

# SYMPOSIUM PROGRAM

## 2013 SID INTERNATIONAL SYMPOSIUM

**May 21-24, 2013 (Tuesday – Friday)**  
**Vancouver Convention Centre**  
**Vancouver, British Columbia, Canada**

### Session 1: Annual SID Business Meeting

Tuesday, May 21, 2013/ 8:00 – 8:20 am / Ballroom C/D

### Session 2: Opening Remarks / Keynote Addresses

Tuesday, May 21, 2013 / 8:20 - 10:20 am / Ballroom C/D

- 2.1: **Keynote 1: Displays and Innovation: An Exciting Future**  
*Dr. Kinam Kim, President & CEO, Samsung Display Co., Chungcheongnam-do, Korea*
- 2.2: **Keynote 2: The Social Life of Devices**  
*Mr. Bill Buxton, Principal Researcher, Microsoft Research, Microsoft Corp., Redmond, WA, USA*
- 2.3: **Keynote 3: Exciting Developments in Oxide TFT Technology**  
*Professor John Wager, Oregon State University, Corvallis, OR, USA*

### Session 3: Autostereoscopic and Multi-View I (3D/Display Systems)

Tuesday, May 21, 2013, / 10:50 - 11:50 am / Ballroom A

**Chair:** Kälil Kälântär, Global Optical Solution

**Co-Chair:** Jean-Pierre Guillou, Apple, Inc.

- 3.1: **A Novel Architecture for Autostereoscopic 2D/3D Switchable Display Using Dual-Layer OLED Backlight Module**  
*Yi-Jun Wang, Shanghai Jiao Tong University, Shanghai, China*
- 3.2: **Application of a Flexible LCD in a High Resolution Switchable Autostereoscopic 3D Display**  
*Shiuan-lou Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 3.3: **Optimized Parallax Control of 3D Images on an Autostereoscopic Display**  
*Takefumi Hasegawa, NLT Technologies, Ltd., Kanagawa, Japan*

### Session 4: Oxide TFTs I (Oxide TFTs/Active-Matrix Devices)

Tuesday, May 21, 2013 / 10:50 - 12:00 Noon / Ballroom B

**Chair:** Arokia Nathan, University College London

**Co-Chair:** Junho Song, Samsung Display Co., Ltd.

- 4.1: **Invited Paper: Electronic Structure, Carrier Transport, Defects, and Impurities in Amorphous Oxide Semiconductors**  
*Toshio Kamiya, Tokyo Institute of Technology, Yokohama, Japan*
- 4.2: **Invited Paper: Development of High Mobility Zinc-Oxynitride TFT**  
*Yan Ye, Applied Material, Santa Clara, CA, USA*
- 4.3: **Invited Paper: High Mobility Oxide TFT for Large Area High Resolution AMOLED Displays**  
*Sang-Hee Park, ETRI, Daejeon, Korea*
- 4.4L: **Late News Paper: Modeling Current-Voltage Behavior in Oxide TFTs Combining Trap Limited Conduction with Percolation**  
*Sungsik Lee, University of Cambridge, Cambridge, UK*

### Session 5: LCD or OLED? (Liquid-Crystal Technology)

Tuesday, May 21, 2013 / 10:50 - 11:50 am / Ballroom C

**Chair:** Akihiro Mochizuki, I-CORE Technology, LLC

**Co-Chair:** Hyun Chul Choi, LG Display Co., Ltd.

- 5.1: **Invited Paper: LCD or OLED: Who Wins?**  
*David Barnes, BizWitz, LLC, Georgetown, TX, USA*
- 5.2: **Invited Paper: TFT LCDs as the Future Leading Role in FPDs**  
*Yasuhiro Ukai, Ukai Display Device Institute, Kobe, Japan*
- 5.3: **Invited Paper: AH-IPS: Superb Display for Mobile Devices**  
*Joun Ho Lee, LG Display Co., Ltd, Gyeonggi-do, Korea*

### Session 6: e-Paper I (e-Paper and Flexible Displays)

Tuesday, May 21, 2013 / 10:50 am - 12:10 pm / Room 118

**Chair:** Makoto Omodani, Tokai University

**Co-Chair:** Deng-Ke Yang, Seoul National University

- 6.1: **Invited Paper: e-Paper System Using High Resolution Electrophoretic Display**  
*Satoshi Nebashi, Seiko-Epson Corp., Nagano, Japan*
- 6.2: **Flexible Electrophoretic Display Driven by Solution Processed OTFTs Manufactured Using All Sputtered Electrodes**  
*Jung Eun Lee, LG Display R&D Center, Gyeonggi-do, Korea*
- 6.3: **Distinguished Paper: A 9-in. Flexible Color Electrophoretic Display with Projected-Capacitive Touch Panel and Integrated a-Si Gate Driver**  
*Yen Lai, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 6.4: **Invited Paper: The Effect of Touching Documents in Reading: Comparing Paper and a Touch Based Tablet Device in Intensive Proofreading**  
*Hirohito Shibata, Fuji Xerox Co., Ltd., Kanagawa, Japan*

### Session 7: Plasma Display Devices (*Emissive Displays*)

Tuesday, May 21, 2013 / 10:50 - 12:00 Noon / Room 202

Chair: Larry Weber, Consultant

Co-Chair: Qun Yan, Sichuan COC Display Devices Co., Ltd.

- 7.1: **Invited Paper:** Progress in Luminous Array Film with Plasma Tube Technology for Seamless-Tiling Super Large Area Display  
*Terukazu Kosako, Shinoda Plasma Co., Ltd., Kobe, Japan*
- 7.2: **Determination Method of Pixel Values for Combined Single-Line and Multi-Line Scanning Method for 120-Hz PDP**  
*Tomokazu Shiga, The University of Electro-Communication, Tokyo, Japan*
- 7.3: **Simulation Study of a Flat Panel Radiation Detector Based on Shadow Mask PDP**  
*Yan Tu, Southeast University, Nanjing, China*
- 7.4L: **Late News Paper:** New, Thinner Phosphor Layer Fabrication Process for ACPDPs  
*Ryuichi Murai, Panasonic AVC Networks Company, Osaka, Japan*

### Session 8: Emerging Displays (*Applications*)

Tuesday, May 21, 2013 / 10:50 - 11:50 am / Room 205

Chair: Jean-Noel Perbet, THALES Avionic

Co-Chair: Adi Abileah, Planar Systems, Inc.

- 8.1: **Invited Paper:** Optical and System Considerations for Mobile Touch Screen Applications  
*Steven Bathiche, Microsoft, Redmond, WA, USA*
- 8.2: **Semi-Transparent Inverted Quantum Dot LEDs**  
*Jin Jang, Kyung Hee University, Seoul, Korea*
- 8.3: **Blur-Free Transparent LCD with Hybrid Transparency**  
*Chia-Wei Kuo, AU Optronics Corp., Hsinchu, Taiwan*

### Session 9: Autostereoscopic and Multi-View II (*3D/Display Systems*)

Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Ballroom A

Chair: Matthew Brennessoltz, Insight Media

Co-Chair: Jae Hyeung Park, Chungbuk National University

- 9.1: **Invited Paper:** Frontal Projection Type 3D Display with Enhanced Brightness Uniformity  
*ByoungHo Lee, Seoul National University, Seoul, Korea*
- 9.2: **A Wide View, High Resolution, 3D Display Using Real Time Rendering Regarding Viewer Position**  
*Yingbao Yang, Japan Display, Inc., Kanagawa, Japan*
- 9.3: **Round View Display Motion-Parallax Based 3D Display with Super Wide Viewing Angle**  
*Hidefumi Takamine, Toshiba Corp., Kawasaki, Japan*

### Session 10: Oxide TFTs II (*Oxide TFTs/Active-Matrix Devices*)

Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Ballroom B

Chair: Tohru Nishibe, Japan Display Central, Inc.

Co-Chair: Hyun Jae Kim, Yonsei University

- 10.1: **High Mobility Self-Aligned Top Gate Oxide TFT for High Resolution AMOLEDs**  
*Narihiro Morosawa, Sony Corp., Kanagawa, Japan*
- 10.2: **Invited Paper:** Development of Advanced Co-Planar Oxide TFT for OLED Displays  
*Jong Uk Bae, LG Display Co., Ltd., Gyeonggi-do, Korea*
- 10.3: **Invited Paper:** High Mobility Oxide TFTs for Future LCD Applications  
*Junho Song, Samsung Display Co., Ltd., Gyeonggi-do, Korea*
- 10.4: **Improvement in Stability of a-IGZO LCDs**  
*Chun Wei Wu, BOE Technology Group Co., Ltd., Beijing, China*

### Session 11: 4K x 2K Displays (*Liquid-Crystal Technology*)

Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Ballroom C

Chair: Shui Chih Lien, TCL Group

Co-Chair: Matthew Sousa, 3M

- 11.1: **Invited Paper:** Development of Largest 110-in. 4K x 2K 3D TFT LCD  
*Li-Yi Chen, Shenzhen China Star Optoelectronics Technology Co., Ltd., Guangdong, China*
- 11.2: **Invited Paper:** Development of Large-Sized Oxide-TFT LCD TV with ADSDS Technology  
*Mi Zhang, BOE Technology Group Co., Ltd., Beijing, China*
- 11.3: **Distinguished Paper:** High Transmission VA LCD with a Three Dimensionally Shaped Pixel Electrode for 4K x 2K Displays  
*Masashi Miyakawa, Sony Corp., Kanagawa, Japan*

### Session 12: e-Paper II (*e-Paper and Flexible Displays*)

Tuesday, May 21, 2013 / 2:00 - 3:20 pm / Room 118

Chair: Paul Drzaic, Apple, Inc.

Co-Chair: Nick Colaneri, Flexible Display Center

- 12.1: **Invited Paper:** Electrofluidic Imaging Films for Brighter, Faster, and Lower Cost e-Paper  
*Jason Heinkenfeld, University of Cincinnati, Cincinnati, OH, USA*
- 12.2: **Invited Paper:** Electrochemical Display for Color e-Paper and Dual Mode Display  
*Norihisa Kobayashi, Chiba University, Chiba, Japan*
- 12.3: **Development of Electro-Osmotic Color e-Paper**  
*Alex Henzen, IRX Innovations BV, Son en Breugel, The Netherlands*
- 12.4: **Recent Development of Transparent Electrowetting Display**  
*Kuo Lung Lo, ITRI, Chutung, Taiwan, ROC*

### Session 13: Plasma Display Protective Layer (*Emissive Displays*)

Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Room 202

Chair: Ryuichi Murai, Panasonic AVC Devices Development Center

Co-Chair: Kyung Cheol Choi, KAIST

- 13.1: **Improvement of Luminous Efficacy by Applying Ca<sub>x</sub>Mg<sub>1-x</sub>O Protecting Layer with High Xe Content Discharge Gas**  
Qun Yan, COC Display Device Co., Wallkill, NY, USA
- 13.2: **Effects of Sealing Conditions and CaO Contents on Aging Behavior of ACPDP with (Mg,Ca)O Protective Layer**  
Yong-Seog Kim, Hong-ik University, Seoul, Korea
- 13.3: **Secondary Electron Emission of Modified MgO Surfaces in Plasma Displays Based on First Principle**  
Yan Tu, Southeast University, Nanjing, China

### Session 14: Human Enhancement and Diagnostics (*Applications*)

Tuesday, May 21, 2013 / 2:00 - 3:20 pm / Room 205

Chair: Jyrki Kimmel, Nokia Research Center

Co-Chair: Susan Jones, Nulumina Corp.

