahashi, Japan Aerospace Exploration Agency (Japan); H. Tajima, Stanford Linear Accelerator Ctr.; Y. Kuroda, M. Onishi, Mitsubishi Heavy Industries, Ltd. (Japan); Y. Fukazawa, H. Yasuda, Hiroshima Univ. (Japan) [6706-27]

2:10 pm: **Evaluation of 0.5-mm thick double-sided silicon strip detector for Compton telescope**, H. Yasuda, S. Nishino, T. Tanaka, Y. Fukazawa, T. Ohsugi, Hiroshima Univ. (Japan); S. Takeda, S. Ishikawa, Japan Aerospace Exploration Agency (Japan) [6706-28]

2:30 pm: **First results from the 128x128 pixel mixed-mode Si x-ray detector chip**, W. Vernon, M. Allin, R. Hamlin, T. Hontz, D. Nguyen, Area Detector Systems Corp.; X. Nguyen-Huu, Univ. of California/San Diego; F. L. Augustine, Augustine Engineering; S. M. Gruner, D. R. Schuette, M. W. Tate, L. J. Koerner, Cornell Univ. [6706-29]

2:50 pm: **4 pi direction sensitive gamma imager with RENA-3 readout ASIC**, Y. Du, W. Li, B. D. Yanoff, J. S. Gordon, D. E. Castleberry, GE Global Research [6706-30]

Coffee Break 3:10 to 3:40 pm

SESSION 8

Conv. Ctr. 29D Tues. 3:40 to 5:30 pm

CZT IV and CdTe

Chair: Kelvin G. Lynn, Washington State Univ.

3:40 pm: **Characterization of the homogeneity of CdZnTe detector grade crystals (Invited Paper)**, M. Fiederle, A. Fauler, A. Zwerger, M. Dambacher, Albert-Ludwigs-Univ. Freiburg (Germany) [6706-31]

4:10 pm: **CZT x-rays detectors obtained by the boron encapsulated vertical Bridgman method**, E. Gombia, R. Mosca, M. Pavesi, M. Zanichelli, L. Marchini, M. Zha, A. Zappettini, Consiglio Nazionale delle Ricerche (Italy); E. Caroli, N. Auricchio, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); B. Negri, Agenzia Spaziale Italiana (Italy) [6706-32]

4:30 pm: **Simple x-ray computed tomography system utilizing a cadmium telluride detector**, E. Sato, Iwate Medical Univ. (Japan); S. Nomiya, Raytech Corp. (Japan); K. Hitomi, Tohoku Institute of Technology (Japan); H. Onabe, Raytech Corp. (Japan); T. Shoji, Tohoku Institute of Technology (Japan); E. Tanaka, Tokyo Univ. of Agriculture and Technology (Japan); T. Kawai, Hamamatsu Photonics K.K. (Japan); T. Inoue, A. Ogawa, S. Sato, Iwate Medical Univ. (Japan); T. Ichimaru, Hirosaki Univ. (Japan); K. Takayama, Tohoku Univ. (Japan) [6706-33]

4:50 pm: **Mapping and annealing of dislocations in CdTe crystals**, A. Choubey, J. Toman, Univ. of Durham (United Kingdom); J. Mullins, B. J. Cantwell, Durham Scientific Crystals Ltd. (United Kingdom); D. P. Halliday, Univ. of Durham (United Kingdom); A. Basu, Durham Scientific Crystals Ltd. (United Kingdom); A. W. Brinkman, Univ. of Durham (United Kingdom) [6706-34]

5:10 pm: **Tunable narrow-photon-energy x-ray source using a silicon single crystal**, E. Sato, Iwate Medical Univ. (Japan); E. Tanaka, Tokyo Univ. of Agriculture and Technology (Japan); H. Mori, National Cardiovascular Ctr. Research Institute (Japan); T. Kawai, Hamamatsu Photonics K.K. (Japan); T. Inoue, A. Ogawa, M. Izumisawa, M. Shozushima, K. Takahashi, S. Sato, Iwate Medical Univ. (Japan); T. Ichimaru, Hirosaki Univ. (Japan); K. Takayama, Tohoku Univ. (Japan) [6706-35]

X-Ray/UV Optics Technical Event

Marriott Mission Hills 8:00 to 10:00 pm

Chair: Forbes R. Powell, Luxel Corp.

Please see page 23 for details.

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Wednesday 29 August

SESSION 9

Conv. Ctr. 29D Wed. 8:20 to 10:00 am

Applications III

Chair: **Peter E. Vanier**, Brookhaven National Lab.

Keynote

8:20 am: **DNDO research and development priorities and programs (Keynote)**, A. Janos, U.S. Dept. of Homeland Security [6706-36]

9:00 am: **Field-deployable gamma-radiation detectors for DHS use**, S. Mukhopadhyay, National Security Technologies, LLC [6706-37]

9:20 am: **Results from the characterization of advanced gamma-tracking-array prototype detectors and their consequences for the next-generation nuclear physics spectrometer**, M. R. Dimmock, A. J. Boston, L. Nelson, S. V. Rigby, The Univ. of Liverpool (United Kingdom); I. H. Lazarus, J. Simpson, Daresbury Lab. (United Kingdom); C. Parisel, C. Santos, Institut de Recherches Subatomiques (France) [6706-38]

9:40 am: **An adapted modulation transfer function for x-ray backscatter radiography by selective detection**, N. F. Sabri, E. T. Dugan, D. Shedlock, A. M. Jacobs, Univ. of Florida [6706-39]

Coffee Break 10:00 am

SESSION 10

Conv. Ctr. 29D Wed. 10:30 am to 12:40 pm

Scintillators

Chair: **Raulf M. Polichar**, Science Applications International Corp.

10:30 am: **Simplified system-level model of scintillator detectors (Invited Paper)**, S. A. Payne, T. R. Niedermayr, N. J. Cherepy, G. Hull, A. Drobshoff, Lawrence Livermore National Lab. [6706-40]

11:00 am: **Barium iodide single-crystal scintillator detectors**, N. J. Cherepy, G. Hull, T. R. Niedermayr, A. Drobshoff, S. A. Payne, Lawrence Livermore National Lab.; U. N. Roy, Y. Cui, A. Bhattacharaya, M. Harrison, M. Guo, M. Groza, A. Burger, Fisk Univ. [6706-41]

11:20 am: **Ce-doped single crystal and ceramic garnet for gamma-ray detection**, G. Hull, T. R. Niedermayr, J. Roberts, J. Kuntz, R. Sanner, T. Tillotson, A. Drobshoff, S. A. Payne, N. J. Cherepy, Lawrence Livermore National Lab. [6706-42]

11:40 am: **New rare-earth-activated phosphate glass scintillators**, J. S. Neal, L. A. Boatner, D. J. Wisniewski, Oak Ridge National Lab. [6706-43]

12:00 pm: **Performance of new ceramic scintillators for gamma- and x-ray detection**, D. J. Wisniewski, L. A. Boatner, J. S. Neal, G. E. Jellison, Jr., J. O. Ramey, A. North, M. Wisniewska, Oak Ridge National Lab. [6706-44]

12:20 pm: **LaF₃:Ce nanocomposite scintillator for gamma-ray detection**, E. A. McKigney, R. E. Muenchausen, D. W. Cooke, R. E. Del Sesto, R. D. Gilbertson, M. K. Bacrania, B. L. Bennett, L. G. Jacobsohn, T. M. McCleskey, K. C. Ott, S. C. Sitarz, J. F. Smith, S. Stange, Los Alamos National Lab. [6706-45]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Recrystallization in ceramic material fabricated from Cd_{1-x}Zn_xTe nanopowders**, N. N. Kolesnikov, E. B. Borisenko, D. N. Borisenko, V. V. Kveder, Institute of Solid State Physics (Russia); R. B. James, Brookhaven National Lab. [6706-46]
- ✓ **Evaluation of the multipixel photon counters with inorganic scintillators**, K. Hitomi, Tohoku Institute of Technology (Japan); E. Sato, Iwate Medical Univ. (Japan); S. Nomiya, Raytech Corp. (Japan); T. Shoji, Tohoku Institute of Technology (Japan) [6706-47]
- ✓ **Study of radiation detectors based on semi-insulating GaAs and InP: aspects of material and electrode technology**, F. Dubecky, Institute of Electrical Engineering (Slovak Republic); V. Necas, Slovak Univ. of Technology (Slovak Republic) [6706-48]
- ✓ **Dielectrometric approach to x-ray and gamma-ray detection**, M. Reznikov, Physical Optics Corp. [6706-49]
- ✓ **Investigation of TlBr detector response under high-flux x-rays**, H. Kim, L. J. Cirignano, Y. N. Dmitriev, K. S. Shah, M. R. Squillante, H. P. Wong, Radiation Monitoring Devices, Inc. [6706-50]
- ✓ **Position sensitive detector for PET**, N. Basharuli, Z. Htet, Moscow Engineering Physics Institute (Russia); M. Namtalishvili, Georgian Academy of Sciences (Georgia); V. S. Belyaev, Moscow Engineering Physics Institute (Russia); G. Hashimoto, Kyoto Univ. (Japan); A. Gambino, Univ. degli Studi di Napoli Federico II (Italy) [6706-51]
- ✓ **Study and realization of real-time, in-depth dosimetry system for IORT (intra operative radiation therapy)**, R. Brancaccio, F. Casali, M. P. Morigi, M. Bettuzzi, A. Berdondini, Univ. degli Studi di Bologna (Italy); C. Bruno, Y. F. Tchuente Siaka, A. Santaniello, Univ. della Calabria (Italy); E. Lamanna, Univ. degli studi Magna Græcia di Catanzaro (Italy) [6706-52]
- ✓ **Surface sensitivity in large mass bolometers: discrimination of the origin of events**, C. Salvioni, Univ. degli Studi dell'Insubria (Italy) and Istituto Nazionale di Fisica Nucleare (Italy) [6706-53]
- ✓ **The crystal geometry and the aspect ratio effects on spectral performance of CdZnTe Frisch collar device**, A. Kargar, M. J. Harrison, R. B. Lowell, D. S. McGregor, Kansas State Univ. [6706-54]

Conference 6707 • Conv. Ctr. 29D

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6707

Penetrating Radiation Systems and Applications VIII

Conference Chairs: **F. Patrick Doty**, Sandia National Labs.; **H. Bradford Barber**, The Univ. of Arizona; **Hans Roehrig**, The Univ. of Arizona

Tuesday 28 August

Penetrating Radiation Technical Event

Marriott Balboa Tues. 8:00 to 10:00 pm

Chair: **Warnick J. Kernan**, National Security Technologies, LLC

Special Presentation: **Exciting Results from the SWIFT Gamma-Ray Burst Explorer**, Ann M. Parsons, NASA Goddard Space Flight Ctr.

Please see page 22 for details.

Wednesday 29 August

SESSION 1

Conv. Ctr. 29D Wed. 1:30 to 3:20 pm

Scintillators I

Chair: **H. Bradford Barber**, The Univ. of Arizona

1:30 pm: **Methodology for packaging reliable scintillation detectors (Invited Paper)**, F. Wilkinson III, Alpha Spectra, Inc. [6707-01]

1:55 pm: **Using LaX scintillator in a new low-background Compton telescope (Invited Paper)**, J. M. Ryan, P. L. Bloser, J. R. Macri, M. L. McConnell, Univ. of New Hampshire [6707-02]

2:20 pm: **New scintillator compositions**, W. M. Higgins, E. Vanlouf, J. Glodo, A. Churilov, K. S. Shah, Radiation Monitoring Devices, Inc. [6707-03]

2:40 pm: **Structure and properties of lanthanide halides**, F. P. Doty, Sandia National Labs. [6707-04]

3:00 pm: **Fracture and deformation behavior of single crystal and polycrystalline rare earth halides**, K. O. Findley, S. Kilpatrick, D. F. Bahr, Washington State Univ. [6707-05]

Coffee Break 3:20 to 3:40 pm

SESSION 2

Conv. Ctr. 29D Wed. 3:40 to 5:50 pm

Scintillators II

Chair: **F. Patrick Doty**, Sandia National Labs.

3:40 pm: **Engineering solution synthesis of rare-earth-doped metal halides and their optical properties (Invited Paper)**, R. E. Riman, Rutgers Univ. [6707-06]

4:05 pm: **Ion-induced luminescence (Invited Paper)**, P. Rossi, Sandia National Labs. [6707-07]

4:30 pm: **LaBr₃-CrBr₃ thermodynamics**, P. Yang, Sandia National Labs. [6707-08]

4:50 pm: **Synthesis of lanthanide halides**, T. J. Boyle, Sandia National Labs. [6707-09]

5:10 pm: **Low-pressure Bridgman growth of cerium-doped lanthanum bromide**, M. J. Harrison, T. N. Krehbiel, A. M. Hageman, D. S. McGregor, Kansas State Univ. [6707-10]

5:30 pm: **High-performance nanosized grain polycrystalline LaBr₃:Ce for special nuclear material detection**, C. Chen, J. Cooley, K. J. McClellan, C. R. Stanek, D. Byler, H. Volz, R. Dickerson, D. Dombrowski, T. Tucker, B. Bartram, B. Ewing, M. Mauro, R. Weinberg, Los Alamos National Lab. [6707-11]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

✓ **Purification of tellurium to 6N using a multistage vacuum distillation method**, A. M. Hageman, M. J. Harrison, N. Fritz, T. N. Krehbiel, R. White, J. Patenaude, D. S. McGregor, Kansas State Univ. [6707-34]

✓ **Order and charge collection correlations in organic materials for neutron detection**, F. P. Doty, T. M. Wilson, M. J. King, D. A. Chinn, B. A. Simmons, Sandia National Labs. [6707-35]

✓ **Investigation of CaF₂ scintillator for D-D neutron interrogation**, A. J. Antolak, A. Herr, T. Raber, D. H. Morse, K. Leung, Sandia National Labs. [6707-36]

Thursday 30 August

SESSION 3

Conv. Ctr. 29D Thurs. 8:10 to 9:55 am

Scintillators III

Chair: **Irina Shestakova**, Radiation Monitoring Devices, Inc.

