



PROGRAM

2014 SID INTERNATIONAL SYMPOSIUM

June 3-6, 2014 (Tuesday – Friday)
San Diego Convention Center
San Diego, California, USA

Session 1: Annual SID Business Meeting

Tuesday, June 3 / 8:00 – 8:20 am / Room 6A

Session 2: Opening Remarks / Keynote Addresses

Tuesday, June 3 / 8:20 – 10:20 am / Room 6B

- 2.1: **Keynote 1: Trends in China's Display Industry and BOE's Role**
Mr. Dongsheng Wang, Chairman, BOE Technology Group Co., Beijing, China
- 2.2: **Keynote 2: The Role of Materials in New Display Technology Developments**
Dr. Michael Heckmeier, Senior VP, Liquid Crystals Research and Development, Merck, Darmstadt, Germany
- 2.3: **Keynote 3: Toward an Immersive Image Experience**
Dr. Kazumasa Nomoto, Senior GM, Display Device Development Division, R&D Platform, Sony Corp., Kanagawa, Japan

Session 3: Oxide TFTs vs. LTPS I (Oxide vs. LTPS/Active-Matrix Devices)

Tuesday, June 3 / 10:50 am – 12:10 pm / Room 6A

Chair: *Arokia Nathan, University of Cambridge*

Co-Chair: *Yoshitaka Yamamoto, Semiconductor Energy Laboratory Co., Ltd.*

- 3.1: **Invited Paper: Oxide versus LTPS TFTs for Active-Matrix Displays**
Jin Jang, Kyung Hee University, Seoul, South Korea
- 3.2: **Invited Paper: Application of Rotation Magnet Sputtering Technology to a-IGZO Film Depositions**
Tetsuya Goto, Tohoku University, Sendai, Japan
- 3.3: **Invited Paper: Future Possibility of C-Axis-Aligned Crystalline Oxide Semiconductor: Comparison with Low-Temperature Polysilicon**
Shunpei Yamazaki, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 3.4L: **Late-News Paper: Advanced ELA for Large-Sized AMOLED Displays**
Minhwan Choi, Samsung Display Co., Ltd., Kyunggi-do, South Korea

Session 4: Display Manufacturing: LCD Materials (Display Manufacturing)

Tuesday, June 3 / 10:50 am – 12:10 pm / Room 6B

Chair: *Chiwoo Kim, Samsung Display Co., Ltd.*

Co-Chair: *Dawei Wang, BOE Technology Group Co., Ltd.*

- 4.1: **Distinguished Paper: Cavity-Shape Control of the Roll-to-Roll Fabricated Novel Microstructure Film for Improving the Viewing-Angle Characteristics of LCDs**
Yasushi Asaoka, Sharp Corp., Chiba, Japan
- 4.2: **Vertical Electrode Fabrication Using Conventional LCD Processes**
Kang-il Kim, LG Display Co., Ltd., Kyunggi-do, South Korea
- 4.3: **Novel Photosensitive Organic Insulator for High-Definition FPD Applications**
Hideyuki Nakamura, FUJIFILM Corp., Shizuoka, Japan
- 4.4: **Vacuumless Lamination of Printable LOCA**
Christopher Campbell, 3M Co., St. Paul, MN, USA

Session 5: OLED Devices I (OLEDs)

Tuesday, June 3 / 10:50 am – 12:10 pm / Room 1

Chair: *Denis Kondakov, DuPont*

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

- 5.1: **Invited Paper: Degradation Analysis of OLEDs by Time-Resolved Photoluminescence Measurements**
Hideyuki Murata, Japan Advanced Institute of Science and Technology, Ishikawa, Japan
- 5.2: **Evidence for the Involvement of Water in the Long-Term Degradation of Green Phosphorescent OLEDs**
Tetsuo Tsutsui, Chemical Materials Evaluation and Research Base (CEREBA), Tsukuba, Japan
- 5.3: **Highly Efficient OLEDs Fabricated on Corrugated High-Index Substrates**
Franky So, University of Florida, Gainesville, FL, USA
- 5.4L: **Late-News Paper: ALA Mediated Metronomic Photodynamic Therapy in Mouse Gliomas Model Using OLEDs**
Meng-Huan Ho, AU Optonics Corp., Hsinchu, Taiwan, ROC

Session 6: Display Manufacturing: Flexible Substrates (Display Manufacturing / e-Paper and Flexible Displays)

Tuesday, June 3 / 10:50 am – 12:10 pm / Room 2

Chair: *Tian Xiao, CBRITE, Inc.*

Co-Chair: *Ryoichi Ishihara, Delft University*

- 6.1: **Invited Paper: Handling Technology of Plastic Substrates in Flexible Display Manufacturing**
Min-Feng Chiang, AU Optonics Corp., Hsinchu, Taiwan, ROC
- 6.2: **Invited Paper: A New Automated Manufacturing Line of All-Printed TFT-Array Flexible Film**
Toshihide Kamata, Japan Advanced Printed Electronics Technology Research Association (JAPER), Tsukuba, Japan