- 14.1: **Invited Paper: Sonification: Multimodal and Auditory Display of Data**  
Bruce Walker, Georgia Institute of Technology, Atlanta, GA, USA
- 14.2: **Invited Paper: Development of Auditory and Cross-Modal Displays for Assistive Technology**  
Tony Stockman, Queen Mary University of London, London, UK
- 14.3: **A Novel Concept for a Blood Vessel Viewer Based on a Bidirectional OLED Microdisplay**  
Constanze Großmann, Fraunhofer IOF, Jena, Germany
- 14.4: **Polychromatic High Frequency Steady State Visual Evoked Potentials for Brain-Display Interaction**  
Yu-Yi Chien, National Chiao Tung University, Hsinchu, Taiwan, ROC

### Session 15: LC Technology for 3D I (*3D/Liquid-Crystal Technology*)

Tuesday, May 21, 2013 / 3:40 - 5:00 pm / Ballroom A

Chair: Philip Bos, Kent State University

Co-Chair: Terry Scheffer, Motif, Inc.

- 15.1: **Invited Paper: High Performance Autostereoscopic 2D/3D Switchable Display Using Liquid Crystal Lens**  
Shinichiro Oka, Japan Display, Inc., Chiba, Japan
- 15.2: **Distinguished Paper: LC GRIN Lens Mode with Wide Viewing Angle for Rotatable 2D/3D Tablet**  
Masako Kashiwagi, Toshiba Corp., Kawasaki, Japan
- 15.3: **A Novel Liquid Crystal Lens for Autostereoscopic 3D Displays**  
Sheng-Chi Liu, AU Optronics Corp., Hsinchu, Taiwan
- 15.4: **Function Integrated LC GRIN Lens for Partially Switchable 2D/3D Display**  
Ayako Takagi, Toshiba Corp., Kawasaki, Japan

### Session 16: Oxide-TFT Reliability (*Oxide TFTs/Active-Matrix Devices*)

Tuesday, May 21, 2013 / 3:40 - 5:00 pm / Ballroom B

Chair: Yoshitaka Yamamoto, Sharp Corp.

Co-Chair: Takatoshi Tsujimura, Konica-Minolta

- 16.1: **Negative Bias Photodegradation Mechanism in SnO TFTs**  
Masashi Tsubuku, Semiconductor Energy Laboratory Co., Ltd, Kanagawa, Japan
- 16.2: **A 4.8-in. AMOLED Display Panel Driven by Stable Amorphous InZnO TFT**  
Lei Wang, Guangzhou New Vision Opto-Electronic Technology Co., Ltd., Guangzhou, China
- 16.3: **AC and DC Bias Temperature Stability of Coplanar Homojunction a-InGaZnO TFT**  
Eric Yu, University of Michigan, Ann Arbor, MI, USA
- 16.4: **Photostability Improvement of a-InGaZnO TFTs by Introducing a Transparent UV Shielding Layer**  
Min-Yen Tsai, National Chiao Tung University, Hsinchu, Taiwan, ROC

### Session 17: Blue Phase LCDs I (*Liquid-Crystal Technology*)

Tuesday, May 21, 2013 / 3:40 - 4:30 pm / Ballroom C

Chair: Shin-Tson Wu, University of Central Florida

Co-Chair: Martin Schadt, MS Hightech Consulting

- 17.1: **Invited Paper: Polymer Stabilized Blue Phase LCDs Applying Novel Groove Cell Structure**  
Cheng-Yeh Tsai, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 17.2: **Low Voltage Blue Phase LCD with Red Shifted Bragg Reflection**  
Jin Yan, University of Central Florida, Orlando, FL, USA
- 17.3L: **Late News Paper: Enhancing the Contrast Ratio of Blue Phase LCDs**  
Yifan Liu, University of Central Florida, Orlando, FL, USA

### Session 18: Flexible AMOLED Displays (*e-Paper and Flexible Displays*)

Tuesday, May 21, 2013 / 3:40 - 4:50 pm / Room 118

Chair: Ruiqing Ma, Universal Display Corp.

Co-Chair: Rashmi Rao, Apple, Inc.

- 18.1: **Invited Paper: Roll-to-Roll Manufacturing of Printed OLEDs**  
Jukka Hast, Oulu, Finland
- 18.2: **A 3.4-in. Flexible High Resolution Full Color Top Emitting AMOLED Display**  
Akihiro Chida, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 18.3: **Flexible Barrier Technology for Enabling Rollable AMOLED Displays and Upscaling Flexible OLED Lighting**  
Flora Li, Holst Centre/TNO, Eindhoven, The Netherlands

**18.4L: *Late News Paper*: Full Color Flexible Top-Emission AMOLED Display on Polyethylene Naphthalate (PEN) Foil with IGZO TFT Backplane**  
*Yusuke Fukui, Panasonic Corp., Osaka, Japan*

### **Session 19: Phosphors and Quantum Dot LEDs (*Emissive Displays*)**

**Tuesday, May 21, 2013 / 3:40 - 5:20 pm / Room 202**

**Chair:** *Ravi Rao, Specialty Phosphors, Inc.*

**Co-Chair:** *Masayuki Nakamoto, Shizuoka University*

- 19.1: Efficiency Enhancement of Indium-Phosphide Based Quantum Dot LEDs by Shell Thickness Tuning**  
*Jiwan Kim, Korea Electronics Technology Institute, Seongnam, Korea*
- 19.2: *Distinguished Paper*: Characterization of Electron-Hole Pair Migration and Trapping in Rare Earth Doped YBO<sub>3</sub> under Vacuum Ultraviolet Excitation**  
*Anthony Diaz, Central Washington University, Ellensburg, WA, USA*
- 19.3: Morphology Controlled Single Crystal ZnO Nanostructures Fabricated by a Novel Mist Chemical Vapor Deposition**  
*Chaoyang Li, Kochi University of Technology, Kami, Japan*
- 19.4L: *Late News Paper*: Development of Stable Alkaline Earth Sulfide LED Phosphors for LCD Backlights**  
*Ravi Rao, Specialty Phosphors, Inc., Cupertino, CA, USA*
- 19.5L: *Late News Paper*: High Efficiency and Long Lifetime Quantum Dot LEDs for Flat Panel Display Application**  
*Paul Holloway, University of Florida, Gainesville, FL, USA*
- 19.6L: *Late News Paper*: How to Fabricate Much Brighter AC Electroluminescent Lamps: Optimizing the Alignment of the Emitting ZnS:Cu Phosphor Particles to the AC Field**  
*Jack Silver, Brunel University, London, UK*

### **Session 20: LC Technology for 3D II (*3D/Liquid-Crystal Technology*)**

**Wednesday, May 22, 2013 / 9:00 - 10:00 am / Ballroom A**

**Chair:** *Hoi-Sing Kwok, Hong Kong University of Science & Technology*

**Co-Chair:** *Allan Kmetz, Consultant*

- 20.1: Color Holographic Display Based on Fast-Response Liquid Crystal Cell**  
*Yikai Su, Shanghai Jiao Tong University, Shanghai, China*
- 20.2: Enlarged Viewing Angle of Integral Imaging System by Liquid Crystal Prism**  
*Chih-Wei Chen, National Chiao Tung University, Hsinchu, Taiwan, ROC*
- 20.3: Novel Adaptive Liquid Lens Actuated by Liquid Crystal Piston**  
*Su Xu, University of Central Florida, Orlando, FL*

### **Session 21: OLED TV (*Active-Matrix Devices/OLEDs*)**

**Wednesday, May 22, 2013 / 9:00 - 10:10 am / Ballroom B**

**Chair:** *Hyun Jae Kim, Yonsei University*

**Co-Chair:** *Sven Murano, Novaled AG*

- 21.1: *Invited Paper*: Technological Progress and Commercialization of AMOLED TV**  
*Chang-Ho Oh, LG Display Co., Ltd., Gyeonggi-do, Korea*
- 21.2: *Distinguished Paper*: A 55-in. AMOLED TV with InGaZnO TFTs Using WRGB Pixel Design**  
*Woo-Jin Nam, LG Display Co., Ltd., Gyeonggi-do, Korea*
- 21.3: A 65-in. Amorphous Oxide TFT AMOLED TV Using Side-by-Side and Fine Metal Mask Technology**  
*Chia-Yu Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 21.4L: *Late News Paper*: Recent Developments in CNT Enabled Vertical Organic Light-Emitting Transistors for OLED Displays**  
*Mitchell McCarthy, nVerPix, LLC, and University of Florida, Gainesville, FL, USA*

### **Session 22: Blue Phase LCDs II (*Liquid-Crystal Technology*)**

**Wednesday, May 22, 2013 / 9:00 - 10:20 am / Ballroom C**

**Chair:** *Xiao-Yang Huang, Ebulent Technologies Corp*

**Co-Chair:** *Kei-Hsiung Yang, National Chiao Tung University*

- 22.1: *Invited Paper*: Low Voltage Polymer Stabilized Blue Phase Liquid Crystal**  
*Yasuhiro Haseba, JNC Petrochemical Corp., Chiba, Japan*
- 22.2: *Invited Paper*: Liquid Crystalline Cubic Blue Phase in Photo-Responsive Bent Core Molecular System**  
*Suk-Won Choi, Kyung Hee University, Seoul, Korea*
- 22.3: Polymer System Effect on Polymer Stabilized Blue Phase Liquid Crystal**  
*Jian Gang Lu, Shanghai Jiao Tong University, Shanghai, China*
- 22.4: Multi-Stable LCD with Dual Frequency Reverse Mode Polymer Stabilized Cholesteric Texture**  
*Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan, ROC*

### **Session 23: Flexible TFTs (*e-Paper and Flexible Displays*)**

**Wednesday, May 22, 2013 / 9:00 - 10:20 am / Room 118**

**Chair:** *Bruce Gnade, University of Texas at Dallas*

**Co-Chair:** *Jin Jang, Kyung Hee University*

- 23.1: *Invited Paper*: Jet Printed TFTs and Circuits for Flexible Electronics**  
*Robert Street, Palo Alto Research Center, Palo Alto, CA, USA*
- 23.2: *Invited Paper*: Solution Processed Metal Oxide TFTs and Circuits on Plastic by Photochemical Activation Process**  
*Sung Kyu Park, Chung-Ang University, Seoul, Korea*
- 23.3: *Invited Paper*: Upgrading Self-Aligned Imprint Lithography (SAIL) in Preparation for Roll-to-Roll Manufacturing of Large Sized High Performance Flexible Electronics**  
*Han-Jun Kim, Hewlett-Packard Labs, Palo Alto, CA USA*
- 23.4: Delamination Effect on Flexible LTPS TFTs**  
*Ssu-Hui Lu, AU Optronics Corp., Hsinchu, Taiwan, ROC*

**Session 24: Novel Measurements (*Display Measurement*)**

**Wednesday, May 22, 2013 / 9:00 - 10:20 am / Room 202**

**Chair:** *Stephen Atwood, Azonix Corp.*

**Co-Chair:** *Xiao-Hua Li, Southeast University*

- 24.1: **Invited Paper:** **Photography of Display Surfaces Using Consumer Cameras: Three Regimes and Tristimulus Imagery**  
*Edward Kelley, KELTEK, Longmont, CO, USA*
- 24.2: **Distinguished Paper:** **Viewing Angle Measurements on Flexible Reflective e-Paper Displays**  
*Dirk Hertel, E Ink Corp., Cambridge, MA, USA*
- 24.3: **Characterization and Modeling of Light-Diffusing Sheet**  
*Yue Cui, Liquid Crystal Institute, Kent State University, Kent, OH, USA*
- 24.4: **A Novel Measurement Method for Sparkle “Characterization”**  
*Ellen Kosik-Williams, Corning Incorporated, Corning, NY, USA*