8:10 am: **Scintillation properties and applications of reduced-afterglow co-doped CsI:TI (Invited Paper)**, V. V. Nagarkar, V. B. Gaysinskiy, L. Ovechkina, S. R. Miller, Radiation Monitoring Devices, Inc.; C. Brecher, A. Lempicki, ALEM Associates [6707-12]

8:35 am: **Gamma tube for photofission-based active interrogation**, A. J. Antolak, K. Leung, J. Reijonen, M. J. King, D. H. Morse, T. Raber, R. A. Gough, B. L. Doyle, Sandia National Labs. [6707-13]

8:55 am: **Radioluminescence and radiation effects in metal organic framework materials**, A. J. Skulan, Sandia National Labs. [6707-14]

9:15 am: **High-resolution beta imaging probe for radioguided surgery**, I. Shestakova, V. B. Gaysinskiy, S. C. Thacker, S. Cool, Radiation Monitoring Devices, Inc.; B. Stack, Univ. of Arkansas for Medical Sciences; V. V. Nagarkar, Radiation Monitoring Devices, Inc. [6707-15]

9:35 am: **Neutron imaging with a 3x3 array of pinholes**, G. P. Grim, R. D. Day, D. D. Clark, V. E. Fatherley, F. P. Garcia, S. A. Jaramillo, A. J. Montoya, G. L. Morgan, J. A. Oertel, T. A. Ortiz, J. R. Payton, P. D. Pasuchanics, D. W. Schmidt, A. C. Valdez, C. H. Wilde, M. D. Wilke, Los Alamos National Lab. [6707-16]

Coffee Break 9:55 to 10:20 am

Conference 6707 • Conv. Ctr. 29D

SESSION 4

Conv. Ctr. 29D Thurs. 10:20 to 11:50 am

Biomedical Imaging

Chair: Vivek V. Nagarkar, Radiation Monitoring Devices, Inc.

10:20 am: **Advantages of semiconductor CZT for medical imaging (Invited Paper)**, D. J. Wagenaar, S. Chowdhury, K. B. Parnham, G. Maehlum, B. E. Patt, Gamma Medica-Ideas, Inc. [6707-17]

10:45 am: **Recent advances in small animal SPECT/CT**, B. H. Hasegawa, M. Sun, A. B. Hwang, T. Funk, C. Taylor, P. Despre's, S. Pevrhal, M. Pan, K. Teo, H. F. VanBrocklin, E. W. Izaguirre, Univ. of California/San Francisco ... [6707-18]

11:10 am: **New residual charge removal methods for selenium detectors.**, D. L. Y. Lee, DxRay, Inc. [6707-19]

11:30 am: **Design and initial performance evaluation of a full-field digital mammography upgrade cassette**, E. Toker, M. A. Baisal, Bioptics, Inc. [6707-20]

Lunch/Exhibition Break 11:50 am to 1:00 pm

SESSION 5

Conv. Ctr. 29D Thurs. 1:00 to 3:05 pm

Gamma-Ray and X-Ray Imaging I

Chair: Bruce H. Hasegawa, Univ. of California/San Francisco

1:00 pm: **Fast maximum-likelihood estimation methods for scintillation cameras and other optical sensors (Invited Paper)**, L. R. Furenliid, College of Optical Sciences/The Univ. of Arizona [6707-21]

1:25 pm: **Advances in monolithic CMOS sensors for charged-particle imaging**, S. Kleinfelder, Univ. of California/Irvine [6707-22]

1:45 pm: **A Bayesian sequential processor approach to spectroscopic portal system decisions**, K. E. Sale, J. V. Candy, D. H. Chambers, T. Gosnell, S. Prussin, Lawrence Livermore National Lab. [6707-23]

2:05 pm: **DQE of a Csl-based CCD imaging detector for application in crystallography**, H. Roehrig, The Univ. of Arizona; W. V. Schempp, Rigaku Corp. [6707-24]

2:25 pm: **Radiography and tomography system using refractive lenses**, C. K. Gary, H. Park, Adelphi Technology, Inc.; R. H. Pantell, Stanford Univ.; Y. I. Dudchik, Institute of Applied Physics Problems (Belarus) [6707-25]

2:45 pm: **Fluorescent x-ray tomography system for atomic imaging**, E. Sato, Iwate Medical Univ. (Japan); K. Hitomi, Tohoku Institute of Technology (Japan); S. Nomiya, Raytech Corp. (Japan); E. Tanaka, Tokyo Univ. of Agriculture and Technology (Japan); T. Kawai, Hamamatsu Photonics K.K. (Japan); T. Inoue, A. Ogawa, M. Izumisawa, M. Shozushima, S. Sato, Iwate Medical Univ. (Japan); K. Takayama, Tohoku Univ. (Japan) [6707-26]

Coffee Break 3:05 to 3:35 pm

SESSION 6

Conv. Ctr. 29D Thurs. 3:35 to 5:35 pm

Gamma-Ray and X-Ray Imaging II

Chair: Hans Roehrig, The Univ. of Arizona

3:35 pm: **Liquids identification with x-ray diffraction**, G. Harding, J. Delfs, GE Security (Germany) [6707-27]

3:55 pm: **Image quality analysis of a color LCD, as well as a monochrome LCD using a Foveon color CMOS camera**, W. J. Dallas, H. Roehrig, E. A. Krupinski, The Univ. of Arizona [6707-28]

4:15 pm: **Chromaticity noise measured with a Konica-Minolta CS200 colotimeter and a Foveon color camera**, H. Roehrig, W. J. Dallas, E. A. Krupinski, The Univ. of Arizona; G. R. Redford, Areté Associates ... [6707-29]

4:35 pm: **Finite element Compton tomography**, T. P. Jansson, P. Paki-Amouzou, N. V. Menon, Physical Optics Corp. [6707-30]

4:55 pm: **High-dose-rate pulse x-ray detection using a multipixel photon counter**, E. Sato, Iwate Medical Univ. (Japan); K. Hitomi, Tohoku Institute of Technology (Japan); S. Nomiya, H. Onabe, Raytech Corp. (Japan); T. Shoji, Tohoku Institute of Technology (Japan); E. Tanaka, Tokyo Univ. of Agriculture and Technology (Japan); T. Kawai, Hamamatsu Photonics K.K. (Japan); T. Inoue, A. Ogawa, S. Sato, Iwate Medical Univ. (Japan); K. Takayama, Tohoku Univ. (Japan) [6707-31]

5:15 pm: **Secondary penetrating radiation registration by interacting x-ray beams from cathode of high-current glow discharge with targets made of various materials**, A. B. Karabut, State Scientific-Industrial Association (Russia) [6707-32]

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Conference 6708 • Conv. Ctr. 30C

Monday-Tuesday 27-28 August 2007 • Proceedings of SPIE Vol. 6708

Atmospheric Optics: Models, Measurements, and Target-in-the-Loop Propagation

Conference Chairs: **Stephen M. Hammel**, Space and Naval Warfare Systems Ctr., San Diego; **Alexander M. J. van Eijk**, TNO Defence, Security and Safety (Netherlands); **Michael T. Valley**, Sandia National Labs.; **Mikhail A. Vorontsov**, Army Research Lab.

Program Committee: **Gail P. Anderson**, Air Force Research Lab.; **Matthew M. Bold**, Defense Strategies and Systems, Inc.; **Frank D. Eaton**, Air Force Research Lab.; **Charles Higgs**, MIT Lincoln Lab.; **Vladimir B. Markov**, MetroLaser, Inc.; **Vincent Michau**, ONERA (France); **Jennifer C. Ricklin**, Defense Advanced Research Projects Agency; **James F. Riker**, Air Force Research Lab.; **Michael C. Roggemann**, Michigan Technological Univ.; **Don D. Seeley**, High Energy Laser Joint Technology Office; **Alexander M. Sergeev**, Institute of Applied Physics (Russia); **Janet E. Shields**, Univ. of California/San Diego; **Thomas Weyrauch**, Univ. of Maryland/College Park

Monday 27 August

SESSION 1

Conv. Ctr. 30C Mon. 8:50 am to 12:00 pm

Turbulence Measurement and Modeling

Chair: **Mikhail A. Vorontsov**, Army Research Lab.

8:50 am: **Analysis of free-space laser signal intensity over a 2.33 km optical path**, A. Tunick, Army Research Lab. [6708-01]

9:10 am: **Free space optical system performance for laser beam propagation through non-Kolmogorov turbulence for uplink and downlink paths**, I. Toselli, Politecnico di Torino (Italy); L. C. Andrews, R. L. Phillips, Univ. of Central Florida; V. Ferrero, Politecnico di Torino (Italy) [6708-02]

9:30 am: **Turbulence effects on laser propagation in a marine environment**, V. M. Gadwal, S. M. Hammel, Space & Naval Warfare Systems Command SPAWARSYSCEN [6708-04]

9:50 am: **Strong atmospheric turbulence modeling using geometric optics of multiple scattering**, H. Yuksel, Univ. of Maryland/College Park; F. Kunter, Bogaziçi Univ. (Turkey) [6708-05]

Coffee Break 10:10 to 10:40 am

10:40 am: **The Levy Brownian motion family as a new paradigm in the modeling of turbulent wave-front phase**, D. G. Perez, Pontificia Univ. Catolica de Valparaiso (Chile); L. Zunino, M. Garavaglia, Univ. Nacional de la Plata (Argentina) [6708-06]

11:00 am: **Evaluating the performance of a bulk optical turbulence model in a maritime environment**, P. A. Frederickson, Naval Postgraduate School; S. M. Hammel, D. Tsintikidis, Space and Naval Warfare Systems Ctr., San Diego [6708-07]

11:20 am: **Coherent illumination for wavefront sensing and imaging**, M. Velluet, V. Michau, T. Fusco, J. Conan, ONERA (France) [6708-08]

11:40 am: **Experimental analysis and wave-optics simulation of turbulence aspects of maritime laser propagation**, B. P. Venet, MZA Associates Corp. [6708-09]

Lunch Break 12:00 to 1:20 pm

SESSION 2

Conv. Ctr. 30C Mon. 1:20 to 3:00 pm

Turbulence Compensation and TIL Mitigation

Chair: **Michael T. Valley**, Sandia National Labs.

1:20 pm: **Turbulence effect mitigation using adaptive optics post-processing of holographically recorded short-exposure images**, M. Aubailly, Univ. of Maryland/College Park; M. A. Vorontsov, Army Research Lab. [6708-10]

1:40 pm: **Integrated multi-dithering control for adaptive atmospheric turbulence compensation**, D. Loizos, Johns Hopkins Univ.; L. Liu, Univ. of Maryland/College Park; P. Sotiriadis, Johns Hopkins Univ.; G. Cauwenberghs, Univ. of California/San Diego; M. A. Vorontsov, Army Research Lab. and Univ. of Maryland/College Park [6708-11]

2:00 pm: **Adaptive compensation over a 2.33 km propagation path with retro reflectors under strong scintillation conditions**, E. Polnau, Univ. of Maryland/College Park; M. A. Vorontsov, U.S. Army Research Lab. and Univ. of Maryland/College Park; L. A. Beresnev, U.S. Army Research Lab. . . [6708-12]

2:20 pm: **Coherent combining of multiple beams with multi-dithering technique: 100 KHz closed-loop compensation demonstration**, L. Liu, Univ. of Maryland/College Park; D. Loizos, P. Sotiriadis, Johns Hopkins Univ.; M. A. Vorontsov, Army Research Lab. and Univ. of Maryland/College Park [6708-13]

2:40 pm: **Anisoplanatic imaging through atmospheric turbulence: brightness function approach**, M. A. Vorontsov, Univ. of Maryland/College Park and U.S. Army Research Lab.; S. L. Lachinova, Univ. of Maryland/College Park; V. V. Dudorov, V. V. Kolosov, Institute of Atmospheric Optics (Russia) [6708-14]

Coffee Break 3:00 to 3:30 pm

SESSION 3

Conv. Ctr. 30C Mon. 3:30 to 4:30 pm

TIL Propagation and Tracking I

Chair: **Alexander M. J. van Eijk**, TNO Defence, Security and Safety (Netherlands)

3:30 pm: **Uncooperative target-in-the-loop performance with backscattered speckle-field effects**, J. E. Kinsky, D. C. Homoele, D. V. Murphy, MIT Lincoln Lab. [6708-15]

3:50 pm: **The BEFWM system for detection and phase conjugation of a weak laser beam**, A. Khizhnyak, V. B. Markov, MetroLaser, Inc. . . . [6708-16]

4:10 pm: **TIL system with nonlinear phase conjugation**, A. Khizhnyak, V. B. Markov, MetroLaser, Inc. [6708-17]

Conference 6708 • Conv. Ctr. 30C

Tuesday 28 August

SESSION 4

Conv. Ctr. 30C Tues. 8:30 to 9:30 am

TIL Propagation and Tracking II

Chair: Thomas Weyrauch, Univ. of Maryland/College Park

8:30 am: **Laboratory demonstration of wavefront-based stochastic parallel gradient descent adaptive optics system**, M. S. Belen'kii, Trex Enterprises Corp.; J. D. Barchers, E. Berg, Science Applications International Corp.; D. G. Bruns, Trex Enterprises Corp.; D. Fung, R. Gallant, C. Kirk, Science Applications International Corp.; V. A. Rye, H. Runyeon, Trex Enterprises Corp.; J. Voas, Pipeline Processing Co. [6708-18]

8:50 am: **Application of stereo laser tracking methods for quantifying flight dynamics**, M. T. Valley, T. J. Miller, Jr., P. L. Reu, Sandia National Labs.; H. Schreier, Correlated Solutions Inc. [6708-19]

9:10 am: **Coherent beam combining with micro-processor based SPGD controller**, L. Liu, Univ. of Maryland/College Park; M. A. Vorontsov, Army Research Lab. and Univ. of Maryland/College Park; A. P. Rostov, Institute of Atmospheric Optics (Russia) [6708-20]

SESSION 5

Conv. Ctr. 30C Tues. 9:30 am to 12:00 pm

Aerosol Extinction: Modeling and Measurement

Chair: Frank D. Eaton, Air Force Research Lab.

9:30 am: **The use of multi-band transmission data, collected at Scripps pier (La Jolla) in November 2006, for the investigation of aerosol characteristics**, A. N. de Jong, TNO (Netherlands); A. M. J. van Eijk, TNO Defence, Security and Safety (Netherlands); P. J. Fritz, TNO (Netherlands); M. M. Moerman, L. H. Cohen, TNO-FEL (Netherlands) [6708-21]

9:50 am: **Production of sea-spray aerosol in the surf zone of the San Diego Bay**, J. Kusmierczyk-Michulec, TNO Defence, Security and Safety (Netherlands); J. J. Piazzola, Univ. de Toulon et du var (France); M. J. Francius, M. M. Moerman, TNO-FEL (Netherlands); A. M. J. Van Eijk, TNO Defence, Security and Safety (Netherlands); D. Merrit, J. Fontana, JDF&A ... [6708-22]

Coffee Break 10:10 to 10:40 am

10:40 am: **Sea spray aerosol and wave energy dissipation in the surf zone**, M. J. Francius, TNO Defence, Security and Safety (Netherlands); J. Piazzola, P. Forget, O. Le Calve, Univ. du Sud Toulon-Var (France); J. Kusmierczyk-Michulec, TNO Defence, Security and Safety (Netherlands) [6708-23]

11:00 am: **Can we predict aerosol extinction in a coastal environment?**, D. Tsintikidis, D. Kichura, S. M. Hammel, Space and Naval Warfare Systems Ctr., San Diego [6708-24]

11:20 am: **Ångström coefficient as a tracer of the continental aerosols**, J. Kusmierczyk-Michulec, A. M. J. Van Eijk, TNO Defence, Security and Safety (Netherlands) [6708-25]

11:40 am: **Satellite retrieved aerosol properties for battlespace characterization and sensor performance**, R. M. Schoemaker, TNO (Netherlands) [6708-26]

Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 6

Conv. Ctr. 30C Tues. 1:20 to 4:30 pm

Novel Methods and Designs

Chair: Stephen M. Hammel, Space and Naval Warfare Systems Ctr., San Diego

1:20 pm: **Adaptive optical antennas: design and evaluation**, T. Weyrauch, Univ. of Maryland/College Park; G. V. Simonova, Institute for Monitoring of Climatic and Ecological Systems (Russia); L. A. Beresnev, M. A. Vorontsov, G. W. Carhart, Army Research Lab.; E. Polnau, Univ. of Maryland/College Park [6708-27]

1:40 pm: **Wavefront correctors based on semi-passive bimorph elements for adaptive optics applications: new designs**, L. A. Beresnev, Army Research Lab. [6708-28]

2:00 pm: **Adaptive compensation of atmospheric phase distortions with Strehl ratio exceeding one: super-focusing effect**, M. A. Vorontsov, Army Research Lab.; V. V. Kolosov, Institute of Atmospheric Optics (Russia) [6708-29]

2:20 pm: **Finding the range to a distant object near the sea surface**, M. Degache, TNO-FEL (Netherlands); S. M. Hammel, Space and Naval Warfare Systems Ctr., San Diego [6708-30]

2:40 pm: **Optical beam tracking based on nonlinear lens mechanism**, A. S. Koujelev, A. E. Dudelzak, Canadian Space Agency (Canada) [6708-31]

Coffee Break 3:00 to 3:30 pm

3:30 pm: **Self-pumped phase conjugation in a liquid crystal light-valve with tilted feedback mirror**, U. Bortolozzo, Lab. Physique Statistique - ENS (France); S. Residori, Institut Non Linéaire de Nice Sophia Antipolis (France); J. Huignard, Thales Research & Technology (France) [6708-32]

3:50 pm: **Intensity and polarization characteristics of the light scattered by the ice crystals of cirrus clouds with preferred orientations**, A. V. Burnashov, Institute of Atmospheric Optics (Russia) [6708-33]

4:10 pm: **Picosecond eye-safe Raman laser for advanced ranging and tracking**, O. V. Kulagin, N. F. Andreev, A. M. Sergeev, Institute of Applied Physics (Russia); M. T. Valley, Sandia National Labs. [6708-34]

Courses of Related Interest

See SPIE Cashier for information.

SC135 Adaptive Optics (Tyson) Tuesday 28, 8:30 am - 5:30 pm

SC134 Optical Design Fundamentals for Infrared Systems (Riedl)
Sunday 26, 8:30 am - 5:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/
Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

Conference 6709 • Conv. Ctr. 30D

Tuesday-Thursday 28-30 August 2007 • Proceedings of SPIE Vol. 6709

Free-Space Laser Communications VII

Conference Chairs: **Arun K. Majumdar**, LCRResearch, Inc.; **Christopher C. Davis**, Univ. of Maryland/College Park

Program Committee: **Larry C. Andrews**, Univ. of Central Florida; **Shlomi Arnon**, Ben-Gurion Univ. of the Negev (Israel); **Mikhail S. Belen'kii**, Trex Enterprises Corp.; **Naresh Chand**, BAE Systems North America; **Frank D. Eaton**, Air Force Research Lab.; **G. Charmaine Gilbreath**, Naval Research Lab.; **Hennes Henniger**, DLR Standort Oberpfaffenhofen (Germany); **Andrew S. Keys**, NASA Marshall Space Flight Ctr.; **Anton Kohnle**, FGAN-FOM (Germany); **Michela Muñoz-Fernández**, Jet Propulsion Lab.; **Dominic C. O'Brien**, Univ. of Oxford (United Kingdom); **Narasimha S. Prasad**, NASA Langley Research Ctr.; **William S. Rabinovich**, Naval Research Lab.; **Marcos Reyes Garcia-Talavera**, Instituto de Astrofísica de Canarias (Spain); **Jennifer C. Ricklin**, Defense Advanced Research Projects Agency; **Thomas M. Shay**, Air Force Research Lab.; **Deepak Varshneya**, Cubic Defense Applications Group

Tuesday 28 August

SESSION 1

Conv. Ctr. 30D Tues. 8:30 to 10:20 am

Components and Systems Design and Analysis I

Chairs: **Arun K. Majumdar**, LCRResearch, Inc.; **Christopher C. Davis**, Univ. of Maryland/College Park

- 8:30 am: **Optical cross links and their applications on distributed space architecture (Invited Paper)**, V. W. S. Chan, Massachusetts Institute of Technology [6709-01]
- 9:00 am: **Evaluation of cone tracking: for optical free space communication with a retro modulator**, E. Saint Georges, NovaSol [6709-02]
- 9:20 am: **An integrated test-bed for PAT testing and verification of inter-satellite lasercom terminals**, L. Liu, L. Wang, J. Sun, Z. Luan, D. Liu, N. Xu, X. Zhong, Shanghai Institute of Optics and Fine Mechanics (China) ... [6709-03]
- 9:40 am: **Design of a very small inertially-stabilized optical space terminal**, J. J. Scozzafava, D. M. Boroson, J. W. Burnside, M. L. Glynn, C. M. DeFranzo, C. DeVoe, MIT Lincoln Lab. [6709-04]
- 10:00 am: **Efficiency penalty of photon-counting with timing jitter**, A. L. Kachelmyer, D. M. Boroson, MIT Lincoln Lab. [6709-05]
- Coffee Break 10:20 to 10:50 am

SESSION 2

Conv. Ctr. 30D Tues. 10:50 am to 12:10 pm

Components and Systems Design and Analysis II

Chairs: **Naresh Chand**, BAE Systems North America; **Frank D. Eaton**, Air Force Research Lab.

- 10:50 am: **Robust free space optical alignment systems using geometrical constraints**, T. Ho, J. Rzasa, S. D. Milner, C. C. Davis, Univ. of Maryland/College Park [6709-06]
- 11:10 am: **A novel high-speed electro-optic beam scanner based on KTN crystals**, J. J. Foshee, Air Force Research Lab.; S. Tang, Y. Tang, Crystal Research, Inc. [6709-07]
- 11:30 am: **Optical free space communication beam tracking optimization with an 8 quadrant PSD and small spot size**, E. Saint Georges, J. Sender, G. Tartakovsky, NovaSol [6709-08]
- 11:50 am: **Optical wireless communications with low voltage self-powered sensor motes**, D. C. O'Brien, J. Liu, W. Yuan, S. Sivathanan, G. E. Faulkner, S. Collins, S. J. Elston, Univ. of Oxford (United Kingdom) [6709-09]
- Lunch/Exhibition Break 12:10 to 1:50 pm

SESSION 3

Conv. Ctr. 30D Tues. 1:50 to 3:30 pm

Coding and Networking I

Chairs: **Christopher C. Davis**, Univ. of Maryland/College Park; **Shlomi Arnon**, Ben-Gurion Univ. of the Negev (Israel)

- 1:50 pm: **Indoor optical wireless communication: interference experimentation and evaluation**, O. Bouchet, C. Rouet, France Télécom (France) [6709-11]
- 2:10 pm: **Optical wireless communication in sensor networks: data harvesting**, D. Kedar, S. Arnon, Ben-Gurion Univ. of the Negev (Israel)[6709-12]
- 2:30 pm: **Quantitative evaluation of radiation transfer for quantum communication in free space**, N. Antonietti, Politecnico di Torino (Italy) [6709-13]
- 2:50 pm: **Optical high-capacity satellite downlinks via high-altitude platform relays**, M. Knapek, J. Horwath, D. Giggenbach, B. Epple, H. Bischl, N. Courville, F. Moll, DLR Standort Oberpfaffenhofen (Germany) [6709-14]
- 3:10 pm: **Wide angle infrared cloud imaging for measuring cloud statistics in support of earth space optical communication**, P. W. Nugent, J. A. Shaw, Montana State Univ./Bozeman; S. Piazzolla, Jet Propulsion Lab. ... [6709-15]
- Coffee Break 3:30 to 4:00 pm

SESSION 4

Conv. Ctr. 30D Tues. 4:00 to 5:00 pm

Coding and Networking II

Chairs: **Christopher C. Davis**, Univ. of Maryland/College Park; **G. Charmaine Gilbreath**, Naval Research Lab.

- 4:00 pm: **A precise pointing technique for FSO links and networks using kinematic GPS and local sensors**, Y. Shim, S. D. Milner, C. C. Davis, Univ. of Maryland/College Park [6709-16]
- 4:20 pm: **Topology reconfiguration of FSO and directional wireless networks with successive approximations**, E. Baskaran, C. C. Davis, S. D. Milner, Univ. of Maryland/College Park [6709-17]
- 4:40 pm: **Mobility control for joint coverage-connectivity optimization in directional FSO/RF wireless backbone networks**, J. Llorca, S. D. Milner, C. C. Davis, Univ. of Maryland/College Park [6709-18]

Conference 6709 • Conv. Ctr. 30D

Wednesday 29 August

SESSION 5

Conv. Ctr. 30D Wed. 8:50 to 10:10 am

Optical Turbulence and Scintillation

Chairs: **Arun K. Majumdar**, LCRResearch, Inc.; **Larry C. Andrews**, Univ. of Central Florida

8:50 am: **Turbulence inner scale sensor for arbitrary atmospheric paths**, M. S. Belen'kii, D. G. Bruns, K. Hughes, L. Moyer, Trex Enterprises Corp.; L. Wright, Air Force Research Lab. [6709-19]

9:10 am: **Kolmogorov and non-Kolmogorov turbulence and its effects on optical communication links**, A. Zilberman, E. Golbraikh, S. Arnon, N. S. Kopeika, Ben-Gurion Univ. of the Negev (Israel) [6709-20]

9:30 am: **Measuring optical turbulence parameters with a three-aperture receiver**, D. Wayne, Florida Space Institute; R. L. Phillips, L. C. Andrews, Univ. of Central Florida; M. R. Borbath, Harris Corp.; B. Griffis, Computer Science Corp.; D. J. Galus, Harris Corp. [6709-21]

9:50 am: **Reconstruction of probability density function of intensity fluctuations relevant to free-space laser communications through atmospheric turbulence**, A. K. Majumdar, LCRResearch, Inc.; C. E. Luna, P. S. Idell, The Boeing Co. [6709-23]

Coffee Break 10:10 to 10:40 am

SESSION 6

Conv. Ctr. 30D Wed. 10:40 am to 12:20 pm

Mitigation, Scintillation, and Adaptive Control

Chairs: **Jennifer C. Ricklin**, Defense Advanced Research Projects Agency; **Mikhail S. Belen'kii**, Trex Enterprises Corp.

10:40 am: **A novel technique for scintillation suppression in optical communications**, T. M. Shay, C. A. Robin, J. B. Spring, A. Gavrielides, Air Force Research Lab. [6709-24]

11:00 am: **The effect of an interferer on atmospheric optical communication that uses diversity incoherent or diversity coherent receivers**, E. J. Lee, V. W. S. Chan, Massachusetts Institute of Technology [6709-25]

11:20 am: **Optimizing partial spatially coherent beams for free space laser communications**, X. Xiao, D. G. Voelz, New Mexico State Univ. [6709-26]

11:40 am: **Saturation and frequency weighting in adaptive control of laser beam jitter**, N. O. Perez Arancibia, S. Gibson, T. Tsao, Univ. of California/Los Angeles [6709-27]

12:00 pm: **Scintillation index and aperture averaging on a 16km modulated retro-reflector free-space optical link**, M. L. Plett, Univ. of Maryland/College Park; R. Mahon, L-3 Communications Titan Group; W. S. Rabinovich, Naval Research Lab.; M. S. Ferraro, Sachs Freeman Associates, Inc.; C. I. Moore, Naval Research Lab. [6709-28]

Lunch/Exhibition Break 12:20 to 1:50 pm

SESSION 7

Conv. Ctr. 30D Wed. 1:50 to 3:30 pm

Experimental Measurements, Concepts, and Performance I

Chairs: **Thomas M. Shay**, Air Force Research Lab.; **Dominic C. O'Brien**, Univ. of Oxford (United Kingdom)

1:50 pm: **Theoretical model of a phase-locked optical amplifier array with a very large number of elements**, T. M. Shay, Air Force Research Lab. [6709-29]

2:10 pm: **Self-synchronous phase locking of a nine element 100-W fiber amplifier array**, T. M. Shay, V. Benham, Air Force Research Lab.; J. T. Baker, Boeing LTS, Inc.; D. E. Pilkington, C. A. Lu, A. D. Sanchez, D. J. Nelson, Air Force Research Lab. [6709-30]

2:30 pm: **10 Gb/s optical heterodyne receiver for intersatellite communications links**, C. Wree, D. Becker, D. Mohr, A. Joshi, Discovery Semiconductors, Inc. [6709-31]

2:50 pm: **Fiberbundle-receiver: a new concept for high speed and high sensitivity tracking**, C. Fuchs, H. Henniger, D. Gigenbach, DLR Standort Oberpfaffenhofen (Germany) [6709-32]

3:10 pm: **Remote sensing with passive specular probes**, D. Slater, Nearfield Systems Inc. [6709-33]

Coffee Break 3:30 to 4:00 pm

SESSION 8

Conv. Ctr. 30D Wed. 4:00 to 6:00 pm

Experimental Measurements, Concepts, and Performance II

Chairs: **Narasimha S. Prasad**, NASA Langley Research Ctr.; **William S. Rabinovich**, Naval Research Lab.