**Session 25: Advanced LCD Electronics (*Display Electronics*)**

**Wednesday, May 22, 2013 / 9:00 - 10:00 am / Room 205**

**Chair:** *Ya Hsiang Tai, National Chiao Tung University*

**Co-Chair:** *Achin Bhowmik, Intel Corp.*

- 25.1: **Invited Paper:** **Capacitively Coupled 13.56-MHz Resonance Controlled Wireless Power Transfer System for e-Paper Modules**  
*Reiji Hattori, Kyushu University, Fukuoka, Japan*
- 25.2: **Invited Paper:** **ESD and EOS Impact During Module Assembly Processes of Display Panel**  
*Ming-Dou Ker, National Chiao-Tung University, Hsinchu, Taiwan, ROC*
- 25.3: **Pixel Circuit with Bootstrapping Structure for Blue Phase LCDs**  
*Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC*

**Session 26: Holographic and Volumetric Displays (*3D/Display Systems*)**

**Wednesday, May 22, 2013 / 10:40 - 11:40 am / Ballroom A**

**Chair:** *Jean-Pierre Guillou, Apple, Inc.*

**Co-Chair:** *Masaru Suzuki, SKC Haas Display Film*

- 26.1: **A Coarse Integral Holographic Display**  
*Quinn Smithwick, Disney Research, Glendale, CA, USA*
- 26.2: **A Two Step Wave Field Projection Method for Fast Hologram Pattern Generation**  
*Hocheon Wey, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea*
- 26.3: **Volumetric Display System Using Multiple Mini-Projectors**  
*Yongtian Wang, Beijing Institute of Technology, Beijing, China*

**Session 27: OLED Displays I (*OLEDs*)**

**Wednesday, May 22, 2013 / 10:40 - 11:50 am / Ballroom B**

**Chair:** *Sven Murano, Novaled AG*

**Co-Chair:** *Yusin Lin, AU Optronics Corp.*

- 27.1: **A 13.3-in. CAAC IGZO FET OLED Display with Narrow Driver Area Using a Highly Efficient Deep Blue Device**  
*Tsunenori Suzuki, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan*
- 27.2: **The Study of Picture Quality of AMOLED TV with WRGB OLED Structure.**  
*Jong-Kun Yoon, LG Display Co., Ltd., Gyeonggi-do, Korea*
- 27.3L: **Late News Paper: Subpixel Structured OLED Microdisplay**  
*Rigo Herold, Fraunhofer COMEDD, Dresden, Germany*

**Session 28: Advanced Displays (*Liquid-Crystal Technology*)**

**Wednesday, May 22, 2013 / 10:40 am - 12:10 pm / Ballroom C**

**Chair:** *Anthony Lowe, Lambent Consultancy*

**Co-Chair:** *Cheng Chen, Apple, Inc.*

- 28.1: **Distinguished Student Paper: High Performance Fringe-Field Switching with a Negative Dielectric Anisotropy Liquid Crystal**  
*Yuan Chen, University of Central Florida, Orlando, FL, USA*
- 28.2: **Driving Method of FFS Mode Oxide LCD for Reducing Eye Strain**  
*Ryo Hatsumi, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan*
- 28.3: **A Novel Vertically Aligned IPS LCD Mode with a Charge-Shared Structure**  
*Sau-Wen Tsao, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 28.4: **A Novel Liquid Crystal Mode with High Picture Quality**  
*Mei-Ju Lu, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 28.5L: **Late News Paper: Wide Color Gamut and Wide Viewing Angle Color Reflective LCD with Novel Anisotropic Diffusion Layer**  
*Takahiro Ishinabe, Tohoku University, Sendai, Japan*

**Session 29: Flexible Barriers and Substrates (*e-Paper and Flexible Displays*)**

**Wednesday, May 22, 2013 / 10:40 - 11:40 am / Room 118**

**Chair:** *Kevin Gahagan, Corning Incorporated*

**Co-Chair:** *Ryoichi Ishihara, Delft University of Technology*

- 29.1: **Ultra-High Barriers for Encapsulation of Flexible Displays and Lighting Devices**  
*John Fahlreich, Fraunhofer Institute for Electron Beam and Plasma Technology FEP, Dresden, Germany*
- 29.2: **Atomic Layer Deposition of Al<sub>2</sub>O<sub>3</sub>/ZrO<sub>2</sub> Nanolaminate on Plastic Substrates for Flexible Displays**  
*Hyun Gi Kim, Kyung Hee University, Yongin, Korea*

- 29.3: **Invited Paper:** The Mechanical Reliability of Flexible ALD Barrier Film  
Samuel Graham, Georgia Institute of Technology, Atlanta, GA, USA
- 29.4: **Invited Paper:** Paper Electronics: A Challenge for the Future  
Rodrigo Martins, Universidade Nova de Lisboa (UNL), Caparica, Portugal

**Session 30: Challenges in 3D Characterization, Motion-Blur Analysis, and Monitor Calibration (Display Measurement)**

Wednesday, May 22, 2013 / 10:40 - 11:50 am / Room 202

Chair: Thomas Fiske, Qualcomm MEMS Technology

Co-Chair: Chuck Yin, Apple, Inc.

- 30.1: **Invited Paper:** Techniques and Challenges in the Measurement of Stereoscopic Displays  
Adi Abileah, Planar Systems, Beaverton, OR, USA
- 30.2: Driving Scheme Required for Blur-Free Motion of a Target Moving at 480 pps  
Owen Watson, Lockheed Martin Corp., Gaithersburg, MD, USA
- 30.3: Comparison of On-Screen Display Based and ICC Profile Based Calibration for OLED Displays  
Wei-Chung Cheng, U.S. Food and Drug Administration, Silver Spring, MD, USA
- 30.4L: **Late News Paper:** A High Resolution Method for Measuring 3D Crosstalk Spatial Uniformity  
John Penczek, NIST, Boulder, CO, USA

**Session 31: High Speed Driver Technologies (Display Electronics)**

Wednesday, May 22, 2013 / 10:40 am - 12:00 Noon / Room 205

Chair: Dick McCartney, Samsung Display Co.

Co-Chair: Taesung Kim, Apple, Inc.

- 31.1: A 3.5-Gbps/Lane Intra-Panel Interface with a PVT Robust VCO-Based CDR for UD TV Applications in 0.18- $\mu$ m High Voltage CMOS Technology  
Young-Hwan Chang, Samsung Electronics Co., Ltd., Yongin, Korea
- 31.2: Power Efficient 5.0-in. 440-ppi Full HD a-Si TFT LCD Single Chip Driver IC  
Young-Sun Na, LG Electronics, Seoul, Korea
- 31.3: A 10-bit CMOS DAC with Logarithmic Time Interpolation  
Young-Chan Jang, Kumoh National Institute of Technology, Gyeongbuk-do, Korea
- 31.4: A 3.4-Gbps/Lane Low Overhead Clock Embedded Intra-Panel Interface for High Resolution and Large Sized TFT LCDs  
Woon-Taek Oh, Samsung Electronics Co., Ltd., Yongin, Korea

**Session 32: Light-Field Display (3D/Display Systems)**

Wednesday, May 22, 2013 / 3:30 - 4:50 pm / Ballroom A

Chair: Brian Schowengerdt, University of Washington

Co-Chair: Jae Hyeung Park, Chungbuk National University

- 32.1: Optimal Projector Configuration Design for a 300-Mpixel Light Field 3D Display  
Jin-Ho Lee, Samsung Institute of Advanced Technology, Gyeonggi-do, Korea
- 32.2: 360° Floating Light Field 3D Display Based on a High Frame Rate Color Projector  
Xu Liu, Zhejiang University, Hangzhou, China
- 32.3: Light Field Approximation Using Basic Display Layer Primitives  
Nicola Ramieri, ETH Zurich, Zurich, Switzerland
- 32.4: A Scalable, Collaborative, Interactive Light Field Display System  
Michael Klug, Zebra Imaging, Inc., Austin, TX, USA

**Session 33: OLED Displays II (OLEDs)**

Wednesday, May 22, 2013 / 3:30 - 4:50 pm / Ballroom B

Chair: Chihaya Adachi, Kyushu University

Co-Chair: Chishio Hosokawa, Idemitsu Kosan Co., Ltd.

- 33.1L: **Late News Paper:** High Resolution 4.4-in. AMOLED Display with 413-ppi Real Pixel Density  
Chung-Chia Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 33.2: Spatial Resolution Characteristics of OLED Displays: A Comparative Analysis of MTF for Handheld and Workstation Formats  
Asumi Yamazaki, U.S. Food and Drug Administration, Silver Spring, MD, USA
- 33.3L: **Late News Paper:** Optimizing Nanostructures to Enhance Optical Outcoupling of OLED Microdisplays  
Richard Pfeifer, Fraunhofer COMEDD, Dresden, Germany
- 33.4L: **Late News Paper:** High Resolution Vacuum Patterning of Organic and Metal Layers for Organic Electronic Devices  
Markus Burghart, VON ARDENNE Anlagentechnik GmbH, Dresden, Germany

**Session 34: Fast Switching LCDs (Liquid-Crystal Technology)**

Wednesday, May 22, 2013 / 3:30 - 4:30 pm / Ballroom C

Chair: Philip Chen, National Chiao Tung University

Co-Chair: Michael Wand, LC Vision, LLC

- 34.1: Novel Super Fast Response Ultra-Wide Temperature Range VA LCD  
Yosuke Iwata, Sharp Corp., Nara, Japan
- 34.2: **Distinguished Student Paper:** A Nematic LCD with Submillisecond Gray-to-Gray Response Time  
Daming Xu, University of Central Florida, Orlando, FL, USA
- 34.3: Dual  $\pi$ -Cell Fast Response LCD for 3D Application  
Philip Bos, Kent, OH, USA

**Session 70: Late News Papers: Flexible OLEDs and Printing Electronics (*e-Paper and Flexible Displays*)**

**Wednesday, May 22, 2013 / 3:30 - 4:20 pm / Room 118**

**Chair:** *Makoto Omodani, Tokai University*

**Co-Chair:** *Rashmi Rao, Apple, Inc.*

**70.1L: *Late-News Paper:* 10.2-in. WUXGA Flexible AMOLED Display Driven by Amorphous-Oxide TFTs on Plastic Substrate**

*Nobuyoshi Saito, Toshiba Corp., Kawasaki, Japan*

**70.2L: *Late News Paper:* 14.7-in. Active Matrix PhOLED Displays on Temporary Bonded PEN Substrates with Low Temperature IGZO TFTs**

*Barry O'Brien, Arizona State University, Flexible Display Center, Tempe, AZ, USA*

**70.3L: *Late News Paper:* All Wet Processable Barrier Film for Flexible OLED Displays**

*Tomoyuki Kikuchi, Samsung Yokohama Research Institute, Yokohama, Japan*

**70.4L: *Late News Paper:* Flexible PIN Diode Sensor Array with InGaZnOx Transistor**

*Michael Marr, Arizona State University, Flexible Display Center, Tempe, AZ, USA*