4:00 pm: **Coherent optical communications receiver design investigations**, M. Muñoz-Fernández, Jet Propulsion Lab. [6709-34]

4:20 pm: **Achievable data rate for ultraviolet communications through the atmosphere**, Z. Xu, G. Chen, Univ. of California/Riverside [6709-35]

4:40 pm: **Demonstration of gigabit per second and greater data rates at extremely high-efficiency using superconducting nanowire single photon detectors**, B. S. Robinson, A. J. Kerman, E. A. Dauler, MIT Lincoln Lab. [6709-36]

5:00 pm: **Demonstration of photon-counting, high-efficiency communications at telecom wavelengths using efficient upconversion and silicon photon-detectors**, M. E. Grein, B. S. Robinson, L. E. Elgin, MIT Lincoln Lab. [6709-37]

5:20 pm: **16 km modulated retro-reflector free-space optical link across the Chesapeake Bay**, M. L. Plett, Univ. of Maryland/College Park; R. Mahon, L-3 Communications Titan Group; W. S. Rabinovich, Naval Research Lab.; M. S. Ferraro, Sachs Freeman Associates, Inc.; C. I. Moore, Naval Research Lab. [6709-38]

5:40 pm: **Experimental demonstration of novel scintillation suppression technique**, C. A. Robin, T. M. Shay, J. B. Spring, A. Gavrielides, Air Force Research Lab. [6709-39]

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

- ✓ **Experiment research on orthogonal tilting scanner**, A. Li, Tongji Univ. (China); L. Liu, J. Sun, X. Zhong, Z. Luan, Shanghai Institute of Optics and Fine Mechanics (China) [6709-50]
- ✓ **Single and double shearing interferometers series for laser wave front testing**, Z. Luan, L. Liu, L. Wang, J. Sun, D. Xu, D. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6709-51]
- ✓ **Technical scheme and corresponding experiment for the PAT performance of a lasercom using an integrated test-bed**, J. Sun, L. Liu, L. Wang, Z. Luan, D. Liu, N. Xu, X. Zhong, Shanghai Institute of Optics and Fine Mechanics (China) [6709-52]
- ✓ **Scintillation index of electromagnetic Gaussian Schell-model beams on propagation through atmospheric turbulence**, W. Lu, L. Liu, J. Sun, Shanghai Institute of Optics and Fine Mechanics (China) [6709-53]
- ✓ **Polarization phase-shifting double-shearing interferometer for the test of the diffraction-limited wavefront**, L. Wang, Z. Luan, J. Sun, Y. Zhou, D. Liu, L. Liu, Shanghai Institute of Optics and Fine Mechanics (China) [6709-54]
- ✓ **Coherent detection of position errors in inter-satellite laser communications**, N. Xu, L. Liu, D. Liu, J. Sun, Z. Luan, Shanghai Institute of Optics and Fine Mechanics (China) [6709-55]
- ✓ **Complex model of terrestrial FSO links**, O. Wilfert, Z. Kolka, Brno Univ. of Technology (Czech Republic); O. Fiser, Institute of Atmospheric Physics (Czech Republic); R. Kopp, Brno Univ. of Technology (Czech Republic) [6709-56]
- ✓ **Narrow-band high-power semiconductor lasers for optical communication**, Z. Buchta, O. Cip, Institute of Scientific Instruments (Czech Republic); O. Wilfert, Brno Univ. of Technology (Czech Republic); J. Lazar, Institute of Scientific Instruments (Czech Republic) [6709-57]
- ✓ **Demodulation of FM data in free-space optical communication systems using discrete wavelet transformation**, N. M. Namazi, The Catholic Univ. of America; H. R. Burris, G. C. Gilbreath, Naval Research Lab. . . [6709-58]

Thursday 30 August

SESSION 9

Conv. Ctr. 30D Thurs. 8:30 to 10:10 am

Free-Space Link Performance I

- Chairs: Marcos Reyes Garcia-Talavera, Instituto de Astrofísica de Canarias (Spain); Michela Muñoz-Fernández, Jet Propulsion Lab.*
- 8:30 am: **Link performance of mobile links**, H. Henniger, DLR Standort Oberpfaffenhofen (Germany) [6709-40]
- 8:50 am: **Tracking in a ground-to-satellite optical link: effects due to lead-ahead and aperture mismatch including temporal tracking response**, S. Basu, D. G. Voelz, New Mexico State Univ. [6709-41]
- 9:10 am: **Performance optimization of FSO communications based on measurements from successful FSO demonstrations**, B. Eppler, DLR Standort Oberpfaffenhofen (Germany) [6709-42]
- 9:30 am: **Wavelength selection criteria and link availability affecting optical links in satellite, aerial, and downlink scenarios**, F. Moll, M. Knapek, DLR Standort Oberpfaffenhofen (Germany) [6709-43]
- 9:50 am: **3.5 micron free space optical channel performance analysis**, C. Ting, E. J. Burlbaw, J. Ding, A. R. Geiger, Y. Huang, M. Gutierrez, C. J. Urbina, Akamai Physics Inc. [6709-44]
- Coffee Break 10:10 to 10:40 am

SESSION 10

Conv. Ctr. 30D Thurs. 10:40 am to 12:20 pm

Free-Space Link Performance II

- Chairs: Hennes Henniger, DLR Standort Oberpfaffenhofen (Germany); Anton Kohnle, Forschungsgesellschaft für Angewandte Naturwissenschaften e.V. (Germany)*
- 10:40 am: **A survey of technology-driven capacity limits for free-space laser communications**, D. M. Boroson, MIT Lincoln Lab. [6709-45]
- 11:00 am: **Evaluation of commercial directional RF and free-space optical transceivers in different weather conditions**, J. Rzasa, S. D. Milner, C. C. Davis, Univ. of Maryland/College Park [6709-46]
- 11:20 am: **Transmission of high-definition imagery using hybrid FSO/RF links**, J. Franco, J. Rzasa, S. D. Milner, C. C. Davis, Univ. of Maryland/College Park [6709-47]
- 11:40 am: **Observation of atmospheric influence on OICETS inter-orbit laser communication demonstrations**, Y. Takayama, T. Jono, Y. Koyama, N. Kura, Japan Aerospace Exploration Agency (Japan); K. Shiratama, NEC TOSHIBA Space Systems, Ltd. (Japan); B. Demelenne, European Space Agency (Belgium); Z. Sodnik, A. Bird, European Space Agency (Netherlands); K. Arai, Japan Aerospace Exploration Agency (Japan) [6709-48]
- 12:00 pm: **Data analysis results from the KODEN experiments**, M. Toyoshima, Y. Takayama, H. Kunimori, National Institute of Information and Communications Technology (Japan); T. Jono, K. Arai, Japan Aerospace Exploration Agency (Japan) [6709-49]

Courses of Related Interest

See SPIE Cashier for information.

SC135 Adaptive Optics (Tyson) Tuesday 28, 8:30 am - 5:30 pm

Conference 6710 • Conv. Ctr. 30E

Sunday-Tuesday 26-28 August 2007 • Proceedings of SPIE Vol. 6710

Quantum Communications and Quantum Imaging V

Conference Chairs: **Ronald E. Meyers**, Army Research Lab.; **Yanhua Shih**, Univ. of Maryland/Baltimore County; **Keith S. Deacon**, Army Research Lab.

Program Committee: **Stefania A. Castelletto**, The Univ. of Melbourne (Australia); **Richard J. Hughes**, Los Alamos National Lab.; **Yoon-Ho Kim**, Pohang Univ. of Science and Technology (South Korea); **Todd B. Pittman**, Univ. of Maryland/Baltimore County; **Barry C. Sanders**, Univ. of Calgary (Canada); **Alexander V. Sergienko**, Boston Univ.; **Dmitry V. Strekalov**, Jet Propulsion Lab.; **Shigeki Takeuchi**, Hokkaido Univ. (Japan); **Zhi Zhao**, Oak Ridge National Lab.

Sunday 26 August

SESSION 1

Conv. Ctr. 30E Sun. 8:30 to 10:35 am

Quantum Imaging I

8:30 am: **Modeling of classical ghost images formed using pseudo-thermal light sources**, S. C. Crosby, S. A. Castelletto, R. E. Scholten, A. Roberts, The Univ. of Melbourne (Australia) [6710-01]

8:55 am: **Ghost imaging with intense entangled fields**, A. Andreoni, E. Puddu, Univ. degli Studi dell'Insubria (Italy); I. P. Degiovanni, Istituto Nazionale di Ricerca Metrologica (Italy); M. Bondani, Consiglio Nazionale delle Ricerche (Italy); S. A. Castelletto, The Univ. of Melbourne (Australia) [6710-02]

9:20 am: **Sub-shot-noise intensity correlations in a mesoscopic dichromatic twin-beam**, M. Bondani, Consiglio Nazionale delle Ricerche (Italy); A. Allevi, G. Zambra, Univ. degli Studi dell'Insubria (Italy); M. G. Paris, Univ. degli Studi di Milano (Italy); A. Andreoni, Univ. degli Studi dell'Insubria (Italy) [6710-03]

9:45 am: **CCD-based detection of quantum spatial correlation of twin beams for high-sensitivity imaging**, O. Jedrkiewicz, Univ. degli Studi dell'Insubria (Italy); G. Molina-Terriza, Institut de Ciències Fotòniques (Spain); E. Brambilla, L. Caspani, A. C. Gatti, L. A. Lugiato, P. Di Trapani, Univ. degli Studi dell'Insubria (Italy) [6710-04]

10:10 am: **Entangled light sources for quantum imaging**, R. W. Boyd, Univ. of Rochester [6710-05]

Coffee Break 10:35 to 11:00 am

SESSION 2

Conv. Ctr. 30E Sun. 11:00 am to 12:40 pm

Quantum Imaging II

11:00 am: **Is entanglement dispensable in quantum lithography?**, M. D'Angelo, Univ. degli Studi di Bari (Italy); G. Scarcelli, Wellman Ctr. for Photomedicine; Y. Shih, Univ. of Maryland/Baltimore County [6710-06]

11:25 am: **Non-local aspects of two-photon correlation using chaotic light**, E. S. Fonseca, I. Vidal Silva de Lima, D. P. Caetano, J. M. Hickmann, Univ. Federal de Estado de Alagoas (Brazil) [6710-07]

11:50 am: **New two-photon quantum ghost imaging experiments**, R. E. Meyers, K. S. Deacon, Army Research Lab.; Y. Shih, Univ. of Maryland/Baltimore County [6710-08]

12:15 pm: **Quantum imaging: recent progress**, M. I. Kolobov, Univ. of Lille I (France); I. V. Sokolov, L. V. Magdenko, St. Petersburg Univ. (Russia) [6710-09]

Lunch Break 12:40 to 1:40 pm

SESSION 3

Conv. Ctr. 30E Sun. 1:40 to 3:20 pm

Quantum Technology I

1:40 pm: **Development of a parametric down-conversion source for two-photon absorption experiments**, T. B. Pittman, Univ. of Maryland/Baltimore County; S. Hendrickson, Johns Hopkins Univ.; J. D. Franson, Univ. of Maryland/Baltimore County [6710-10]

2:05 pm: **Why is the orbital angular momentum conserved in spontaneous parametric down-conversion?**, S. Feng, C. Chen, G. A. Barbosa, P. Kumar, Northwestern Univ. [6710-11]

2:30 pm: **The orbital angular momentum spectrum of photons generated via parametric down-conversion or Raman transitions**, C. I. Osorio, Univ. Politècnica de Catalunya (Spain); J. P. Torres, Institut de Ciències Fotòniques (Spain) [6710-12]

2:55 pm: **Unheralded single-photon source using two-photon absorption**, B. C. Jacobs, Johns Hopkins Univ. [6710-13]

Coffee Break 3:20 to 3:40 pm

SESSION 4

Conv. Ctr. 30E Sun. 3:40 to 4:55 pm

Quantum Technology II

3:40 pm: **Tunable control and use of the spectrum of photons in quantum optics applications**, A. C. Valencia, M. Hendrych, X. Shi, N. Garcia Gonzalez, A. Cerè, Institut de Ciències Fotòniques (Spain); J. P. Torres, Institut de Ciències Fotòniques (Spain) and Univ. de Catalunya (Spain) [6710-15]

4:05 pm: **Steering light by electromagnetically-induced transparency**, A. I. Lvovsky, F. Vewinger, J. Appel, E. V. Figueroa Barragan, K. Marzlin, Univ. of Calgary (Canada) [6710-16]

4:30 pm: **Cavity QED with chip-based toroidal microresonators**, B. Dayan, T. Aoki, E. Wilcut, W. P. Bowen, California Institute of Technology; S. A. Parkins, Univ. of Auckland (New Zealand); T. J. Kippenberg, K. J. Vahala, California Institute of Technology [6710-17]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Danielle Merfeld, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

SESSION 5

Conv. Ctr. 30E Mon. 8:30 to 10:35 am

Quantum Communications I

- 8:30 am: **Quantum hacking: attacking practical quantum key distribution systems**, B. Qi, C. F. Fung, Y. Zhao, X. Ma, Univ. of Toronto (Canada); K. Tamaki, NTT Corp. (Japan); C. Chen, H. Lo, Univ. of Toronto (Canada) [6710-18]
- 8:55 am: **Towards a practical quantum repeater**, A. Kuzmich, Georgia Institute of Technology [6710-19]
- 9:20 am: **10 Gbps secure communication by quantum stream cipher Y-00 for high definition television**, O. Hirota, Tamagawa Univ. (Japan) .. [6710-20]
- 9:45 am: **Quantum networking with quantum dots coupled to micro-cavities**, E. Waks, D. Sridharan, Univ. of Maryland/College Park ... [6710-21]
- 10:10 am: **Quantum effects of a partially coherent beam propagating through the atmosphere**, G. P. Berman, Los Alamos National Lab.; A. A. Chumak, Instytut Fizyki (Ukraine) [6710-22]
- Coffee Break 10:35 to 11:00 am

SESSION 6

Conv. Ctr. 30E Mon. 11:00 am to 12:40 pm

Entanglement I

- 11:00 am: **Compact sources of correlated and entangled photons**, M. Fiorentino, S. M. Spillane, Hewlett-Packard Labs.; T. D. Roberts, AdvR, Inc.; R. G. Beausoleil, Hewlett-Packard Labs. [6710-23]
- 11:25 am: **Experimental study of different Bell states within the linewidth of SPDC**, M. Genovese, Istituto Nazionale di Ricerca Metrologica (Italy) [6710-24]
- 11:50 am: **Gravitationally Induced Decoherence of Optical Entanglement**, T. C. Ralph, G. J. Milburn, T. Downes, The Univ. of Queensland (Australia) [6710-25]
- 12:15 pm: **Reliability of photon NOON-state production schemes**, A. Garuccio, Univ. degli Studi di Bari (Italy) and Istituto Nazionale Di Fisica Nucleare (Italy); V. Tamma, M. D'Angelo, Univ. degli Studi di Bari (Italy) [6710-26]
- Lunch Break 12:40 to 1:40 pm

SESSION 7

Conv. Ctr. 30E Mon. 1:40 to 3:20 pm

Quantum Communications II

- 1:40 pm: **Quantum communications over optical fiber networks**, T. E. Chapuran, R. J. Runser, P. Toliver, N. A. Peters, M. S. Goodman, S. R. McNow, J. T. Kosloski, Telcordia Technologies, Inc.; R. J. Hughes, C. G. Peterson, K. P. McCabe, J. E. Nordholt, K. Tyagi, P. A. Hiskett, N. Dallmann, Los Alamos National Lab.; L. B. Mercer, H. Dardy, Naval Research Lab. [6710-27]
- 2:05 pm: **Long distance decoy state quantum key distribution in optical fiber**, D. Rosenberg, J. W. Harrington, P. R. Rice, P. A. Hiskett, C. G. Peterson, R. J. Hughes, Los Alamos National Lab.; S. W. Nam, A. E. Lita, National Institute of Standards and Technology; J. E. Nordholt, Los Alamos National Lab. [6710-28]
- 2:30 pm: **Quantum stream cipher part V: on the optimal modulation scheme and the implementation of deliberate signal randomization**, K. Kato, National Tsing Hua Univ. (Taiwan); O. Hirota, Tamagawa Univ. (Japan) [6710-29]
- 2:55 pm: **Optimal eavesdropping strategies in quantum cryptography using photonic quantum control**, S. D. Bartlett, The Univ. of Sydney (Australia) [6710-30]
- Coffee Break 3:20 to 3:45 pm

SESSION 8

Conv. Ctr. 30E Mon. 3:45 to 5:00 pm

Quantum Technology III

- 3:45 pm: **Preparation of general single-quart states using ultrafast spontaneous parametric down-conversion**, S. Baek, Pohang Univ. of Science and Technology (South Korea); S. S. Straupe, S. P. Kulik, M.V. Lomonosov Moscow State Univ. (Russia); Y. Kim, Pohang Univ. of Science and Technology (South Korea) [6710-32]
- 4:10 pm: **Entangling operations and rapid measurement of atomic clock-state qubits for violating Bell inequalities**, R. Stock, Univ. of Calgary (Canada) and Univ. of Toronto (Canada); N. S. Babcock, Univ. of Calgary (Canada); M. G. Raizen, The Univ. of Texas at Austin; B. C. Sanders, Univ. of Calgary (Canada) [6710-33]
- 4:35 pm: **Gradient echo quantum memory for light using two-level atoms**, J. J. Longdell, Univ. of Otago (New Zealand); G. Hetet, A. L. Alexander, P. K. Lam, M. J. Sellars, The Australian National Univ. (Australia) [6710-34]

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

- Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.*
- ✓ **Fast and power-efficient infrared single-photon upconversion using hot-carrier luminescence**, H. Finkelstein, K. Zhao, M. Gross, Y. Lo, S. C. Esener, Univ. of California/San Diego [6710-42]
- ✓ **Improve the efficiency of a practical quantum key distribution system**, B. Qi, Y. Zhao, X. Ma, H. Lo, L. Qian, Univ. of Toronto (Canada) .. [6710-43]
- ✓ **Variation of the ground state properties of trapped Bose-Einstein condensate due to localized impurity**, S. Tewari, P. Silotia, A. Saxena, L. K. Gupta, Univ. of Delhi (India) [6710-45]
- ✓ **Two-photon effects in quantum imaging systems**, N. J. Gunther, Performance Dynamics Consulting; E. Charbon, D. L. Boiko, École Polytechnique Fédérale de Lausanne (Switzerland); G. B. Beretta, Hewlett-Packard Labs. [6710-46]

Tuesday 28 August

SESSION 9

Conv. Ctr. 30E Tues. 8:30 to 11:00 am

Quantum Technology IV

- 8:30 am: **Einstein-Podolsky-Rosen correlations in entangled macroscopic quantum systems**, F. De Martini, F. Sciarrino, Univ. degli Studi di Roma/La Sapienza (Italy) [6710-35]
- 8:55 am: **Small scale quantum circuits using linear optics**, S. Takeuchi, Hokkaido Univ. (Japan) [6710-37]
- 9:20 am: **Tools for multimode quantum information: Modulation, detection, and spatial quantum correlations (Presentation Only)**, C. C. Harb, Univ. of New South Wales (Australia) and The Australian National Univ. (Australia) [6710-38]
- 9:45 am: **Quantum-enhanced phase estimation without entanglement**, G. J. Pryde, B. L. Higgins, Griffith Univ. (Australia); D. W. Berry, Macquarie Univ. (Australia); S. D. Bartlett, H. M. Wiseman, Griffith Univ. (Australia) ... [6710-39]
- 10:10 am: **Higher-order quantum interference and its applications to quantum metrology**, J. L. O'Brien, Univ. of Bristol (United Kingdom) [6710-40]
- 10:35 am: **Review of quantum optical communications and future devices evaluations**, S. Tsao, National Taiwan Normal Univ. (Taiwan); Q. Wang, L. Höglund, B. Noharet, Acreo AB (Sweden); M. Oane, F. Scarlat, A. Scarisoreanu, National Institute for Lasers, Plasma and Radiation Physics (Romania); W. Cheng, H. Tsao, National Taiwan Univ. (Taiwan) [6710-41]

Conference 6711 • Conv. Ctr. 30C

Wednesday-Thursday 29-30 August 2007 • Proceedings of SPIE Vol. 6711

Advanced Wavefront Control: Methods, Devices, and Applications V

Conference Chairs: **Richard A. Carreras**, Air Force Research Lab.; **John D. Gonglewski**, Air Force Research Lab.; **Troy A. Rhoadarmer**, Science Applications International Corp.

Program Committee: **Geoff P. Andersen**, U.S. Air Force Academy; **Jeffrey D. Barchers**, Science Applications International Corp.; **Leonid A. Beresnev**, Army Research Lab.; **Thomas G. Bifano**, Boston Univ.; **Philip J. Bos**, Kent State Univ.; **James M. Brase**, Lawrence Livermore National Lab.; **Keith A. Bush**, AgilOptics, Inc.; **David C. Dayton**, Applied Technology Associates; **Lewis F. DeSandre**, Office of Naval Research; **Sergey A. Dimakov**, S.I. Vavilov State Optical Institute (Russia); **Matthew E. Goda**, Air Force Institute of Technology; **Mark T. Gruneisen**, Air Force Research Lab.; **Gordon D. Love**, Univ. of Durham (United Kingdom); **Justin D. Mansell**, MZA Associates Corp.; **Dan K. Marker**, Air Force Research Lab.; **Kent L. Miller**, Air Force Office of Scientific Research; **Scot S. Olivier**, Lawrence Livermore National Lab.; **James F. Riker**, Air Force Research Lab.; **James R. Rotgé**, The Boeing Co.; **Darryl J. Sanchez**, The Univ. of New Mexico; **Don D. Seeley**, High Energy Laser Joint Technology Office; **Michael L. Shilko, Sr.**, ITT Industries, Inc.; **Vladimir Y. Venediktov**, Research Institute for Laser Physics (Russia)

Tuesday 28 August

**Adaptive Optics Technical Event and Panel
Marriott Coronado Tue. 8:00 to 10:00 pm**

Keynote speaker: **Olivier Guyon**, National Astronomical
Observatory of Japan/Subaru Telescope

See pg. 22 for details.

Wednesday 29 August

SESSION 1

Conv. Ctr. 30C Wed. 8:30 to 10:30 am

Image-Based Wavefront Sensing

Chairs: **James R. Rotgé**, The Boeing Co.; **Justin D. Mansell**, MZA
Associates Corp.

8:30 am: **Image-based wavefront-sensorless adaptive optics (Invited Paper)**, M. J. Booth, Univ. of Oxford (United Kingdom) [6711-01]

9:00 am: **Phase-diversity adaptive optics for future telescopes (Invited Paper)**, R. Paxman, B. Thelen, R. Murphy, K. Gleichman, J. A. Georges III, General Dynamics Advanced Information Systems [6711-02]

9:30 am: **The optical spatial heterodyne interferometric Fourier transform technique (SHIFT) and a resulting interferometer**, J. A. Georges III, General Dynamics Advanced Information Systems [6711-03]

9:50 am: **A high speed closed loop dual deformable mirror phase diversity testbed**, J. A. Georges III, P. Dorrance, K. Gleichman, J. Jonik, D. Liskow, General Dynamics Advanced Information Systems; V. I. Naik, Xoran Technologies, Inc.; S. Parker, R. Paxman, M. Warmuth, A. Wilson, T. Zaugg, General Dynamics Advanced Information Systems [6711-04]

10:10 am: **AI&T and calibration of a phase-diversity wavefront sensing and control testbed**, V. I. Naik, Xoran Technologies, Inc.; J. A. Georges III, P. Dorrance, K. Gleichman, J. Jonik, D. Liskow, S. Parker, R. Paxman, M. Warmuth, A. Wilson, T. Zaugg, General Dynamics Advanced Information Systems [6711-05]

Coffee Break 10:30 to 11:00 am

SESSION 2

Conv. Ctr. 30C Wed. 11:00 am to 12:50 pm

Advanced Hardware Techniques for Adaptive Optics I

Chairs: **Dan K. Marker**, Air Force Research Lab.; **David C. Dayton**,
Applied Technology Associates

11:00 am: **Low-cost high-speed control for adaptive optics (Invited Paper)**, C. D. Saunter, G. D. Love, Durham Univ. (United Kingdom) [6711-06]

11:30 am: **Characterization and closed-loop demonstration novel electro-static membrane mirror using COTS membranes**, D. C. Dayton, Applied Technology Associates; J. D. Mansell, MZA Associates Corp.; J. D. Gonglewski, Air Force Research Lab.; R. W. Praus II, MZA Associates Corp. [6711-07]

11:50 am: **Stabilization of the sodium beacon: a proposal to achieve full-sky coverage for laser guidestar adaptive optics**, D. J. Sanchez, Air Force Research Lab. [6711-08]

12:10 pm: **Actuator fault detection via electrical impedance testing**, R. M. Morgan, W. K. Wilkie, X. Bao, E. Sidick, Jet Propulsion Lab. [6711-09]

12:30 pm: **Closed-loop adaptive optics using a membrane-mirror-on-VLSI phase modulator: preliminary results**, T. L. Simpkins, C. Warde, Optron Systems, Inc. [6711-10]

Lunch Break 12:50 to 1:50 pm

SESSION 3

Conv. Ctr. 30C Wed. 1:50 to 2:50 pm

Advanced Hardware Techniques for Adaptive Optics II

Chairs: **Dan K. Marker**, Air Force Research Lab.; **David C. Dayton**,
Applied Technology Associates

1:50 pm: **Real time wave front transformation and correction**, L. Wu II, J. Zhang, B. Liu, Harbin Institute of Technology (China) [6711-11]

2:10 pm: **Atmospheric turbulence generator testbed for adaptive optical systems testing**, C. C. Wilcox, J. R. Andrews, S. R. Restaino, Naval Research Lab.; S. W. Teare, New Mexico Institute of Mining and Technology; T. Martinez, Air Force Research Lab.; D. M. Payne, Narrascope, Inc. [6711-12]

2:30 pm: **Open-loop performance of a MEMS reflective wavefront sensor**, J. R. Andrews, Naval Research Lab.; S. W. Teare, New Mexico Institute of Mining and Technology; S. R. Restaino, Naval Research Lab.; D. V. Wick, Sandia National Labs.; C. C. Wilcox, Naval Research Lab.; T. Martinez, Air Force Research Lab. [6711-13]

SESSION 4

Conv. Ctr. 30C Wed. 2:50 to 5:30 pm

Advanced Modeling and Simulation for Adaptive Optics

Chairs: **Lewis F. DeSandre**, Office of Naval Research; **John D. Goglewski**, Air Force Research Lab.

- 2:50 pm: **Wavefront-based stochastic parallel gradient descent beam control (Invited Paper)**, M. S. Belen'kii, V. A. Rye, H. Runyeon, Trex Enterprises Corp. [6711-14]
- 3:20 pm: **Numerical analysis of hybrid wavefront-based stochastic parallel gradient descent AO system for correcting beacon anisoplanatism and thermal blooming**, M. S. Belen'kii, V. A. Rye, H. Runyeon, Trex Enterprises Corp. [6711-15]
- Coffee Break 3:40 to 4:10 pm
- 4:10 pm: **An improved temporally phase-shifted SRI design**, T. M. Venema, Air Force Institute of Technology; J. D. Schmidt, Univ. of Dayton ... [6711-16]
- 4:30 pm: **Wavefront control toolbox for James Webb Space Telescope testbed**, S. Shiri, D. L. Aronstein, J. S. Smith, B. H. Dean, NASA Goddard Space Flight Ctr.; E. M. E. Sabatke, Ball Aerospace & Technologies Corp. [6711-17]
- 4:50 pm: **Novel wavefront sensor based on phase-shifting interferometry**, A. Khizhnyak, V. B. Markov, J. D. Trolinger, MetroLaser, Inc. [6711-18]
- 5:10 pm: **Arbitrary expected fringe producing by employing phase-only liquid crystal spatial light modulator**, J. Zhang, L. Wu II, B. Liu, Harbin Institute of Technology (China) [6711-19]

Thursday 30 August

SESSION 5

Conv. Ctr. 30C Thurs. 8:30 to 10:20 am

Multi-Conjugated Adaptive Optics Techniques

Chairs: **Darryl J. Sanchez**, The Univ. of New Mexico; **Troy A. Rhoadarmer**, Science Applications International Corp.

- 8:30 am: **Progress toward low-cost compact adaptive optics systems (Invited Paper)**, J. D. Mansell, R. W. Praus II, S. Coy, MZA Associates Corp. [6711-20]
- 9:00 am: **Implementation of a projection-on-constraints algorithm for beam intensity redistribution**, C. C. Beckner, Jr., Air Force Research Lab.; D. Oesch, Science Applications International Corp. [6711-21]
- 9:20 am: **Emulation of optical effects of atmospheric turbulence using two liquid-crystal spatial light modulators**, J. D. Schmidt, Univ. of Dayton; M. E. Goda, Air Force Institute of Technology; B. D. Duncan, Univ. of Dayton [6711-22]
- 9:40 am: **Linear analysis of closed-loop field conjugation by decentralized multi-conjugate adaptive optics**, L. H. Lee, Lockheed Martin Advanced Technology Ctr. [6711-23]
- 10:00 am: **MCAO: a case study**, J. M. Roche, P. J. Reardon, K. Pitalo, Univ. of Alabama in Huntsville; T. R. Rimmele, K. Richards, National Solar Observatory [6711-25]

Courses of Related Interest

See SPIE Cashier for information.