**70.5L: *Late News Paper:* Low Temperature Curable Cu Ink and Fine Ink Jet Printed Patterning**

*Miyako Fukuda, Asahi Glass Co., Ltd., Tokyo, Japan*

**Session 35: OLED Pixel and Driving (*Display Electronics*)**

**Wednesday, May 22, 2013 / 3:30 - 4:50 pm / Room 205**

**Chair:** *Hyoungsik Nam, Kyung Hee University*

**Co-Chair:** *Seung Woo Lee, Kyung Hee University*

**35.1: High Resolution AMOLED Pixel Using Negative Feedback Structure for Improving Image Quality**

*Oh-Kyong Kwon, Hanyang University, Seoul, Korea*

**35.2: A New Feedback Programming Architecture Compatible with 2T1C AMOLED Displays**

*Thoma Charisouli, Lehigh University, Bethlehem, PA, USA*

**35.3: A 10-bit Linear R-String DAC Architecture for Mobile Full HD AMOLED Driver IC**

*Ki-Duk Kim, KAIST, Daejeon, Korea*

**35.4: Programmable Pulse Width LTPS TFT Shift Register for High Resolution and High Frame Rate**

**Active Matrix Flat Panel Display**

*Hyoungsik Nam, Kyung Hee University, Seoul, Korea*

**Session 36: Perception in 3D Display (*3D/Applied Vision/Human Factors*)**

**Thursday, May 23, 2013 / 9:00 - 10:20 am / Ballroom A**

**Chair:** *Yi-Pai Huang, National Chiao Tung University*

**Co-Chair:** *David Hoffman, Samsung Display*

**36.1: Visual Comfort and Viewing Time of 3D Content on Mobile Device**

*Takashi Shibata, Tokyo University of Social Welfare, Gunma, Japan*

**36.2: Age Differences in the Use of Binocular Disparity and Pictorial Depth Cues in 3D Graphics Environment**

*Ken Kihara, Kagoshima University, Kagoshima, Japan*

**36.3: Effects of 3D Display System on Convergence and Accommodation**

*Takehito Kojima, Nagoya University, Nagoya, Japan*

**36.4: Comparison between Different Rating Scales for 3D TV**

*Kjell Brunnström, Acreo Swedish ICT AB, Kista, Sweden*

**Session 37: OLED Materials (*OLEDs*)**

**Thursday, May 23, 2013 / 9:00 - 10:20 am / Ballroom B**

**Chair:** *Yasunori Kijima, Sony Corp.*

**Co-Chair:** *Denis Kondakov, DuPont*

**37.1: *Invited Paper:* Third Generation OLED by Hyper Fluorescence**

*Chihaya Adachi, Kyushu University, Fukuoka, Japan*

**37.2: Efficiency Improvement of Fluorescent Blue Device by Molecular Orientation of Blue Dopant**

*Hitoshi Kuma, Idemitsu Kosan Co., Ltd., Chiba, Japan*

**37.3: Air Stable Electron Transport Materials for Low Voltage OLEDs**

*Tobia Canzler, Novaled AG, Dresden, Germany*

**37.4: *Invited Paper:* Molecular Triplet Emitters: From Design to Assembly and Functions**

*Vivian Yam, The University of Hong Kong, Clear Water Bay, Hong Kong*

**Session 38: Film and Alignment (*Liquid-Crystal Technology*)**

**Thursday, May 23, 2013 / 9:00 - 10:20 am / Ballroom C**

**Chair:** *Birendra Bahadur, Rockwell Collins*

**Co-Chair:** *Gang Xu, Tianma Microelectronics*

**38.1: *Invited Paper:* Innovation of Optical Films Using Polymerized Discotic Materials: Past, Present, and Future**

*Yoji Ito, FUJIFILM Corp., Tokyo, Japan*

**38.2: Comparative Analysis of Polyimide Film Alignment Using Near Edge X-Ray Adsorption**

*Musun Kwak, LG Display Co., Ltd., Gyeonggi-do, Korea*

**38.3: Fast Ferroelectric Liquid Crystal Modes Based on Photoaligning Technology**

*Vladimir Chigrinov, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*

**38.4: Novel Photoalignment Layer for IPS Mode LCD Using 313-nm UV Light**

*Kohei Goto, Nissan Chemical Industries, Ltd., Funabashi, Japan*

### Session 39: Touch User Experience (*Touch and Interactivity*)

Thursday, May 23, 2013 / 9:00 - 10:00 am / Room 118

Chair: *Steven Bathiche, Microsoft*

Co-Chair: *Reiner Mauch, Schott AG*

- 39.1: **Invited Paper:** The Next Touch Evolution Advancing the Consumer Experience in Other Realms: Tasks and Tough Environment  
*Donald Norman, Norman Neilsen Group, Fremont, CA, USA*
- 39.2: **Invited Paper:** Natural and Intuitive User Interfaces: Technologies and Applications  
*Achintya Bhowmik, Intel Corp., Santa Clara, CA, USA*
- 39.3: **Invited Paper:** The Need for Speed in Touch Systems  
*Albert Ng, Microsoft, Mountain View, CA, USA*

### Session 40: Automotive and Head-Up Displays (HUD) (*Display Systems/Projection*)

Thursday, May 23, 2013 / 9:00 - 10:00 am / Room 202

Chair: *Akihiro Tagaya, Keio University*

Co-Chair: *Cheng-Huan Chen, National Tsing-Hua University*

- 40.1: **Invited Paper:** Head-Up Display for Car Navigation System  
*Osami Utsuboya, Pioneer Corp., Saitama, Japan*
- 40.2: **Automotive Display Visibility Consideration**  
*Paul Weindorf, Visteon, Van Buren Twp., MI, USA*
- 40.3: **High Efficiency Dual Mode Head-Up Display System for Vehicle Application**  
*I-Hsuan Shao, National Tsing Hua University, Hsinchu, Taiwan, ROC*

### Session 41: Colors and Image Quality (*Applied Vision/Human Factors*)

Thursday, May 23, 2013 / 9:00 - 10:20 am / Room 205

Chair: *Sakuichi Ohtsuka, Kagoshima University*

Co-Chair: *Miyoshi Ayama, Utsunomiya University*

- 41.1: **Distinguished Paper:** Viewer Preferences for Shadow, Diffuse, Specular, and Emissive Luminance Limits of High Dynamic Range Displays  
*Scott Daly, Dolby Laboratories, Sunnyvale, CA, USA*
- 41.2: **Evaluation on the Colorfulness of Displays**  
*Takehiro Nakatsue, Sony Corp., Kanagawa, Japan*
- 41.3: **Evaluating the Effects of Environmental Illuminance on the Readability of e-Books**  
*Tatsuya Koizuka, Nagoya University, Nagoya, Japan*
- 41.4: **Subjective Image Quality of Viewing Angle beyond the Color Difference Metric in FPDs**  
*Chao-Hua Wen, National Taiwan University of Science and Technology, Taipei, Taiwan, ROC*

### Session 42: 3D Algorithms and Driving (*3D/Display Systems*)

Thursday, May 23, 2013 / 10:40 - 12:00 Noon / Ballroom A

Chair: *Jean-Pierre Guillou, Apple, Inc.*

Co-Chair: *John Parker, Retired*

- 42.1: **A Real Time 3D Multi-View Rendering from a Real Time 3D Capture**  
*Didier Doyen, Technicolor, Sévigné, France*
- 42.2L: **Late-News Paper:** Real Time Up-Converter from HDTV to 4K with Super High Resolution  
*Seiichi Gohshi, Kogakuin University, Tokyo, Japan*
- 42.3: **Efficient Multi-View Input Data Format for Glasses-Free 3D Display**  
*Chia-Fen Hung, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 42.4L: **Late News Paper:** Footprint of Scalable 3D Telecommunication System: Using Integral Light Field Display and Kinect Based Capture  
*Yifan Peng, Zhejiang University, Hangzhou, China*

### Session 43: OLED Devices I (*OLEDs*)

Thursday, May 23, 2013 / 10:40 am - 12:00 Noon / Ballroom B

Chair: *Denis Kondakov, DuPont Display*

Co-Chair: *Franky So, University of Florida*

- 43.1: **Invited Paper:** Demonstrating Ideal Injection Efficiency and Enabling Cost Effective Manufacturing with Solution Processed Hole Injection Layer  
*Mathew Mathai, Plextronics, Inc., Pittsburgh, PA, USA*
- 43.2: **Invited Paper:** Light Outcoupling for OLEDs: Doubling the Efficiency while Keeping the Dark Current Low  
*Guillaume Lecamp, Saint-Gobain Recherche, Aubervillier, France*
- 43.3: **Inverted Top Emitting White OLEDs with Improved Optical and Electrical Characteristic**  
*Tobia Schwab, TU Dresden, Institut für Angewandte Photophysik, Dresden, Germany*
- 43.4: **Invited Paper:** Non-Isotropic Emitter Orientation in OLED  
*Tobia Schmidt, University of Augsburg, Augsburg, Germany*

### Session 44: Liquid Crystals with Reactive Mesogen (*Liquid Crystal Technology*)

Thursday, May 23, 2013 / 10:40 am - 12:00 Noon / Ballroom C

Chair: *Jae Hoon Kim, Hanyang University*

Co-Chair: *Deng-Ke Yang, Kent State University*

- 44.1: **Ameliorating the Sticking Phenomenon of the Photosensitive Alignment Layer by Using Reactive Mesogen**  
*Tsu-Yu Ting, Chunghwa Picture Tubes, Ltd., Bade, Taiwan, ROC*



- 44.2: **Critical Effect of Polymer Bumps in PS Vertically Aligned LCDs**  
Xinhui Zhong, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- 44.3: **Characterization of Intra-Molecular Energy Transfer in Reactive Mesogen Liquid Crystal Mixture**  
Chung-Ching Hsieh, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- 44.4: **Development of Fast Response 4.3-in. WVGA FFS LCD Using Alignment Layer Mixed with Reactive Mesogen**  
Jae-Hoon Kim, Hanyang University, Seoul, Korea

#### Session 45: Touch Integration and Controller (*Touch and Interactivity*)

Thursday, May 23, 2013 / 10:40 - 11:40 am / Room 118

Chair: Jeff Han, Microsoft

Co-Chair: Byeong Koo Kim, LG Display Co., Ltd.

- 45.1: **Distinguished Paper:** 12.2-in. 1920 x RGBW x 720 IPS LCD Integrating In-Cell Touch Panel for Automotive Use  
Chihiro Tanaka, Japan Display, Inc., Kanagawa, Japan
- 45.2: **A Capacitive Touch Screen Controller IC with Noise Based Hybrid Sensing Scheme**  
Ki-Duk Kim, Samsung Electronics Co., Gyeonggi-do, Korea
- 45.3: **High Intensity Radiated Field Effect on Projected-Capacitive Touch Screen**  
Philippe Coni, THALES Avionics, Le Haillan, France

#### Session 46: OLED and Oxide TFT Manufacturing (*Oxide TFTs/Display Manufacturing*)

Thursday, May 23, 2013 / 10:40 am - 12:10 pm / Room 202

Chair: Toshiaki Arai, Sony Corp.

Co-Chair: Tian Xiao, CBRITE, Inc.