SC135 Adaptive Optics (Tyson) Tuesday 28, 8:30 am - 5:30 pm

SC134 Optical Design Fundamentals for Infrared Systems (Riedl) Sunday 26, 8:30 am - 5:30 pm

SC835 Infrared Systems - Technology & Design (Daniels) Tuesday/Wednesday 28-29, 8:30 am - 5:30 pm/8:30 am - 12:30 pm

Conference 6712 • Conv. Ctr. 30B

Sunday 26 August 2007 • Proceedings of SPIE Vol. 6712

Unconventional Imaging III

Conference Chairs: **Jean J. Dolne**, The Boeing Co.; **Victor L. Gamiz**, Air Force Research Lab.; **Paul S. Idell**, The Boeing Co.

Program Committee: **John F. Belsher**, The Optical Sciences Co.; **Keith A. Bush**, Intellite, Inc.; **Paul W. Fairchild**, Trex Enterprises; **James R. Fienup**, Univ. of Rochester; **Richard A. Hutchin**, Optical Physics Co.; **Charles L. Matson**, Air Force Research Lab.; **Paul F. McManamon**, Air Force Research Lab.; **Timothy J. Schulz**, Michigan Technological Univ.; **Marija Strojnik-Scholl**, Ctr. de Investigaciones en Óptica, A.C.; **Laura J. Ulibarri**, Air Force Research Lab.; **David G. Voelz**, New Mexico State Univ.

Sunday 26 August

SESSION 1

Conv. Ctr. 30B Sun. 8:30 to 10:10 am

Active Imaging

Chair: **Victor L. Gamiz**, Air Force Research Lab.

8:30 am: **Phase and frequency stability in synthetic aperture lidar**, T. J. Karr, J. H. Glezen, H. Lee, Northrop Grumman Corp. [6712-01]

8:50 am: **Signal-to-noise ratios of coherent imaging lidar**, T. J. Karr, Northrop Grumman Corp. [6712-02]

9:10 am: **Coherent lidar has double the phase**, T. J. Karr, Northrop Grumman Corp. [6712-13]

9:30 am: **Technical assessment of a 100W CW fiber laser amplifier for Fourier telescopy imaging**, X. J. Pan, D. W. Hult, Trex Enterprises Corp. [6712-19]

9:50 am: **Simulation and laboratory results from a multiple beam Fourier telescopy imaging experiment**, E. L. Cuellar, J. L. Stapp, D. P. Dimiduk, J. A. Cooper, P. W. Fairchild, Trex Enterprises Corp. [6712-24]

Coffee Break 10:10 to 10:40 am

SESSION 2

Conv. Ctr. 30B Sun. 10:40 am to 12:20 pm

Image Synthesis and Formation

Chair: **Jean J. Dolne**, The Boeing Co.

10:40 am: **Image synthesis from a series of coherent frames of pupil intensity**, J. D. Phillips, S. C. Cain, Air Force Institute of Technology [6712-04]

11:00 am: **Image formation by use of continuously self-imaging gratings**, G. Druart, N. Guérineau, R. Haïdar, J. Primot, ONERA (France) [6712-06]

11:20 am: **Hyper-spectral imaging using an optical fiber transition element**, B. C. Bush, L. J. Otten III, Photon Research Associates, Inc.; J. Schmoll, Univ. of Durham (United Kingdom) [6712-12]

11:40 am: **A comparative study of algorithms for radar imaging from gapped data**, X. Xu, Beihang Univ. (China); R. Luan, Beihang Univ. (China); L. Jia, Y. Huang, Beihang Univ. (China) [6712-11]

12:00 pm: **Estimating object shape from return flux measurements using a sinusoid beam dither method**, S. Avula, D. G. Voelz, S. P. Adepun, New Mexico State Univ.; G. W. Lukesh, S. Chandler, Nukove Scientific Consulting, LLC [6712-10]

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

SESSION 3

Conv. Ctr. 30B Sun. 1:20 to 3:10 pm

Image Processing

Chair: **Jean J. Dolne**, The Boeing Co.

1:20 pm: **Sampling artifacts, system design, and image processing (Invited Paper)**, G. C. Holst, JCD Publishing [6712-22]

1:50 pm: **New approaches to image super-resolution beyond the diffraction limit**, E. B. Barrett, Lockheed Martin Corp. [6712-07]

2:10 pm: **Digital and optical superresolution of low-resolution image sequences**, S. Prasad, The Univ. of New Mexico [6712-16]

2:30 pm: **Fourier image sharpness sensor for high-speed wavefront correction**, K. N. Walker, R. K. Tyson, The Univ. of North Carolina at Charlotte [6712-08]

2:50 pm: **Real time phase diversity and wavefront sensing**, J. J. Dolne, The Boeing Co. [6712-14]

Coffee Break 3:10 to 3:40 pm

SESSION 4

Conv. Ctr. 30B Sun. 3:40 to 5:00 pm

Algorithm Optimization

Chair: **Timothy J. Schulz**, Michigan Technological Univ.

3:40 pm: **Piston phase error due to bending of delivery fiber**, X. J. Pan, D. W. Hult, Trex Enterprises Corp. [6712-23]

4:00 pm: **Maximum a-posteriori estimation of detector array non-uniformity and shift in sequences of short exposure images**, D. C. Dayton, Applied Technology Associates; J. D. Gonglewski, Air Force Research Lab. . . [6712-03]

4:20 pm: **Evolutionary optimization of graphical models for robust fingerprinting of objects and behavior recognition in video imagery**, S. Medasani, Y. Owechko, HRL Labs., LLC [6712-20]

4:40 pm: **Swarm optimization methods for cognitive image analysis**, Y. Owechko, S. Medasani, HRL Labs., LLC [6712-21]

All-Conference Plenary Session

Conv. Ctr. Ballroom 20A Sun. 6:00 to 7:30 pm

6:00 pm: **Technology to Enable our Solar Technology Future**, Danielle Merfeld, GE Global Research

6:45 pm: **The Concept of the Photon - Updated**, Marlan O. Scully, Texas A&M Univ. and Princeton Univ.

See pg. 13 for presentation overviews.

Monday 27 August

✓ Posters-Monday

Conv. Ctr. Ballroom 20C/D Mon. 6:00 to 7:30 pm

Poster authors will begin displaying posters after 10:00 am Monday morning. A poster session, with authors present at their posters, will be held Monday evening from 6:00 to 7:30 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Monday. Poster presenters who have not set up by 5:00 pm on Monday 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.

✓ **Range estimation based on multiple imaging**, Q. Yang, L. Liu, D. Liu, Z. Luan, Shanghai Institute of Optics and Fine Mechanics (China) . . [6712-09]

Course of Related Interest

See SPIE Cashier for information.

SC135 Adaptive Optics (Tyson) Tuesday 28, 8:30 am - 5:30 pm

Conference 6713 • Conv. Ctr. 30B

Monday-Tuesday 27-28 August 2007 • Proceedings of SPIE Vol. 6713

Nanophotonics and Macrophotonics for Space Environments

Conference Chairs: **Edward W. Taylor**, International Photonics Consultants, Inc.; **David A. Cardimona**, Air Force Research Lab.

Program Committee: **Mansoor Alam**, Nufern; **Natalie Clark**, NASA Langley Research Ctr.; **Richard O. Claus**, Virginia Polytechnic Institute and State Univ.; **Douglas M. Craig**, Air Force Research Lab.; **Raluca Dinu**, Lumera Corp.; **Alexandre I. Fedoseyev**, CFD Research Corp.; **Michael J. Hayduk**, Air Force Research Lab.; **Dan-Hong Huang**, Air Force Research Lab.; **James E. Nichter**, Air Force Research Lab.; **Melanie N. Ott**, NASA Goddard Space Flight Ctr.; **Narasimha S. Prasad**, NASA Langley Research Ctr.; **Anthony D. Sanchez**, Air Force Research Lab.; **Robert C. Stirbl**, Jet Propulsion Lab.

Monday 27 August

Welcome and Introductions

Conv. Ctr. 30B Mon. 8:25 to 8:30 am

Edward W. Taylor, International Photonics Consultants, Inc.

SESSION 1

Conv. Ctr. 30B Mon. 8:30 to 10:05 am

Polymer/Organic Materials and Components for Space Environments

Chair: **Raluca Dinu**, Lumera Corp.

8:30 am: **Optical signal processor operating at wavelength of 1.55 um using electro-optic polymer waveguides**, B. Seo, S. K. Kim, H. R. Fetterman, Univ. of California/Los Angeles; D. Jin, R. Dinu, Lumera Corp. [6713-01]

8:50 am: **Record high intrinsic hyperpolarizabilities for polymeric electro-optic modulators (Invited Paper)**, K. J. Clays, J. Perez-Moreno, Katholieke Univ. Leuven (Belgium); M. G. Kuzyk, Washington State Univ.; Y. Zhao, Technical Institute of Physics and Chemistry (China) [6713-02]

9:15 am: **Advances in semiconducting polymer lasers (Invited Paper)**, I. D. W. Samuel, G. A. Turnbull, Univ. of St. Andrews (United Kingdom) .. [6713-03]

9:40 am: **Supramolecular photonics: molecular self-assembly and controlled lattice hardening for electro-optic coefficients beyond 450 pm/V (Invited Paper)**, A. K. Jen, J. Luo, T. Kim, Z. Shi, Y. Cheng, S. Jang, S. Huang, X. Zhou, B. Polishak, L. R. Dalton, B. H. Robinson, P. Sullivan, Univ. of Washington; N. N. Peyghambarian, R. Norwood, College of Optical Sciences/The Univ. of Arizona; W. H. Steier, Univ. of Southern California; D. Jin, R. Dinu, Lumera Corp. [6713-04]

Coffee Break 10:05 to 10:35 am

SESSION 2

Conv. Ctr. 30B Mon. 10:35 am to 12:00 pm

Nano-Polymer Materials and Components in Space Radiation Environments I

Chair: **Natalie Clark**, NASA Langley Research Ctr.

10:35 am: **DARPA's supermolecular photonics engineering program (MORPH) (Keynote)**, D. K. Shenoy, Defense Advanced Research Projects Agency [6713-05]

11:15 am: **Fusion of nanoparticles with organic-polymers for radiation hardening and shielding applications**, E. W. Taylor, International Photonics Consultants, Inc. [6713-06]

11:35 am: **Hardening of polymer optical materials with laser cycling and gamma-rays (Invited Paper)**, M. G. Kuzyk, Washington State Univ.; E. W. Taylor, International Photonics Consultants, Inc.; N. B. Embaye, Y. Zhu, J. Zhou, Washington State Univ. [6713-07]

Lunch Break 12:00 to 1:00 pm

SESSION 3

Conv. Ctr. 30B Mon. 1:00 to 3:15 pm

Nano-Polymer Materials and Components in Space Radiation Environments II

Chair: **Alexandre I. Fedoseyev**, CFD Research Corp.

1:00 pm: **Radiation effects in quantum dot superlattices and their physical 3D modeling (Invited Paper)**, A. I. Fedoseyev, A. Raman, M. Turowski, CFD Research Corp. [6713-08]

1:25 pm: **Modeling-based optimization of the photovoltaic quantum dot superlattices**, Q. Shao, A. A. Balandin, E. P. Pokatilov, D. L. Nika, Univ. of California/Riverside; A. I. Fedoseyev, M. Turowski, CFD Research Corp. [6713-09]

1:45 pm: **Novel hybrid electro-optic modulators with horizontal taper structure**, G. Yu, B. Li, D. Jin, L. Zheng, Y. Fang, R. Dinu, Lumera Corp. [6713-10]

2:05 pm: **Discrete carbon nanotube photonic devices for space applications (Invited Paper)**, K. Bosnick, National Institute for Nanotechnology (Canada) [6713-11]

2:30 pm: **In-situ monitoring of slow light structures in dye-doped polymer waveguide materials**, E. M. McKenna, Jr., A. Lin, A. R. Mickelson, Univ. of Colorado/Boulder [6713-12]

2:50 pm: **Experimental research on radiation induced changes of polymer optical fiber under gamma-ray irradiation (Invited Paper)**, W. Ge, Xinjiang University (China) [6713-13]

Coffee Break 3:15 to 3:45 pm

SESSION 4

Conv. Ctr. 30B Mon. 3:45 to 5:15 pm

Photonics Technology for Space Applications I

Chair: **Narasimha S. Prasad**, NASA Langley Research Ctr.

3:45 pm: **Space qualification issues in acousto-optic and electro-optic devices (Invited Paper)**, N. S. Prasad, NASA Langley Research Ctr.; E. W. Taylor, International Photonics Consultants, Inc.; S. B. Trivedi, J. I. Soos, Brimrose Corp. of America [6713-14]

4:10 pm: **Advanced optical technologies for space exploration (Invited Paper)**, N. Clark, NASA Langley Research Ctr. [6713-15]

4:35 pm: **Sensor and actuator ASICs for space missions**, D. Kerns, Sigenics, Inc. [6713-16]

4:55 pm: **Tunable liquid crystal filters for space exploration**, C. Crandall, High Chiva Systems, Inc.; N. Clark, P. Davis, NASA Langley Research Ctr. [6713-18]

Conference 6713 • Conv. Ctr. 30B

Tuesday 28 August

Welcome and Introductions

Conv. Ctr. 30B **Tues. 8:35 to 8:40 am**

David A. Cardimona, Air Force Research Lab.

SESSION 5

Conv. Ctr. 30B **Tues. 8:40 am to 12:00 pm**

Novel Photonic Devices and Concepts for Space-Based Applications

Chair: Dan-Hong Huang, Air Force Research Lab.