- 46.1: **Invited Paper:** Ink Jet Printed 17-in. AMOLED Display with Amorphous IGZO TFT Backplane  
Ze Liu, BOE Technology Group Co., Ltd., Beijing, China
- 46.2: **Invited Paper:** Micron Patterned Deposition through Shadow Masks with High Precision Alignment for OLED and e-Paper Application  
Thomas Ambrose, Advantech US, Inc., Pittsburgh, PA, USA
- 46.3: **Development of Source/Drain Electrodes for Amorphous IGZO TFTs**  
Chengyuan Dong, National Engineering Lab for TFT-LCD Materials and Technologies, Shanghai Jiao University, Shanghai, China
- 46.4: **Self-Aligned Bottom Gate Amorphous IGZO TFT Using the Back Side Exposure Technique**  
Sang-Moo Park, LG Display Co. Ltd., Gyeonggi-do, Korea
- 46.5L: **Late News Paper:** Large Area Sputtered Al<sub>2</sub>O<sub>3</sub> Films for High Mobility Active Matrix TFT Backplanes on PVD Array System  
Andrea Kloeppel, Applied Materials GmbH & Co. KG, Alzenau, Germany

#### Session 47: Human Factors on Lighting (*Lighting/Applied Vision*)

Thursday, May 23, 2013 / 10:40 am - 12:00 Noon / Room 205

Chair: Ingrid Heynderickx, Philips Research Laboratories

Co-Chair: James Larimer, ImageMetrics, LLC

- 47.1: **Invited Paper:** Displays as Light Sources: Resolving the Conflict between Gamut and Color Rendering  
Lorne Whitehead, University of British Columbia, Vancouver, British Columbia, Canada
- 47.2: **Novel Measurement Method of Bright Light Contrast Ratio Based on Binocular Vision**  
Karlheinz Blankenbach, Pforzheim University, Pforzheim, Germany
- 47.3: **The Impact of Watching Television on Evening Melatonin Levels**  
Mariana Figueiro, Rensselaer Polytechnic Institute, Troy, NY, USA
- 47.4: **Invited Paper:** Opportunities with LEDs for Increasing the Visual Benefits of Lighting  
Mark Rea, Rensselaer Polytechnic Institute, Troy, NY, USA

#### Session 48: 3D Applications (*3D/Applications*)

Thursday, May 23, 2013 / 1:30 - 2:50 pm / Ballroom A

Chair: Ian Underwood, University of Edinburgh

Co-Chair: Bao-Jen Pong, Industrial Technology Research Institute

- 48.1: **Research on the Fringe Electric Field Effect of a Liquid Crystal Phase Modulator for Digital Holography**  
Qing Li, Southeast University, Nanjing, China
- 48.2: **Light Field Rendering of Multi-View Contents for High-Density Light Field Displays**  
J. Park, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea
- 48.3: **Viewer's Eye Position Estimation Using a Single Camera**  
Seong-Hwan Ju, LG Display Co., Ltd., Gyeonggi-do, Korea
- 48.4: **Dead Zone Free 2D/3D Switchable Barrier Type 3D Display**  
Hsuan-Yi Wu, AU Optonics Corp., Hsinchu, Taiwan, ROC

#### Session 49: OLED Devices II (*OLEDs*)

Thursday, May 23, 2013 / 1:30 - 2:40 pm / Ballroom B

Chair: Tariq Ali, eMagin Corp.

Co-Chair: Michael Weaver, Universal Display Corp.

- 49.1: **Invited Paper:** Solution Processed OLED Displays: Advantages and Challenge  
Shiva Prakash, DuPont Display, Santa Barbara, CA, USA
- 49.2: **A Study on Electron Injecting and Surface Modifying Layer for Transparent OLEDs**  
Jang Hyuk Kwon, Kyung Hee University, Seoul, Korea
- 49.3: **Highly Efficient OLED Device with Device Architecture for Reducing Drive Voltage**  
Yoshiharu Hirakata, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

49.4L: **Late News Paper:** Highly Transmissive One Sided Emission OLED Panel for Novel Lighting Application  
*Akio Amano, Toshiba Corp., Kawasaki, Japan*

**Session 50: Low Power and Sensor Integrated Display (Active Matrix Devices)**

**Thursday, May 23, 2013 / 1:30 - 2:30 pm / Ballroom C**

**Chair:** *Kalluri Sarma, Honeywell, Inc.*

**Co-Chair:** *Kenichi Takatori, NLT Technologies, Ltd.*

- 50.1: **Innovative 5-in. FHD and 7-in. WQXGA Displays for Next Generation Smart Phones and Tablet**  
*Toshiki Kaneko, Japan Display, Inc., Mobara, Japan*
- 50.2: **Adding Depth Sensing Capability to an OLED Display System Based on Coded Aperture Imaging**  
*Sungjoo Suh, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea*
- 50.3: **Low Power High Image Quality Color Reflective LCDs Realized by Memory-in-Pixel Technology and Optical Optimization Using Newly Developed Scattering Layer**  
*Yoko Fukunaga, Japan Display, Inc., Kanagawa, Japan*

**Session 51: Touch Application (Touch and Interactivity)**

**Thursday, May 23, 2013 / 1:30 - 2:30 pm / Room 118**

**Chair:** *John Zhong, Apple, Inc.*

**Co-Chair:** *Bob Senior, Canatu, Inc.*

- 51.1: **Integrated Touch Sensing and Front Lit Device and Applications**  
*Ion Bitu, Qualcomm MEMS Technologie, San Jose, CA, USA*
- 51.2: **Touch Mura Mechanisms and Its Suppression by Use of Cover Glass**  
*Tomohiro Ishikawa, Corning Incorporated, Corning, NY, USA*
- 51.3: **Pulling Force Sensing Unit for 3D Image Movement**  
*Tsun-Yi Chen, National Tsing Hua University, Hsinchu, Taiwan, ROC*

**Session 52: Oxide TFT Manufacturing (Oxide TFTs/Display Manufacturing)**

**Thursday, May 23, 2013 / 1:30 - 2:50 pm / Room 202**

**Chair:** *Fang Chen Luo, AU Optronics Corp.*

**Co-Chair:** *Jerzy Kanicki, University of Michigan*

- 52.1: **Invited Paper: High Performance Metal Oxide TFT on Flexible Plastic Substrates**  
*Chan-Long Shieh, CBRITE, Inc., Goleta, CA, USA*
- 52.2: **Invited Paper: Advanced Sputtering Technologies and Targets for Oxide Semiconductor TFT**  
*Masasuke Matsudai, ULVAC, Inc., Kanagawa, Japan*
- 52.3: **Development of the Back Channel Etched TFT Using C Axis Aligned Crystalline InGaZn Oxide**  
*Takuya Hirohashi, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan*
- 52.4: **Distinguished Paper: Electrical Properties of Amorphous InGaZnO TFTs Prepared by Magnetron Sputtering Using Kr and Xe Gas**  
*Tetsuya Goto, Tohoku University, Sendai, Japan*

**Session 53: Lighting Design (Lighting/Applications)**

**Thursday, May 23, 2013 / 1:30 - 2:50 pm / Room 205**

**Chair:** *Gary Jones, Nanoquantum Corp.*

**Co-Chair:** *Susan Jones, Nulumina Corp.*

- 53.1: **Invited Paper: Drivers in the Adoption Speed of Solid-State Lighting**  
*Coen Liedtbaum, Philips Research Laboratories, Eindhoven, The Netherlands*
- 53.2: **An Optimization Design Method of an LED Freeform Lens for Uniform Circular Illumination**  
*Zhenrong Zheng, Zhejiang University, Hangzhou, China*
- 53.3: **Properties of a Field Emission Lighting Device Employing Highly Crystallized Single Wall Carbon Nanotube**  
*Toshimasa Hojo, Tohoku University, Miyagi, Japan*
- 53.4: **U-Shaped Daytime Running Light Using Textured TIR Lens**  
*Kuan-Yu Chen, Chilin Technology Co., Ltd., Tainan, Taiwan, ROC*

**Session 54: Projection Screens (3D/Projection)**

**Thursday, May 23, 2013 / 3:10 - 4:30 pm / Ballroom A**

**Chair:** *Sergei Yakovenko, LensVector, Inc.*

**Co-Chair:** *Alan Sobel, Flatscreen Technologies Corp.*

- 54.1: **Achieving High Stereo Contrast Ratio in Polarization Based 3D Front Projection**  
*Gary Sharp, RealD, Inc., Boulder, CO, USA*
- 54.2: **Invited Paper: High Efficiency Polarization Preserving Cinema Projection Screen**  
*Dave Coleman, RealD, Inc., Boulder, CO, USA*
- 54.3: **Full Color High Contrast Front Projection on a Black Emissive Screen**  
*Ted Sun, Superimaging, Fremont, CA, USA*
- 54.4: **Novel Transparent Emissive Display on Optically Clear Phosphor Screen**  
*Minghua Zhu, California State University, East Bay, CA, USA*

### Session 55: OLED Manufacturing (OLEDs)

Thursday, May 23, 2013 / 3:10 - 4:10 pm / Ballroom B

Chair: Chin Hsin (Fred) Chen, National Chaio Tung University

Co-Chair: Yasunori Kijima, Sony Corp.

- 55.1: **Invited Paper:** Organic Vapor Jet MicroPrinting of OLED Displays and Lighting Panel  
*Stephen Forrest, University of Michigan, Ann Arbor, MI, USA*
- 55.2: **Ink-Jet-Printed AMOLED Displays Based on IGZO TFTs: Cost Does Matter!**  
*Chih-Lei Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 55.3: **Development of Transparent Filling Type Desiccant for OLEDs**  
*Takahiro Niiyama, Futaba Corp., Chiba, Japan*
- 55.4: **Invited Paper:** Development of Highly Productive In-line Vacuum Evaporation System for OLED Lighting  
*Young Im, Sunic System, Suwon, Korea*

### Session 56: TFT Application (Active Matrix Devices)

Thursday, May 23, 2013 / 3:10 - 4:30 pm / Ballroom C

Chair: James Chang, Apple, Inc.

Co-Chair: Tohru Nishibe, Japan Display Central, Inc.

- 56.1: **Invited Paper:** Development of IGZO TFT and Creation of New Devices Using IGZO TFTs  
*Hajime Imai, Sharp Corp., Kameyama, Japan*
- 56.2: **Investigating IGZO TFT Performance under Gate Bias Stress with and without Light Illumination for 4K x 2K 65-in. Display**  
*Bo-Liang Yeh, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 56.3: **Performance Improvement of Compensation Circuit Using p-Type SPC TFT for AMOLED Driving**  
*Jungmin Lee, LG Display Co., Ltd., Gyeonggi-do, Korea*
- 56.4L: **Late News Paper:** 12.1-in. WXGA TFT LCDs Driven by Solution Processed Metal Oxide TFTs  
*Liang-Yu Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 56.5L: **Late News Paper:** All Printed Oxide TFT Arrays for High Resolution Active Matrix Displays  
*Shinji Matsumoto, Ricoh Co., Ltd., Yokohama, Japan*

### Session 57: Touch Sensors, Materials, and Manufacturing (Touch and Interactivity/Display Manufacturing)

Thursday, May 23, 2013 / 3:10 - 4:10 pm / Room 118

Chair: Willem Den Boer, Guardian Industries Corp.

Co-Chair: Lauren Palmateer, Subtle Energy Design

- 57.1: **WITHDRAWN**
- 57.2: **Transparent Conductive Coatings Made by Electrochemical and Physicochemical Method**  
*A Smirnov, Belarusian State University of Informatics and Radioelectronic, Minsk, Belaru*
- 57.3: **WITHDRAWN**
- 57.4: **Ink Jet Printed Silver Ring Coating to Replace ITO**  
*Robert Even, ClearJet, Yokneam, Israel*
- 57.5L: **Late News Paper:** Flexible Transparent Conductors and Touch Sensors for High Contrast Displays  
*Erkki Soininen, Canatu Oy, Helsinki, Finland*
- 57.6L: **Late News Paper:** Touch Sensor ITO Thin Films Deposited Using Rotary Sputtering Technology: Comparison of Coating Properties and Cost for DC vs. MF-AC Deposition.  
*Paul Lippen, Umicore Thin Film Products AG, Balzer, Liechtenstein*

### Session 58: Advanced Substrates and Manufacturing on Flex (Display Manufacturing/e-Paper and Flexible Displays)

Thursday, May 23, 2013 / 3:10 - 4:30 pm / Room 202

Chair: Greg Gibson, FAS Holdings Group

Co-Chair: Ryoichi Ishihara, Delft University of Technology

- 58.1: **Invited Paper:** Advanced Glass Substrate for the Enhancement of OLED Lighting Outcoupling Efficiency  
*Nobuhiro Nakamura, Asahi Glass Co., Ltd., Yokohama, Japan*
- 58.2: **Distinguished Paper:** Roll-to-Roll Process on Ultra Thin Flexible Glass for Manufacturing a Multi Touch Sensor Panel  
*Chia-Sheng Huang, ITRI, Hsinchu, Taiwan, ROC*
- 58.3: **Reliability and Barrier Layer Dependency of Flexible 2D/3D- witchable Liquid Crystal Cell**  
*Pin-Hsiang Chiu, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- 58.4: **A Novel Handling Method for Ultra-Thin Flexible Glass Substrates for Thin and Flexible Displays**  
*Ru-De Chen, ITRI, Hsinchu, Taiwan, ROC*

### Session 59: Novel Backlighting System (Display Systems)

Thursday, May 23, 2013 / 3:10 - 4:10 pm / Room 205

Chair: Masaru Suzuki, SKC Haas Display Film

Co-Chair: Akihiro Tagaya, Keio University

- 59.1: **A Backlight System with a Phosphor Sheet to Provide 90% NTSC Gamut with Improved Optical Efficiency**  
*Yasushi Ito, Dexerials Corp., Kanuma, Japan*
- 59.2: **A Novel LED Backlight System with Tilted Cylindrical Surfaces on the Light Guide Plate**  
*Kazutada Takaira, Mitsubishi Electric Corp., Kumamoto, Japan*
- 59.3: **Compact LED Pixelized Backlight for LCDs**  
*Chin Sher, National Tsing Hua University, Hsinchu, Taiwan, ROC*
- 59.4: **WITHDRAWN**

### Session 60: Projection Light Source (*Projection*)

Friday, May 24, 2013 / 9:00 - 10:30 am / Ballroom A

Chair: David Eccles, Rockwell Collins

Co-Chair: Fujio Okumura, NEC Corp.

- 60.1: **Integrated RGB Laser Flat Package Module Using Si Platform Technology**  
*Masafumi Ide, Citizen Holdings Co., Ltd., Tokorozawa, Japan*
- 60.2: **Distinguished Paper: A 30-W Pure Blue Emission with NUV Laser Diode Pumped Phosphor for High-Brightness Projector**  
*Kiyoshi Morimoto, Panasonic Industrial Devices Co., Kyoto, Japan*
- 60.3: **A 6-W Multi-Beam Green Laser for Companion Laser Projector**  
*Yi Gan, McMaster University, Hamilton, Ontario, Canada*
- 60.4: **A Novel Full Color 3LED Projection System Using R-G-B LEDs on Silicon (LEDoS) Microdisplay**  
*Wing Cheung Chong, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*

### Session 61: OLED Lighting I (*Lighting/OLEDs*)

Friday, May 24, 2013 / 9:00 - 10:20 am / Ballroom B

Chair: Franky So, University of Florida

Co-Chair: Mike Lu, Acuity Brands Lighting

- 61.1: **Invited Paper: 80-lm/W White OLEDs for Solid State Lighting**  
*Jaemin Moon, LG Chem, Daejeon, Korea*
- 61.2: **Phosphorescent Stacked OLEDs for Warm White Lighting Applications**  
*Xin Xu, Universal Display Corp., Ewing, NY, USA*
- 61.3: **High Performance OLEDs on Graphene Electrode and Thin c-Si TFT for Flexible Display and Lighting**  
*Ning Li, IBM T. J. Watson Research Center, Yorktown Heights, NY, USA*
- 61.4: **Bottom Emitting Large Area Stacked White OLED with Silver Nanowire Network as Transparent Anode**  
*Florian Pschenitzka, Cambrios Technologies Corp., Sunnyvale, CA, USA*
- 61.5L: **Late News Paper: Highly Efficient White OLEDs with Single Solution Processed Emitting Layer Consisting of Three Kinds of Dopant**  
*Hirota Sakuma, Hitachi Research Laboratory, Ibaraki, Japan*

### Session 62: TFTs for Mobile Displays (*Active Matrix Devices*)

Friday, May 24, 2013 / 9:00 - 10:20 am / Ballroom C

Chair: Kenichi Takatori, NLT Technologies, Ltd.

Co-Chair: Yoshitaka Yamamoto, Sharp Corp.

- 62.1: **Invited Paper: The Joys of Being Digital: Low Power Mobile Multimedia Display**  
*Richard Payne, Pixtronix, Inc., Andover, MA, USA*
- 62.2: **Invited Paper: Bridged Grain Poly-Si TFT**  
*Hoi-Sing Kwok, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*
- 62.3: **Six-Terminal OLED Display Using Low Temperature Single Crystal Silicon (LTSS) Technology**  
*Masashi Fujita, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan*
- 62.4: **High Performance Low Temperature Polycrystalline Silicon TFTs with Submicron-Dot-Array Doped Active Channel**  
*Meng Zhang, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*

### Session 63: Mechanical Reliability Testing for Displays (*Display Manufacturing*)

Friday, May 24, 2013 / 9:00 - 10:10 am / Room 202

Chair: Bradley Bowden, Corning Incorporated

Co-Chair: Don Carkner, Research In Motion

- 63.1: **Biaxial Stress in Thin Glass during Ring-on-Ring Testing with Large Deflection**  
*Suresh Gulati, Corning Incorporated, Corning, NY, USA*
- 63.2: **A Study of the Static Push Test to Define Tensile Failure Stress for Rectangle Glass**  
*Yu-Chen Liu, G-Tech Optoelectronics Corp., Miaoli, Taiwan, ROC*
- 63.3: **Best Practices in Strength Testing of LCD Glass**  
*K. Hemanth Vepakomma, Corning Incorporated, Corning, NY, USA*
- 63.4L: **Late-News Paper: New Technology for Thinner Cover Glass Substrates: Improvement of Surface Strength by Polishing after Chemical Strengthening**  
*Hiroyuki Ohkawa, Asahi Glass Co., Ltd., Kanagawa, Japan*

### Session 64: Near-to-Eye, Transparent, and Floating Displays (*Display Systems*)

Friday, May 24, 2013 / 9:00 - 10:00 am / Room 205

Chair: Bill Cumming, Qualcomm MEMS Technology

Co-Chair: W. Hendrick, Rockwell Collins Optronic

- 64.1: **High Efficiency Waveguide Display System with Achromatic Volume Hologram and a Prism In-Coupler**  
*Juan Liu, Beijing Institute of Technology, Beijing, China*
- 64.2: **Objective LC lens Array for a Near-to-Eye Display**  
*Sergiy Valyukh, IFM, Linkoping University, Linkoping, Sweden*
- 64.3L: **Late News Paper: Aerial Imaging by Retro-Reflection (AIRR)**  
*Hirotsugu Yamamoto, University of Tokushima, Tokushima, Japan*

### Session 65: Projection Display Components (*Projection*)

Friday, May 24, 2013 / 10:40 - 12:00 Noon / Ballroom A

Chair: Frederic Kahn, Kahn International, Inc.

Co-Chair: Ming Hsien Wu, Hamamatsu Corp

- 65.1: **A Vertically Aligned LCOS with Submillisecond Response Time for Color-Field-Sequential Projection Display**  
Yuan Chen, University of Central Florida, Orlando, FL, USA
- 65.2: **Blue Phase Liquid Crystals for Color Field Sequential Projection Displays**  
Linghui Rao, University of Central Florida, Orlando, FL, USA
- 65.3: **Phase-Modulation LCoS Display System with Off-Axis LED Reconstruction Light**  
Li-Yuan Liao, National Tsing Hua University, Hsinchum Taiwan, ROC
- 65.4: **Speckle Suppression by Limited Phase Range in Laser Projection System**  
Yan-Shuo Chang, National Taiwan University, Taipei, Taiwan, ROC

### Session 66: OLED Lighting II (Lighting/OLEDs)

Friday, May 24, 2013 / 10:40 - 12:00 Noon / Ballroom B

Chair: Michael Weaver, Universal Display Corp.

Co-Chair: Chin Hsin (Fred) Chen, National Chaio Tung University

- 66.1: **Invited Paper: Outcoupling Efficiency Enhancement Strategies in OLED Lighting Panel**  
Min-Hao Lu, Acuity Brands Lighting, Berkeley, CA, USA
- 66.2: **Invited Paper: Highly Efficient White OLEDs with Over 100-lm/W for General Lighting**  
Kazuyuki Yamae, Panasonic Eco Solutions Company, Osaka, Japan
- 66.3: **Highly Improved Light Out-Coupling of OLEDs by Utilizing a Simple and Easy Process Based on a Nano-Scale Random Light Extraction Structure**  
Young Wook Park, Korea University, Seoul, Korea
- 66.4: **Large Sized Flexible Display with Highly Efficient OLED**  
Nobuharu Ohsawa, Advanced Film Device, Inc., Tochigi, Japan

### Session 67: TFT Driver Circuit (Active-Matrix Devices)

Friday, May 24, 2013 / 10:40 am - 12:00 Noon / Ballroom C

Chair: Roger Stewart, Sourland Mountain Associates

Co-Chair: Norbert Fruehauf, University of Stuttgart

- 67.1: **Distinguished Student Paper: A 40- $\mu\text{m}$ -pitch IGZO TFT Gate Driver for High Resolution Rollable AMOLED Displays**  
Jin Jang, Kyung Hee University, Seoul, Korea
- 67.2: **Novel Driving Method to Compensate RC Delays in Ultra-Large Sized and High Resolution LCDs**  
Seung-Woo Lee, Kyung Hee University, Seoul, Korea
- 67.3: **New Driving Method for Reducing Eye Strain Technology (REST) in Displaying Still Images Using C Axis Aligned Crystalline IGZO LCDs**  
Hiroyuki Miyake, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 67.4: **Compensating Threshold Voltage Circuit in the Transient State for AMOLED Displays Collocated with Uni-Type GOA Driving**  
Shih-Song Cheng, AU Optronics Corp., Hsinchu, Taiwan, ROC

### Session 68: Advances in Materials for Manufacturing (Display Manufacturing)

Friday, May 24, 2013 / 10:40 am - 12:00 Noon / Room 202

Chair: Ion Bita, Qualcomm MEMS Technologies

Co-Chair: Elliott Schlam, Elliott Schlam Associates

- 68.1: **Invited Paper: Quantum Dot Manufacturing Requirements for the High Volume LCD Market**  
Seth Coe-Sullivan, QD Vision, Inc., Lexington, MA, USA
- 68.2: **Invited Paper: Development of Novel Optical Bonding Process and Materials for Flat Panel Display Modules**  
Kozaburo Hayashi, Dexerials Corp., Tochigi, Japan
- 68.3: **Liquid Optically Clear Adhesives for Next Generation Display Applications**  
Daniel Lu, Henkel China, Shanghai, China
- 68.4: **Minimizing the Impact of Bonding-Induced Defect**  
Grace Yeh, DuPont, Taoyuan, Taiwan, ROC

### Session 69: Energy Efficient Displays (Display Systems/Display Electronics)

Friday, May 24, 2013 / 10:40 am - 12:00 Noon / Room 205

Chair: Wei Chen, Apple, Inc.

Co-Chair: Haruhiko Okumura, Toshiba Corp.