8:40 am: **Integrated multi-modal sensing (Keynote)**, K. C. Reinhardt, Air Force Office of Scientific Research [6713-19]

9:20 am: **A quantum dot longwave infrared photodetector with integrated optical amplifier**, X. Lu, Univ. of Massachusetts/Lowell; M. J. Meisner, Raytheon Missile Systems [6713-20]

9:40 am: **A longwave infrared transparent conductive coating by printing or spraying at room temperature**, X. Lu, Univ. of Massachusetts/Lowell; X. Han, Brewer Science, Inc. [6713-21]

Coffee Break 10:00 to 10:30 am

10:30 am: **Nanophotonic structure for enhancing infrared detection (Invited Paper)**, S. Lin, C. Chang, A. Chang, Rensselaer Polytechnic Institute; D. Huang, Air Force Research Lab. [6713-22]

10:55 am: **The darkest manmade material: nanostructure and randomness (Invited Paper)**, S. Lin, Z. Yang, L. Ci, J. A. Bur, P. M. Ajayan, Rensselaer Polytechnic Institute [6713-23]

11:20 am: **Improving SNR of fiber Bragg grating sensor by digital signal processing**, J. Ning, Y. Zhang, H. Cui, Stevens Institute of Technology [6713-24]

11:40 am: **Plasmon assisted photonic crystal quantum dot sensors**, R. V. Shenoi, Ctr. for High Technology Materials; J. Rosenberg, California Institute of Technology; D. A. Ramirez, Y. D. Sharma, R. Allaturi, The Univ. of New Mexico; O. J. Painter, California Institute of Technology; S. Krishna, The Univ. of New Mexico [6713-25]

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

SESSION 6

Conv. Ctr. 30B **Tues. 1:30 to 3:10 pm**

Photonics Technology for Space Applications II

Chair: Melanie N. Ott, NASA Goddard Space Flight Ctr.

1:30 pm: **Requirements validation testing on the 7 optical fiber array connector/cable assemblies for the lunar reconnaissance orbiter (LRO) (Invited Paper)**, M. N. Ott, X. Jin, NASA Goddard Space Flight Ctr.; F. V. LaRocca, MEI Technologies, Inc.; A. J. Matuszeski, NASA Goddard Space Flight Ctr.; R. F. Chuska, S. L. Macmurphy, MEI Technologies, Inc. . . [6713-26]

2:00 pm: **Investigation of radiation-induced photodarkening in passive erbium-, ytterbium-, and Yb/Er co-doped optical fibers**, B. P. Fox, K. Simmons-Potter, J. H. Simmons, The Univ. of Arizona; W. J. Thomes, Jr., R. P. Bambha, D. A. V. Kliner, Sandia National Labs. [6713-27]

2:20 pm: **Space flight qualification on a novel five-fiber array assembly for the lunar orbiter laser altimeter (LOLA) at NASA Goddard Space Flight Center**, X. Jin, M. N. Ott, NASA Goddard Space Flight Ctr.; F. V. LaRocca, R. F. Chuska, MEI Technologies, Inc.; S. M. Schmidt, A. J. Matuszeski, NASA Goddard Space Flight Ctr.; S. L. Macmurphy, MEI Technologies, Inc. [6713-28]

2:40 pm: **Investigation of hermetically sealed COTS LiNbO3 optical modulator for use in laser/lidar space-flight applications (Invited Paper)**, F. V. LaRocca, Muniz Engineering, Inc.; M. N. Ott, X. Jin, NASA Goddard Space Flight Ctr.; J. S. Canham, Swales Aerospace; R. F. Chuska, S. L. Macmurphy, Muniz Engineering, Inc.; T. L. Jamison, NASA Goddard Space Flight Ctr. [6713-29]

Coffee Break 3:10 to 3:40 pm

SESSION 7

Conv. Ctr. 30B **Tues. 3:40 to 4:50 pm**

Photonics Technology for Space Applications III

Chair: Robert C. Stirbl, Jet Propulsion Lab.

3:40 pm: **Waveguide PPLN second harmonic generator for NASA's space interferometry mission (SIM) (Invited Paper)**, D. Chang, I. Poberezhskiy, J. Mulder, Jet Propulsion Lab. [6713-30]

4:10 pm: **Compact electro-optic imaging Fourier transform spectrometer**, T. Chao, Jet Propulsion Lab. [6713-31]

4:30 pm: **Silicon-on-sapphire fiber optic transceiver technology for space applications**, C. Kuznia, Ultra Communications, Inc. [6713-33]

Courses of Related Interest

See SPIE Cashier for information.

SC497 Nanophotonics (Prasad) Sunday 26, 1:30 - 5:30 pm

Conference 6714 • Conv. Ctr. 31C

Thursday 30 August 2007 • Proceedings of SPIE Vol. 6714

Adaptive Coded Aperture Imaging and Non-Imaging Sensors

Conference Chairs: **David P. Casasent**, Carnegie Mellon Univ.; **Timothy Clark**, Defense Advanced Research Projects Agency

Program Committee: **David J. Brady**, Duke Univ.; **Michael T. Eismann**, Air Force Research Lab.; **Stephen R. Gottesman**, Northrop Grumman Corp.; **Abhijit Mahalanobis**, Lockheed Martin Missiles and Fire Control; **Mark A. Neifeld**, The Univ. of Arizona; **Demetri Psaltis**, California Institute of Technology; **Stanley Rogers**, Air Force Research Lab.; **Christopher W. Slinger**, QinetiQ (United Kingdom); **Nikola S. Subotic**, Michigan Tech Research Institute; **Rebecca A. Wilson**, QinetiQ (United Kingdom)

Wednesday 29 August

✓ Posters-Wednesday

Conv. Ctr. Ballroom 20C/D Wed. 5:30 to 7:00 pm

Poster authors will begin displaying posters after 10:00 am Wednesday morning. A poster session, with authors present at their posters, will be held Wednesday evening from 5:30 to 7:00 pm. Light refreshments will be served.

Poster Setup

Poster presenters may set up their posters between 10:00 am and 5:00 pm on Wednesday. Poster presenters who have not set up by 5:00 pm on Wednesday 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.

✓ **Interferometric control of contact line, shape, and aberrations of liquid lens**, I. G. Voitenko, R. F. Storm, R. T. Westfall, Eclipse Energy Systems, Inc.; S. Rogers, Air Force Research Lab. [6714-14]

Thursday 30 August

SESSION 1

Conv. Ctr. 31C Thurs. 8:30 to 10:00 am

Imaging and Non-Imaging Sensors Needs

Chairs: **Timothy Clark**, Defense Advanced Research Projects Agency; **David P. Casasent**, Carnegie Mellon Univ.

8:30 am: **Challenges in the evolution of advanced imaging systems (Keynote)**, K. L. Lewis, QinetiQ (United Kingdom) [6714-01]

9:00 am: **DARPA interest in diffractive sensors (Invited Paper)**, T. Clark, Defense Advanced Research Projects Agency [6714-02]

9:30 am: **Imaging sensors with extreme form factors (Invited Paper)**, R. A. Athale, MITRE Corp. [6714-03]

Coffee Break 10:00 to 10:20 am

SESSION 2

Conv. Ctr. 31C Thurs. 10:20 am to 12:00 pm

Imaging and Non-Imaging Diffractive System Concepts

Chair: **Stephen R. Gottesman**, Northrop Grumman Corp.

10:20 am: **Coded apertures: past, present and future application and design**, S. R. Gottesman, Northrop Grumman Corp. [6714-04]

10:40 am: **Agile, detecting and discriminating, infrared electro-optical system (ADDIOS) application to coded aperture imaging and non-imaging sensor systems**, M. A. Gutin, Applied Science Innovations, Inc.; S. Rogers, Air Force Research Lab.; O. N. Gutin, X. Wang, Applied Science Innovations, Inc.; D. Warner, J. Gueits, Air Force Research Lab. [6714-05]

11:00 am: **Large-scale optical lensless imaging with geometric fibre constructs**, A. F. Abouraddy, Y. Fink, Massachusetts Institute of Technology [6714-06]

11:20 am: **An investigation into the potential use of high resolution, adaptive coded aperture systems, in the mid-wave infrared**, C. W. Slinger, N. Gordon, M. E. McNie, D. Payne, K. Ridley, M. Strens, G. De Villiers, R. A. Wilson, QinetiQ Ltd. (United Kingdom); M. T. Eismann, Air Force Research Lab. [6714-07]

11:40 am: **Beam steering and pointing with counter-rotating grisms**, C. W. Chen, Raytheon Space and Airborne Systems [6714-08]

Lunch/Exhibition Break 12:00 to 1:20 pm

SESSION 3

Conv. Ctr. 31C Thurs. 1:20 to 3:00 pm

Diffractive Imaging Hardware

Chair: **Stanley Rogers**, Air Force Research Lab.

1:20 pm: **Single-disperser design for snapshot coded aperture spectral imaging**, A. A. Wagadarikar, R. John, R. Willett, Duke Univ.; T. J. Schulz, Michigan Technological Univ.; M. Gehm, The Univ. of Arizona; D. J. Brady, Duke Univ. [6714-10]

1:40 pm: **Reconfigurable mask for adaptive coded aperture imaging based on an addressable MOEMS microshutter array**, M. E. McNie, D. Combes, G. Smith, N. Price, K. Brunson, QinetiQ Ltd. (United Kingdom); K. L. Lewis, Sciovis Ltd. (United Kingdom); C. W. Slinger, QinetiQ Ltd. (United Kingdom); S. Rogers, Air Force Research Lab. [6714-11]

2:00 pm: **Dynamic aperture optical arrays based on polymeric MEMS actuators for large scale coding elements with application in visible to MWIR**, S. H. Goodwin, J. Carlson, B. Stoner, RTI International; D. J. Brady, C. Kim, J. Kim, Duke Univ.; S. Rogers, Air Force Research Lab. [6714-12]

2:20 pm: **IR performance study of an adaptive coded aperture "diffractive imaging" system employing MEMS "eyelid shutter" technologies**, A. Mahalanobis, Lockheed Martin Missiles and Fire Control; S. Rogers, Air Force Research Lab.; D. J. Brady, Duke Univ. [6714-13]

2:40 pm: **Eclipse SteerTech™ liquid lenslet beam steering technology**, R. T. Westfall, Eclipse Energy Systems, Inc.; S. Rogers, Air Force Research Lab.; K. C. Shannon III, Eclipse Energy Systems, Inc. [6714-15]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Conv. Ctr. 31C Thurs. 3:30 to 5:10 pm

Imaging and Non-Imaging Algorithms

Chair: **Nikola S. Subotic**, Michigan Tech Research Institute

3:30 pm: **System models for IR diffractive optical systems based on a coherence theoretic framework**, N. S. Subotic, Michigan Tech Research Institute; M. T. Eismann, Air Force Research Lab.; C. Roussi, Michigan Tech Research Institute; J. Meola, Air Force Research Lab. [6714-16]

3:50 pm: **Optimum orthogonal binary coded apertures for object recognition (Invited Paper)**, D. C. Braunreiter, Science Applications International Corp. [6714-17]

4:20 pm: **DAZLE: a new approach to adaptive imaging (Invited Paper)**, R. L. Kellogg, Argon ST, Inc.; M. J. Escuti, North Carolina State Univ. [6714-18]

4:50 pm: **Compressive imaging using shift invariant coded PSFs**, D. J. Brady, Duke Univ.; R. Coifman, Plain Sight Systems, Inc.; M. Maggioni, R. Willett, Duke Univ.; A. Mahalanobis, Lockheed Martin Missiles and Fire Control; N. Pitsianis, Duke Univ. [6714-19]

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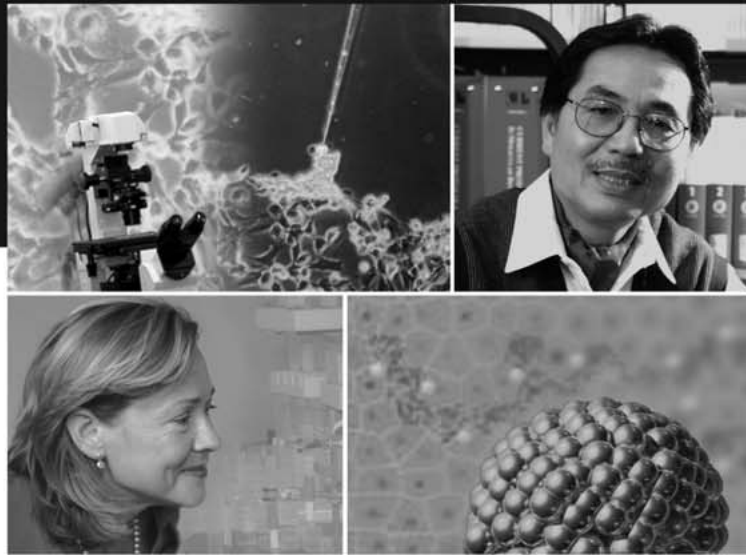
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General Information

Registration Hours

Convention Center, Hall D Lobby

Sunday 26 August 7:00 am to 5:00 pm
Monday 27 August 7:15 am to 5:00 pm
Tuesday 28 August 7:30 am to 5:00 pm
Wednesday 29 August 7:30 am to 5:00 pm
Thursday 30 August 7:45 am 4:00 pm

Proceedings and CD-ROMs as part of a registration include tax and shipping. Proceedings and CD-ROM's purchased separately do not include shipping or taxes.

SPIE members receive 15% off conference and course registration fees.

Exhibition

Tuesday 28 August 10:00 am to 5:00 pm
Wednesday 29 August 10:00 am to 5:00 pm
Thursday 30 August 10:00 am to 2:00 pm

Admission is included in your conference, course or workshop fees.

Speaker Check In Desk / Preview Station

Convention Center, Upper Level, Room 27 Lobby

Sunday 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.

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, short 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 SPIE Audiovisual 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 on-site company representatives. Individuals not complying with this policy will be asked to surrender their film and to leave the exhibit hall.

Poster Sessions

Convention Center Ballroom 20C/D

Monday 27 August 6:00 to 7:30 pm
Tuesday 28 August 8:00 to 10:00 pm
Wednesday 29 August 5:30 to 7:00 pm

Poster Setup

Poster presenters may set up between 10:00 am and 3:00 pm on the day of their assigned presentation. Poster presenters who have not set up by 4:30 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.

SPIE Guest Hospitality Suite

San Diego Marriott Hotel and Marina, SPIE Suite

Monday-Thursday, 27-30 August 8:30 to 10:00 am

Guests of attendees are invited to meet, relax, and enjoy a cup of coffee and breakfast breads in SPIE's Guest Hospitality Suite. This suite is for guests of attendees only. The hotel concierge will be available during a portion of this time to answer travel, shopping, and tourist questions.

SPIE Marketplace

Located in the Convention Center, Upper Level Ballroom Lobby

The SPIE Marketplace is your source for the latest SPIE Press books, Proceedings, and Educational and Professional Development materials. You can become a member of SPIE, explore the Digital Library, and take home a souvenir.