- 69.1: **Image Quality Assessment of Ultra-High Resolution Mobile Display Utilizing New RGBW Method**  
Akira Sakaigawa, Japan Display, Inc., Ebina, Japan
- 69.2: **Compact Color Filter and Polarizer Based on Nanowire Grating for Energy Efficient Displays**  
Zhicheng Ye, Shanghai Jiao Tong University, Shanghai, China
- 69.3: **Balancing Luminance Boosting and Color Breakup Reduction for a Color Sequential Display**  
Martin Hammer, TP Vision, Eindhoven, The Netherlands
- 69.4: **Invited Paper: Extending Battery Life of Ultrabook through Use of Panel Self-Refresh Technology**  
Kamal Shah, Intel Corp., Hillsboro, OR, USA

### Poster Session

Thursday, May 23, 2013 / 4:00 - 7:00 pm / West Exhibit Hall B

#### 3D

- P.1: **Distinguished Student Poster Paper: Submillisecond Response Time Liquid Crystal Cylindrical Microlens Array for 3D Display**  
Jie Sun, University of Central Florida, Orlando, FL, USA
- P.2: **New Approach of Flexible e-Paper with Single Particles**  
Seung Yong Jeong, Korean Institute of Industrial Technology, Cheonan, Korea

## Active-Matrix Devices

- P.3:** **3D Stacked Complementary TFT Devices Using n-Type a-IGZO and p-Type F8T2 TFTs: Operation Confirmation of NOT and NAND Logic Circuits**  
*Mutsumi Kimura, Ryukoku University, Otsu, Japan*
- P.4:** **A Charge-Cyclic Digital-to-Analog Converter for IGZO TFT Integrated Sata Driver**  
*Congwei Liao, Peking University, Shenzhen, China*
- P.5:** **Highly Uniform Solid Phase Crystallized Bridged-Grain Poly-Si TFT**  
*Wei Zhou, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*
- P.6:** **An Integrated a-Si:H Gate Driver Circuit Design for Large Sized TFT LCD Applications**  
*Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC*
- P.7:** **New Pixel Structure with High Gray-to-Gray Response Time for Large Sized and High Resolution AMOLED TVs.**  
*Joong-Sun Yoon, LG Display Co., Ltd., Gyeonggi-do, Korea*
- P.8:** **Trap States in Amorphous-ITZO TFTs Analyzed Using the Dependence on Channel Thickness**  
*Mutsumi Kimura, Ryukoku University, Otsu, Japan*
- P.9:** **Power Saving Sunlight Readable TFT LCD**  
*Yao-Dong Ma, MacroDisplay Inc., Richardson, TX, USA*
- P.10:** **WITHDRAWN**
- P.11:** **Recognition of Existence of n-Type IGZO Layer in CAAC IGZO Film under a Source and Drain Electrode Made of Tungsten**  
*Ryo Tokumaru, Kanagawa, Japan*
- P.12:** **Development of Novel Post-Annealing Process for Flexible Oxide TFTs**  
*Po-Tsun Liu, National Chiao Tung University, Hsinchu, Taiwan, ROC*
- P.13:** **Rollable a-IGZO TFTs with Nanocomposite Dielectric on PEN Substrate**  
*Zingway Pei, National Chung Hsing University, Taichung, Taiwan, ROC*
- P.14:** ***Distinguished Poster Paper:* Separate Extraction Technique of Intrinsic Donor and Acceptor Like Density of States over Full Energy Range Sub-Bandgap in Amorphous Oxide Semiconductor TFTs by Using One Shot Monochromatic Photonic Capacitance-Voltage Characteristic**  
*Dong Kim, Kookmin University, Seoul, Korea*
- P.15:** **Influence of Photo-Thermal Pre-Treatment on Electrical Characteristics and Reliability of ZnSnO TFTs**  
*Ting-Chang Chang, National Sun Yat-Sen University, Kaohsiung, Taiwan, ROC*
- P.16:** **Dynamic Supply Voltage Scaling of Pixel Circuits for Static Power Reduction in AMOLED Displays**  
*Xiaojun Guo, Shanghai Jiao Tong University, Shanghai, China*
- P.17:** **Integration of Solution Processed Oxide TFTs with Normal Structure OLEDs for Low Voltage Operation Top Emitting AMOLED Display**  
*Xiaojun Guo, Shanghai Jiao Tong University, Shanghai, China*
- P.18:** **Effects of Interface and Bulk States on the Stability of Amorphous-InGaZnO TFTs under Gate Bias and Temperature Stress**  
*Runze Zhan, Shanghai Jiao Tong University, Shanghai, China*
- P.19:** **Density-of-States Based Device Circuit Co-Design Platform for Solution Processed Organic Integrated Circuit**  
*Dae Kim, Kookmin University, Seoul, Korea*
- P.20:** **Transfer Characteristic-Based Electro-Optical Technique for Characterization of Carrier Lifetimes with Associated Physical Mechanisms in Polymer-Based Organic TFTs**  
*Dong Kim, Kookmin University, Seoul, Korea*
- P.21:** **High Input Impedance Active Pixel Sensing Circuit with Threshold Voltage Compensation Implemented by Dual Gate IGZO TFTs**  
*Lu-Sheng Chou, National Chiao Tung University, Hsinchu, Taiwan*
- P.22:** **Improving Switching Characteristics of Amorphous InGaZnO<sub>4</sub> TFTs by Dual Gate Driving**  
*Jin Jang, Kyung Hee University, Seoul, Korea*
- P.23:** **Nano-Si Optical Pixel Sensor Array Using TFT Technology as Image Scan/Fingerprint Panel**  
*An-Thung Cho, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- P.157L:** ***Late News Poster:* Characterization of Asymmetrical Negative Bias Stress Effect on the Density of States and Parasitic Resistances in a-IGZO TFTs**  
*Dong Kim, Kookmin University, Seoul, Korea*

## Applied Vision

- P.24:** **Relationship between Recognition of Illumination and Depth Perception**  
*Hiroyuki Kaji, Utsunomiya University, Utsunomiya, Japan*
- P.25:** **The Effect of Environmental Illumination and Screen Brightness on Accommodation and Convergence**  
*Yuki Okada, Nagoya University, Nagoya, Japan*
- P.26:** **Constant vs. Non-Constant Luminance Video Signals for UHD TV**  
*Seo Young Choi, SAIT, Yongin, Korea*
- P.27:** **Effect of Blue Primary Color on Preference and Colorfulness of Display**  
*Seung Hyun Kim, LG Display Co., Ltd., Gyeonggi-do, Korea*
- P.28:** **Hue Blending Method: Improved Red-Green Color Segregation Capability for Dichromacy Support**  
*Sakuichi Ohtsuka, Kagoshima University, Kagoshima, Japan*
- P.29:** ***Distinguished Poster Paper:* Perception of Sparkle in Anti-Glare Display Screen**  
*Jame Ferwerda, Rochester Institute of Technology, Rochester, NY, USA*
- P.30:** **Effect of the Correlated Color Temperature of Light on Overhead Glare in Office Environment**  
*Yan Tu, Southeast University, Nanjing, China*
- P.134L:** ***Late News Poster:* Resolution Limits for Smartphones: Video Playback**  
*Lee Spencer, Sharp Devices Europe, Oxford, UK*

## Display Electronics

- P.31:** **Image Compression for Color Sequential LCOS with Decompression at the Retina**  
*Andrew Russell, Syndiant, Inc., Dallas, TX, USA*
- P.32:** **A New a-IGZO AMOLED Pixel Circuit Design to Improve the OLED Luminance Degradation in 3D Display**  
*Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC*
- P.33:** **Homogeneous Backlight Distribution Algorithm for SCC Local Dimming Edge-Lit LCD**  
*Tobia Jung, Saarland University, Saarbruecken, Germany*

- P.34: A Video Signal Coding Method Based on an Absolute Color Space for Saving Bit Depth**  
*Senfar Wen, Yuan Ze University, Chung-Li, Taiwan, ROC*
- P.35: Charge Recycling Match Technique for Low Power Display Column Driver**  
*Ke-Horng Chen, National Chiao Tung University, Hsinchu, Taiwan, ROC*

### Display Manufacturing

- P.36: Analysis of Rubbing Mura in Fringe Field Switching LCD**  
*Wei Zhang, BOE Optoelectronics Technology Co., Ltd., Beijing, China*
- P.37: Novel Gray-Toneless Technology for Mask Reduction in High Aperture FFS Mode**  
*Seung-Jin Choi, BOE Technology Group Co., Ltd., Beijing, China*
- P.38: Estimate of the Distribution of Contrast Ratio in Optically Compensated IPS Mode Using the Response Surface Method**  
*Koji Yonemura, Mitsubishi Electric Corp., Kumamoto, Japan*
- P.39: Study of Uncured Sealant Contamination of Liquid Crystal in One Drop Filling Process for TFT LCDs**  
*Ang Xiao, BOE Optoelectronics Technology Co., Ltd., Beijing, China*
- P.40: Encapsulated Flexible OLEDs: Progress toward a Simple and Cost Effective Contact Printing Technique**  
*Byeong-Kwon Ju, Korea University, Seoul, Korea*
- P.41: Display Component Quality and Process Control with Advanced Automated Optical Inspection**  
*Jochen Koenig, Dr. Schenk Inspection Systems, Woodbury, MN, USA*
- P.149L: *Late News Poster*: Behavior of OLED Panel During Four Point Bending**  
*Tzu-Chi Tseng, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- P.154L: *Late News Poster*: Establishment of Evaluation Method of Surface Fracture mode with Front-Side Origin for Cover Glass**  
*Aya Nakagawa, Asahi Glass Co., Ltd., Kanagawa, Japan*

### Display Measurement

- P.42: Estimation and Evaluation of Image Sticking on OLED Devices**  
*Kyongho Lim, LG Display Co., Ltd., Gyeonggi-do, Korea*
- P.43: Model Development for Cell Gap Induced Mura to Improve Quality of Glass Substrates to Display Manufacturers**  
*Michal Mlejnek, Corning Incorporated, Corning, NY, USA*
- P.44: Display Aspect Simulation Using Measured Emissive and Reflective Display Imperfection**  
*Pierre Boher, ELDIM, Herouville, France*
- P.45: The Study of LCD Panel Touch Mura**  
*John Liang, Corning Incorporated, Corning, NY, USA*

### Display Systems

- P.46: Enhanced Single Viewing Zone Integral Imaging Display Based on Medium Packing Technique**  
*Qiong-Hua Wang, Sichuan University, Chengdu, China*
- P.47: Integral Imaging Display Based on Space Multiplexed Elemental Image Array**  
*Qiong-Hua Wang, Sichuan University, Chengdu, China*
- P.48: Flat Panel Autostereoscopic Display with Wide Viewing Zone Using Time Division Multiplexing Backlight**  
*Shuta Ishizuka, University of Tsukuba, Tsukuba, Japan*
- P.49: Light Diffusing Films Using Two Step UV Irradiation for Various Displays**  
*Kentaro Kusama, LINTEC Corp., Warabi, Japan*
- P.50: Design of a Novel Hybrid Light Guide Plate for Viewing-Angle Switchable Backlight Module**  
*Jui Pan, National Chiao Tung University, Tainan, Taiwan, ROC*
- P.51: Local Gamma Adjustment for High Frame Rate LCDs**  
*Hyun-Dae Lee, Samsung Display Co., Gyeonggi-do, Korea*
- P.52: A Colorful Holographic Display System with Enlarged Viewing Zone Using Multiplex SLM**  
*Juan Liu, Beijing Institute of Technology, Beijing, China*
- P.53: Low Dynamic Crosstalk in Scanning Liquid Crystal Prism Type 3D Display**  
*Jian Gang Lu, Shanghai Jiao Tong University, Shanghai, China*
- P.54: Light Field Integral Display Using LCD and Eye Tracking Technique**  
*Han Wang, Zhejiang University, Hangzhou, China*
- P.55: Study of Optimal Viewing Distance in an Autostereoscopic 3D (AS3D) Display**  
*Hsu-Wan Hsuan, National Taiwan University, Taipei, Taiwan*
- P.56: X-Shaped Pixel Alignment in Large Scale Image Display System**  
*Satoshi Yamanaka, Mitsubishi Electric Corp., Kyoto, Japan*
- P.57: Transmissive and Reflec\*-tive Dual Operational Mode Display Device**  
*Ju-Ai Ruan, NOVA MEMS Display, Plano, TX, USA*
- P.147L: *Late News Poster*: Adaptive Anisotropic Diffusion for Depth Map Enhancement in 3D Video Coding**  
*Ilsoon Lim, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea*
- P.148L: *Late News Poster*: 3D Integral Imaging Display System Using Eye Tracking Method**  
*Yiyang Pu, TCL Corporate Research, Shenzhen, Guangdong, China*

### Emissive Displays

- P.58: Quantitative Assessment of Host-to-Activator Energy Transfer Efficiency of Multiple d-Orbital Trap States for Microcrystalline YBO<sub>3</sub>:Tb<sup>3+</sup>**  
*Max Wallace, Central Washington University, Ellensburg, WA, USA*
- P.59: New Synthesis of Novel Phosphor for LED Technology: Synthesizing Sr<sub>3</sub>Y<sub>2</sub>(BO<sub>3</sub>)<sub>4</sub>:Eu<sup>2+</sup> from Strontium Borate Precursor**  
*Troy Kilburn, Central Washington University, Ellensburg, WA, USA*

## e-Paper and Flexible Displays

### Flexible TFTs

- P.60: Thermally Stable Organic Semiconductor for Solution Processed Field Effect Transistors with High Mobilitie**  
*Takashi Fukuda, Tosoh Corp., Yokkaichi, Japan*
- P.61: Negative Mold Transfer-Patterned Conductive Polymer Electrode for Flexible OLED Displays**  
*Byeong-Kwon Ju, Korea University, Seoul, Korea*
- P.62: Effects of Amorphous-InGaZnO TFTs with Various Buffer Layers on a Polyimide Substrate under Negative Bias Temperature Stress**  
*Jin-Seong Park, Dankook University, Cheonan, Korea*
- P.63: Low Temperature Oxide TFTs on Plastic Films for Flexible Display Application**  
*Wei-Ting Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC*
- P.64: WITHDRAWN**
- P.65: The Effect of Surface Polarity of Gate Dielectric Buffer Layer on Operational Stability of Organic TFTs**  
*Changhee Lee, Seoul National University, Seoul, Korea*

### e-Paper

- P.66: An Electrowetting Light Valve Using ODF Assembly Process**  
*In-cha Hsieh, National Chung Hsing University, Taichung, Taiwan, ROC*
- P.67: Reflective Color Displays Using Photonic Crystal**  
*Zhenyue Luo, University of Central Florida, Orlando, FL, USA*
- P.68: Reflective Interferometric Modulator Display with Temporal Color Modulation**  
*Ji Zhong, Jiaying Unipel Display Technologies, Ltd., Zhejiang, China*
- P.69: Large Area Seamlessly Tiled Flexible eBoard**  
*Erica Montbach, Kent Display, Kent, OH, USA*
- P.70: Durability and Reliability of an eWriter**  
*Clinton Braganza, Kent Display, Kent, OH, USA*
- P.135L: WITHDRAWN**
- P.136L: *Late News Poster*: Using Independent Component Analysis for Colorant Estimation in Electrophoretic Displays**  
*Yen-Hsing Lu, National Chiao Tung University, Hsinchu, Taiwan, ROC*
- P.150L: *Late-News Poster*: Conformal Display**  
*Ming-Huan Yang, ITRI, Hsinchu, Taiwan, ROC*

### Lighting Applications

- P.71: High Efficiency and High Uniformity Modularized Street Lamp Light Engine with a Single LED Source**  
*Kuan-Yu Chen, Chilin Technology Co., Ltd., Tainan, Taiwan, ROC*
- P.72: Glass Based Color Conversion Multilayer for White LEDs and Its Angular Color Performance**  
*Li-Yin Chen, National Sun Yat-sen University, Kaohsiung, Taiwan, ROC*
- P.73: WITHDRAWN**

### Liquid-Crystal Technology

#### Blue Phase

- P.74: Polymer Stabilized Double Twist Cylinders of Blue Phase Liquid Crystal for Reduced Hysteresis and Operating Voltage**  
*Seung Hee Lee, Nano-Science and Engineering, Jeonju, Korea*
- P.75: Temperature Dependence of Dielectric and Electro-Optical Properties and Disordered Structure in Polymer Stabilized Blue Phases at Low Temperature**  
*Gihwan Lim, Kyushu University, Kasuga, Japan*
- P.76: Threshold Temperature Effect on Phase Transition of Blue Phase Liquid Crystal**  
*Jian Gang Lu, Shanghai Jiao Tong University, Shanghai, China*
- P.77: High Transmittance Blue Phase LCD with a Floating Electrode**  
*Yifan Liu, University of Central Florida, Orlando, FL, USA*
- P.78: A Tunable Microlens Using Two Blue Phase Liquid Crystal Layers with Different Kerr Constant**  
*Yan Li, University of Central Florida, Orlando, FL, USA*
- P.79: WITHDRAWN**  
*Tsung-Hsien Lin, National Sun Yat-Sen University, Kaohsiung, Taiwan, ROC*
- P.80: Analysis of Polymer Network Structure of Polymer Stabilized Blue Phase**  
*Musun Kwak, LG Display Co., Ltd., Gyeonggi-do, Korea*
- P.81: A Time Multiplexed Dual View Display Using Blue Phase Liquid Crystal**  
*Qiong-Hua Wang, Sichuan University, Chengdu, China*
- P.82: Entire Spectrum Measurement of Kerr Constant and Birefringence Dispersion in a Polymer Stabilized Blue Phase Liquid Crystal Composite**  
*Hongqing Cui, infoVision Optoelectronics (Kunshan) Co., Ltd., Kunshan, China*
- P.137L: *Late News Poster*: Polymer Dispersed Blue Phase Liquid Crystal**  
*Emine Kemiklioglu, Kent State University, Liquid Crystal Institute, Kent, OH, USA*

#### Fast Switching

- P.83: Electrically Suppressed Helix Ferroelectric LC Field Sequential Color Display**  
*Abhishek Srivastava, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*
- P.84: Increasing the Light Modulation Frequency Due to the Increase in FLC Viscosity**  
*Igor Kompanet, P. N. Lebedev Physical Institute, Moscow, Russia*
- P.85: Fast Switching of an IPS Cell at Low Temperature by Forming Polymer Network**  
*Tae-Hoon Yoon, Pusan National University, Busan, Korea*
- P.86: A Novel Bistable LCD Having Memory Display Mode and High Speed Switching Mode**  
*Taiju Takahashi, Kogakuin University, Tokyo, Japan*



- P.87: The Study of Improvements in the Flatness of an LCD Panel Using an Advanced Polarizer**  
Seong Han Hwang, LG Display Co., Ltd., Gyeonggi-do, Korea
- P.88: A Novel Design of a Polarizer with a Parallel Absorb Axis**  
Chih-Tsung Kang, Shenzhen China Star Optoelectronics Technology Co., Shenzhen, Guangdong, China
- P.156L: Late News Poster: Real Time Dynamic Color Holographic Display Using a Super-Fast-Response Liquid Crystal Thin Film**  
Hongyue Gao, Virginia Tech, Blacksburg, VA, USA

### LCD Optical Characteristics

- P.89: Direct Measurements of Asymmetric Pretilt Angles of Optically Compensated Bend (OCB) Nematic Liquid Crystal Cell**  
Sheng-Ya Wang, National Chiao Tung University, Tainan, Taiwan, ROC
- P.90: Optical Properties of LC Cells with Hybrid Orientation and Negative Birefringence**  
V Belyaev, Moscow Region State University, Moscow, Russia
- P.91: Adobe RGB LCD Monitor with Three Primary Colors by Using Deep-Green Color Filter Technology**  
Seung Hoon Ji, LG Display Co., Ltd., Gyeonggi-do, Korea
- P.92: Characterization of Complex Liquid Crystal Polarization Gratings at Oblique Incidence Using Extended Jones Matrix Method**  
Li Tan, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

### Polymer Dispersed Liquid Crystal

- P.93: Optically Isotropic Polymer Dispersed Liquid-Crystal Composite for High Contrast Ratio and Fast Response Time**  
Seung Hee Lee, Chonbuk National University, Jeonju, Korea
- P.94: A High-Sensitivity PDLC Based Electro-Optic Modulator for TFT Array Inspection**  
Chang-Jae Yu, Hanyang University, Seoul, Korea
- P.95: Process Technology of Flexible and Transparent Display by Stacking OLED and PDLC Embedded with OPV**  
Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan, ROC
- P.96: Synthesis of Reactive Mesogen and Its Stabilizing Characteristics in Polymer Stabilized Vertically Aligned LCD**  
Seung Hee Lee, Chonbuk National University, Jeonju, Korea

### Surface and Alignment

- P.97: Low Driving Voltage and Gray Scale Capability of Nanostructure Enhanced Cholesteric Liquid Crystal Device**  
Yi-Fan Liang, National Chiao Tung University, Hsinchu, Taiwan, ROC
- P.98: Novel Composite Photo-Alignment Layer for Ferroelectric LCD**  
Qi Guo, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong
- P.99: Alignment Peculiarities of Cholesteric Liquid Crystals on the Surfaces Processed by Plasma Beam**  
Oleg Yaroshchuk, Institute of Physics, National Academy of Science Ukraine, Kyiv, Ukraine
- P.100: Multi-Domain Vertical Alignment of Liquid Crystals through Control of the Anchoring Energy**  
Tae-Hoon Yoon, Pusan National University, Busan, Korea
- P.146L: Late News Poster: Practical Approach of New Photoalignment Material for High Quality Competitive Retardation Film**  
Gyo-jic Shin, Korea Institute of Industrial Technology (KITECH), Cheonan-do, Korea
- P.155L: Late News Poster: Surface Monolayer Stabilized Vertically Aligned Liquid Crystals for Display Applications**  
Shin-Woong Kang, Chonbuk National University, Jeonju, Korea

### Wide-Viewing

- P.101: Investigation on Flexoelectric Effect in the Fringe Field Switching Mode**  
Seung Hee Lee, Chonbuk National University, Jeonju, Korea
- P.102: Improvement of Gamma Curve Distortion in VA LCDs by Using an Optical Film-Patterned Retarder**  
Gi Dong Lee, Dong-A University, Busan, Korea
- P.103: High Transmittance LC Mode Based on Fringe Field Switching of Vertically Aligned Negative LC**  
Tae-Hoon Yoon, Pusan National University, Busan, Korea
- P.104: Two Face Viewable Display Using Dye Doped Liquid Crystal**  
Chao Ping Chen, Shanghai Jiao Tong University, Shanghai, China
- P.105: Normally Black Electrically Controlled Birefringence Mode with Slit Electrode Structure**  
Jin Seog Gwang, Yeungnam University, Gyeonggi-do, Korea

### OLEDs

- P.106: Magnetic Resonant Wireless Power Transmission to Thin OLED Lighting Panel**  
Yong-Hae Kim, ETRI, Daejeon, Korea
- P.107: New Emissive Materials for Mixed Host Architectures to Achieve Longer Lifetime for Green-to-Red Phosphorescent OLED Displays and Lighting Application**  
Cheng Yao, E-Ray Optoelectronics Technology Co., Ltd., Chungli, Taiwan, ROC
- P.108: Organic Wrinkles as Optical Scattering Source**  
Jaehyun Moon, ETRI, Daejeon, Korea
- P.109: Improvement of the Outcoupling Efficiency of Blue OLEDs**  
Kyung Cheol Choi, KAIST, Daejeon, Korea
- P.110: High Efficiency OLEDs Based on the Gradient Doping in Transport Layer**  
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