Course Materials Desk

Convention Center, Hall D Lobby

Open during Registration hours

If you have registered to attend a course, please stop by the Course Materials Desk AFTER you pick up your badge, to obtain your course notes and to find out where the class will be located. You may also get a copy of the latest Education Services catalog to see the many courses SPIE has available at symposia, on video and CD-ROM, and to discover the opportunities of customized In-Company courses.

Cashier and Badge Corrections

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. Please have your badge removed from the badge holder, marked with your changes, and ready to hand to the attendant upon approaching the counter.

Support of Green Meetings

SPIE supports the efforts of The San Diego Convention Center Corporation (SDCCC) in its commitment to encourage sustainable practices. We invite Optics + Photonics attendees to help minimize the impact of our large meeting by seeking out clearly marked bins throughout the building for mixed recyclables (paper, plastic, aluminum, glass). The bins are collected daily and recycled appropriately. Complete information about SDCCC efforts can be found at <http://www.visitsandiego.com/meetingplanners/greenmeetings.cfm>

General Information

SPIEWorks Career Fair

Special 2-Day Event!

Exhibition Hall D

Tuesday 28 August 11:00 am to 3:00 pm

Wednesday 29 August 11:00 am to 3:00 pm

Job Seekers

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

- Get 'face-to-face' time with employers and interview on the spot
- Learn more about the jobs available in our industry
- Network
- Post your resume online today! Visit SPIEworks.com

All SPIEWorks services are free to individuals seeking employment.

Employers

Don't Miss This Recruiting Opportunity—hire top talent at Optics + Photonics.

SPIEWorks offers a customized recruitment package in conjunction with this conference. A typical Career Fair package includes:

- 2 x 6 draped table
- Job postings on the SPIEWorks website
- Resume access (includes data on who plans to attend the conference)
- A display banner on the homepage to promote your recruiting effort
- Promotion of your company on signage and in show programs.

For more information, contact Dave Baggenstos at 360.715.3705 or email sales@SPIEworks.com. Reserve your space today!

Internet Pavilion

Convention Center Hall E Lobby

Sponsored by  **Newport**
Experience | Solutions

SPIE will have a complimentary Internet Pavilion at the meeting site on Sunday through Thursday where attendees can use provided workstations or hook up their laptop to an Ethernet connection to access the Internet.

Complimentary Internet Wireless Access

Convention Center Upper Level Lobby

Sponsored by  **Newport**
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SPIE is pleased to provide complimentary wireless access to the Internet for all conference attendees bringing 802.11b wireless-enabled laptops or PDAs.

Properly secure your computer before accessing the public wireless network. Failure to do so may allow unauthorized access to your laptop as well as potentially introduce viruses to your computer and/or presentation.

Media Center

Convention Center Upper Level Ballroom Lobby

The on-site Media Center provides media representatives with conference space, refreshments, convenient one-stop-shopping for press releases, and allows news to be communicated via phone, and high-speed internet connections. For more information about SPIE media services, see SPIE.org/resources.

SPIE Copy Center

Convention Center Hall D Lobby

Sunday 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.

Business Center

FedEx Kinko's is the in-house business center for the San Diego Convention Center. It is located inside Lobby D. The company provides small package FedEx shipping, packing supplies, color copying services, fax services and office supplies. Phone (619) 525-5450, Fax (619) 525-5477. Email usa1324@fedexkinkos.com.

SPIE Message Center

Convention Center Hall E Lobby

The SPIE Message Center telephone number is (619) 525-6200. Messages will be taken during registration hours Sunday through Thursday. Please check the message board at the message center near SPIE registration daily to receive your messages.

Luggage/Package Storage and Coat Check

Convention Center Lobby D0

Sunday 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.

Coffee Breaks

Complimentary coffee will be served twice each day of the conference at approximately 10:00 am and 3:00 pm. Please check the individual technical conference listings for exact times and locations.

Refreshment Purchases

For attendee purchase of light refreshments, including continental breakfast, specialty carts will be set up throughout the Convention Center Sunday through Thursday.

Cash Lunches and Exhibition Concessions

A cash sandwich bar will be available in the Convention Center at the Ballroom Lobby on Sunday and Monday from 11:30 am to 2:00 pm.

Visit the Café Express located in the back of the exhibition halls on Tuesday, Wednesday, and 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 11:00 am to 2:00 pm.

Free Popcorn

Popcorn carts will be located in Exhibition Hall D and will be open from 11:00 am to 2:00 pm Tuesday through Thursday.

Desserts

Exhibition Halls D&E

Tuesday and Wednesday

Dessert snacks will be served from 3:00 to 3:30 pm. Complimentary tickets for the dessert snacks will be included in attendee registration packets.



SPIE Connecting minds
Advancing light.



Innovation at Work

Make your work part of the world's largest collection of research on emerging applications. Be among those in the international scientific community who are building the future through discovery and innovation in these technical areas:

- ▶ Nanotechnology
- ▶ Solar and Alternative Energy
- ▶ Illumination Engineering
- ▶ Photonic Devices
- ▶ Organic Materials
- ▶ Optical Engineering and Instrumentation

Connect with others in the field by participating at Optics + Photonics 2008.

10–14 August 2008
Exhibition: 12–14 August 2008

San Diego Convention Center
San Diego, California, USA

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spie.org/events/op

General Information

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 Audiovisual 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 Exhibition 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.

Child Care Services

The San Diego Marriott Hotel & Marina does not provide child care services, however, a child sitting service available in San Diego and recommended by the San Diego Marriott Hotel & Marina is: Marion's Child Care, email amy@hotelchildcare.com, within San Diego call (619) 303-4379, or 1-888-891-5029, www.hotelchildcare.com

SPIE does not imply an endorsement or recommendation of this service. It is provided on an "information only" basis for your further analysis and decision. Other services may be available.

No Suitcasing Policy

Suitcasing is the act of soliciting business in the aisles during the exhibition or in other public spaces, including another company's booth or a hotel lobby.

Please note that while all meeting attendees are invited to the exhibition, any attendee who is observed to be soliciting business in the aisles or other public spaces, in another company's booth, or in violation of any portion of SPIE Exhibition Policy will be asked to leave immediately. Additional penalties may be applied. Please report any violations you may observe to show management.

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.

Restaurant Reservations and Information Desk

The San Diego CC Corporation operates a Restaurant Reservations and Information Desk in the Hall B lobby of the CC. The desk will be staffed Sunday through Thursday, during the convention from 9:00 am to 6:00 pm. If you wish to pre-plan your individual or group dining arrangements, you may call Laurie Peters at 619-525-5291.

Parking

(Note: All rates are subject to change)

At San Diego Convention Center

For underground parking, the CC parking entrance is at the north end of Harbor Drive off Convention Center Way. A special convention parking rate of \$8 per day will be in effect at the San Diego CC for the duration of the meeting. However, please note that parking rates are subject to change and during Padre baseball season, parking rates increase by \$10 during home games. Exhibitors may purchase a parking permit at the parking office inside the garage which allows in and out privileges for move-in/move-out days only. Exhibitors should purchase their \$8 parking ticket at the gate, proceed to the parking office inside, hand in the \$8 parking ticket along with an additional \$4 to receive the \$12 Parking Pass (with in & out privileges only on move-in/move-out days). Exhibitor badge ID is necessary to obtain the permit. They are open from 5am to 11:00 pm, with no overnight parking. For further information contact Ace Parking at 619-237-0399.

At applicable hotels, Hotel Guest Parking:

San Diego Marriott Hotel & Marina

For guests: Self \$19, Valet \$25

Non-Guests: Self \$20, Valet \$28

Holiday Inn On The Bay

For guests: Self \$20, Valet \$24

Non-Guests pay regular posted parking rate.

The Sofia Hotel

Valet only: \$25

San Diego Marriott Gaslamp Quarter

Valet only: \$26

Omni San Diego Hotel

Self \$14, Valet \$26

Town And Country Resort & CC

Self \$7

Holiday Inn Express (Formerly Quality Inn & Suites)

Self: \$12

Comfort Inn

Self: \$12

Parking in Downtown San Diego

Directly across the street at the east end of the Center is a 2,000 space parking structure.

Metered street parking is available in some areas. Parking meters are enforced Monday through Saturday, from 8 a.m. until 6 p.m., unless otherwise posted. Metered spots are free on Sunday and designated holidays. Meters accept nickels, dimes, quarters, and prepaid electronic debit cards.

<http://www.sandiego.gov/parkingmanagement/enforcement/cards.shtml>

For more information:

- Gaslamp Quarter Parking Information

<http://www.gaslamp.org/>

- City of San Diego Special Events Parking information <http://www.sandiego.gov/eventsparking/index.shtml>

Car Rental



Hertz Car Rental has been selected as the official car rental agency for this Symposium. To reserve a car, identify yourself as an Optics & Photonics Conference attendee using the Hertz Meeting Code CV# 029B0010. Call 1 (800) 654-2240.

Travel Information

THE HEADQUARTERS HOTEL FOR THE SPIE SAN DIEGO SYMPOSIUM IS THE:

1. SAN DIEGO MARRIOTT HOTEL & MARINA

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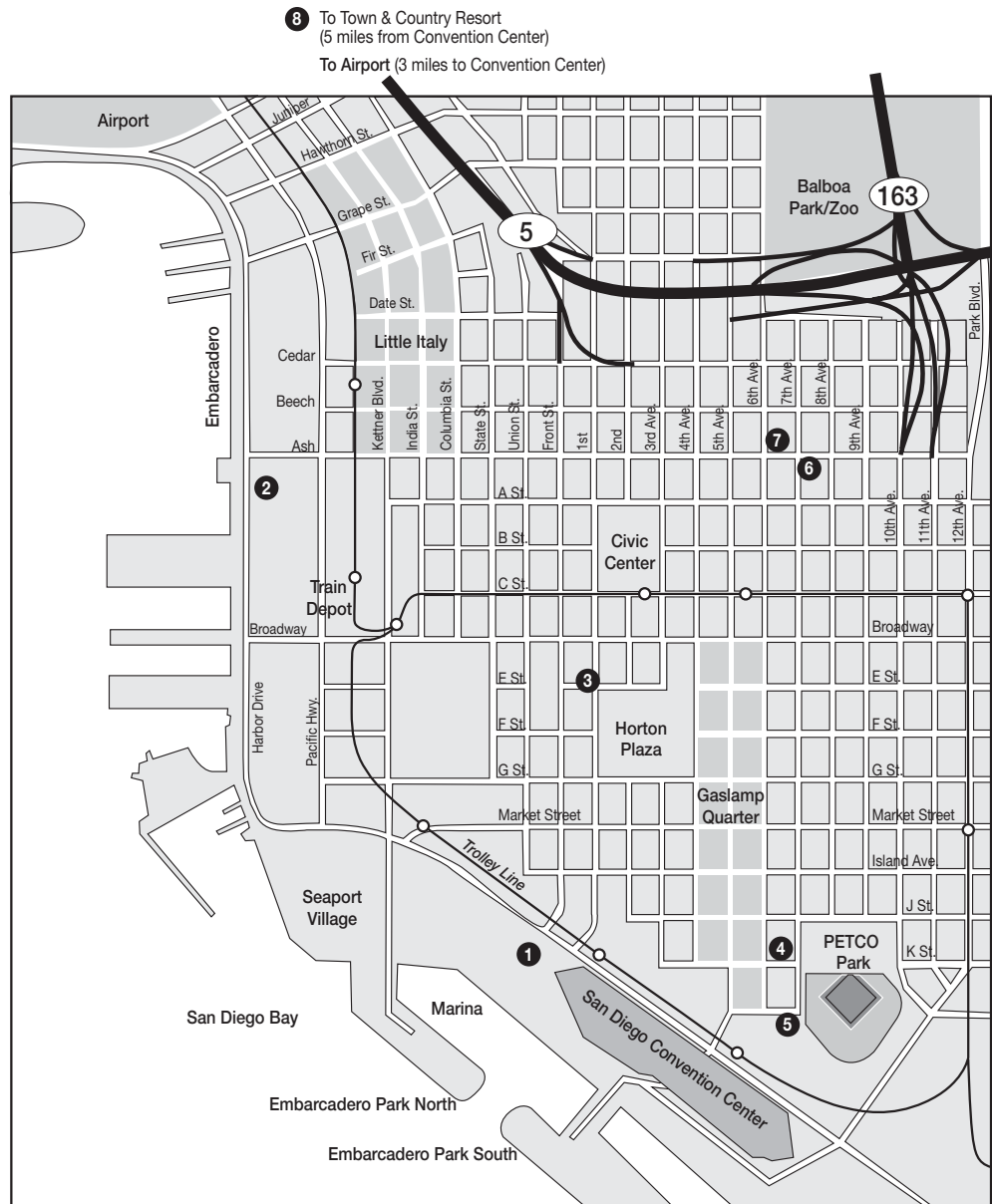
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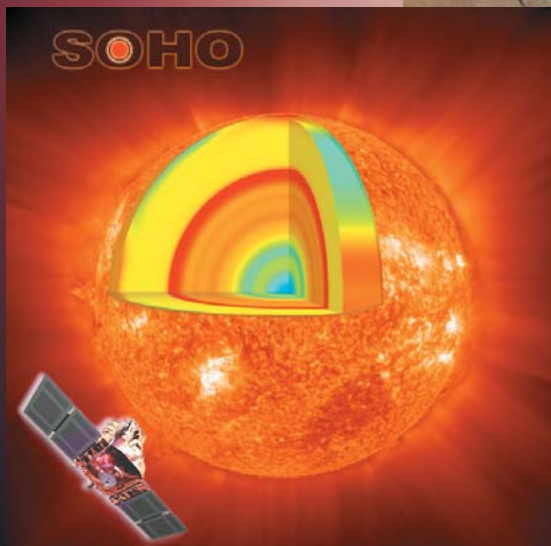
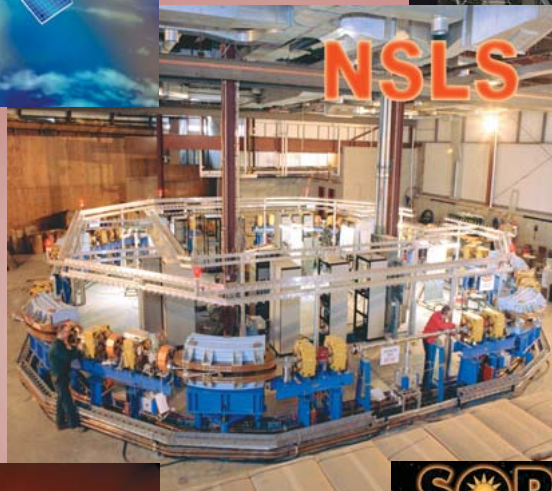


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