- 6.3: **Application of Nanocomposite Materials in the Backplane Technology of Flexible Displays**
Kun-Lung Hsieh, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 6.4: **Ultra-High Gas-Barrier Films Based on a Layered Stack Having a Few Barrier Layers Fabricated by a Wet-Coating Process and Plasma-Assisted Surface Modification**
Yuta Suzuki, LINTEC Corp., Saitama, Japan

Session 7: Electroluminescent Quantum Dots (*Emissive Displays*)

Tuesday, June 3 / 10:50 am – 12:20 pm / Room 5

Chair: *Seth Coe-Sullivan, QD Vision, Inc.*

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

- 7.1: **Invited Paper: Quantum Dot and Other Nano-Technologies as Extremely Thin Displays and Active Surfaces**
Vladimir Bulovic, MIT, Cambridge, MA, USA
- 7.2: **Red Quantum Dots under the Electron Microscope**
George Fern, Brunel University, Uxbridge, UK
- 7.3: **Influence of Layer Thickness on the Performance of Quantum-Dot Light-Emitting Devices**
Jing Chen, Southeast University, Nanjing, China
- 7.4: **Invited Paper: High-Efficiency Quantum-Dot LEDs for Displays**
Jin Jang, Kyung Hee University, Seoul, South Korea
- 7.5L: **Late-News Paper: Cathodoluminescence Quantum Efficiency of Quantum-Dot Thin Films**
Heayoung Yoon, National Institute of Standards and Technology, Gaithersburg, MD, USA

Session 8: Oxide TFTs vs. LTPS II (*Oxide TFTs vs. LTPS / Active-Matrix Devices*)

Tuesday, June 3 / 2:00 – 3:20 pm / Room 6A

Chair: *James Chang, Apple, Inc.*

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

- 8.1: **Invited Paper: Value of LTPS: Present and Future**
Hiroyuki Ohshima, Japan Display, Inc., Tokyo, Japan
- 8.2: **Invited Paper: Current Status and Future Promise of Excimer-Laser Annealing for LTPS on Large Glass Substrates**
Rainer Paetzel, Coherent LaserSystems GmbH & Co. KG, Gottingen, Germany
- 8.3: **Invited Paper: Advantages of IGZO Oxide Semiconductors**
Shigeyasu Mori, Sharp Corp., Nara, Japan
- 8.4L: **Late-News Paper: Electrical Properties of a-IGZO Films Depending on Trap States**
Ju-Yeon Kim, Hoseo University, Chungnam-do, South Korea

Session 9: High-Resolution LCDs (*Liquid-Crystal Technology*)

Tuesday, June 3 / 2:00 – 3:00 pm / Room 6B

Chair: *Cheng Chen, Apple, Inc.*

Co-Chair: *Takahiro Ishinabe, Tohoku University*

- 9.1: **Invited Paper: Fast High-Resolution Ferroelectric LCDs**
Vladimir G. Chigrinov, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- 9.2: **High-Image-Quality Reflective Color LCD Using Novel RGBW Technology**
Masashi Mitsui, Japan Display, Inc., Kanagawa, Japan
- 9.3: **Analysis of Liquid-Crystal Drop Mura in High-Resolution Mobile TFT-LCDs**
Hongpeng Lee, BOE Optoelectronics Technology Co., Ltd., Beijing, China
- 9.4: **Invited Paper: Highly Birefringence Nematic Liquid Crystals and Mixtures**
Przemyslaw Kula, Military University of Technology, Warsaw, Poland

Session 10: Flexible OLEDs I (*OLEDs*)

Tuesday, June 3 / 2:00 – 3:20 pm / Room 1

Chair: *Tariq Ali, eMagin Corp.*

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

- 10.1: **Invited Paper: OLED Lighting Commercialization on Flexible Barrier Film Substrates**
Takatashi Tsujimura, Konica Minolta, Inc., Tokyo, Japan
- 10.2: **Strategic Approach to the Reliable Evaluation of the Water Vapor Barrier Properties for Flexible OLED Displays**
Akira Suzuki, Chemical Materials Evaluation and Research Base (CEREBA), Tsukuba, Japan
- 10.3: **Predicting the Lifetime of Flexible Permeation Barrier Layers for OLED Displays**
Bhadri Visweswaran, Princeton University, Princeton, NJ, USA
- 10.4: **A Delamination Method for Flexible OLED Displays**
Chia-Hsun Tu, AU Optronics Corp., Hsinchu, Taiwan, ROC

Session 11: Flexible Interactive Displays (*Touch and Interactivity / e-Paper and Flexible Displays*)

Tuesday, June 3 / 2:00 – 3:00 pm / Room 2

Chair: *Steven Bathiche, Microsoft Research*

Co-Chair: *Chao-Yuan Chen, Jiangsu Hecheng Display Technology*

- 11.1: **A 4-mm-Radius Curved Display with a Touch Screen**
Takayuki Ikeda, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 11.2: **Invited Paper: Imperceptible Electronic Skin**
Tsuyoshi Sekitani, University of Tokyo, Tokyo, Japan
- 11.3: **A Curvature Sensing Circuit for Flexible Displays**
Po-Yang Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC

Session 12: Photoluminescent Quantum Dots (*Emissive Displays*)

Tuesday, June 3 / 2:00 – 3:40 pm / Room 5

Chair: Masayuki Nakamoto, Shizuoka University

Co-Chair: Yong-Seog Kim, Hong-ik University

- 12.1: **Invited Paper: Quantum Dots: The Ultimate Down-Conversion Material for LCDs**
Jonathan Steckel, QD Vision, Inc., Lexington, MA, USA
- 12.2: **Invited Paper: Colloidal Quantum Rods and Wells for Lighting and Lasing Applications**
Dmitri Talapin, University of Chicago, Chicago, IL, USA
- 12.3: **Core-Shell Quantum Dots Synthesized by Using Tri-n-Octylphosphine-Assisted Method for High-Color-Saturation Displays**
Kai Wang, South University of Science and Technology of China, Shenzhen, China
- 12.4: **Surface Exciton Properties of MgO in ZnO-MgO Core-Shell Quantum Dots**
Wen-Jian Kuang, Southeast University, Nanjing, China
- 12.5L: **Late-News Paper: Quantum Dots for High-Color-Gamut LCDs Using an On-Chip LED Solution**
Julian Osinski, Pacific Light Technologies, Portland, OR, USA

Session 13: Oxide vs. LTPS TFTs III (*Oxide vs. LTPS / Active-Matrix Devices*)

Tuesday, June 3 / 3:40 – 5:00 pm / Room 6A

Chair: Man Wong, Hong Kong University of Science & Technology

Co-Chair: Takatoshi Tsujimura, Konica Minolta, Inc.

- 13.1: **Invited Paper: Excimer-Laser Annealing: Microstructure Evolution and a Novel Characterization Technique**
Paul Christian van der Wilt, Coherent Laser Systems GmbH & Co. KG, Goettingen, Germany
- 13.2: **Invited Paper: LTPS vs Oxide Backplanes for AMOLED Displays: System Design Considerations and Compensation Techniques**
Reza Chaji, IGNIS Innovation, Waterloo, Ontario, Canada
- 13.3L: **Late-News Paper: Roll-to-Roll Processed and Top-Gate-Structured a-InGaZnO TFTs with Large Source/Drain Offsets**
Kyung Min Kim, LG Display Co., Ltd., Kyunggi-do, South Korea
- 13.4: **Flexible Low-Temperature Solution-Processed Oxide-Semiconductor TFT Backplanes for Use in AMOLED Displays**
Brian Cobb, TNO/Holst Centre, Eindhoven, The Netherlands

Session 14: Blue-Phase LCDs (*Liquid-Crystal Technology*)

Tuesday, June 3 / 3:40 – 5:00 pm / Room 6B

Chair: Michael Wand, LC Vision, LLC

Co-Chair: Philip Bos, Kent State University

- 14.1: **Low-Temperature and High-Frequency-Operation Limits of a Blue-Phase Liquid Crystal**
Fenglin Peng, University of Central Florida, Orlando, FL, USA
- 14.2: **Distinguished Student Paper: Low-Voltage High-Transmittance Blue-Phase LCDs**
Daming Xu, University of Central Florida, Orlando, FL, USA
- 14.3: **Improving Kerr Constant of Polymer-Stabilized Blue-Phase Liquid Crystal with Multiple Dopants**
Jian-Gang Lu, Shanghai Jiao Tong University, Shanghai, China
- 14.4: **A Hysteresis-Free Polymer-Stabilized Blue-Phase Liquid Crystal**
Yifan Liu, University of Central Florida, Orlando, FL, USA

Session 15: Flexible OLEDs II (*OLEDs*)

Tuesday, June 3 / 3:40 – 5:00 pm / Room 1

Chair: Yusin Lin, AU Optronics Corp.

Co-Chair: Chin Hsin (Fred) Chen, Guangdong Aglaia Optoelectronic Materials Co., Ltd.

- 15.1: **Invited Paper: Printed Organic TFT Arrays and Integrated Circuits**
Shizuo Tokito, Yamagata University, Yamagata, Japan
- 15.2: **Method to Measure the Optical Performance of Flexible OLED Displays**
Jong-Ho Chong, Samsung Display Co., Ltd., Kyunggi-do, South Korea
- 15.3: **Development of Side-Roll and Top-Roll Panels for an RGBW High-Resolution Flexible Display Using a White OLED with Microcavity Structure**
Riho Kataishi, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 15.4L: **Late-News Paper: A 7-in. Full-Color Flexible PMOLED Displays on Plastic Substrates**

Session 16: Touch Sensor Materials (*Touch and Interactivity*)

Tuesday, June 3 / 3:40 – 4:40 pm / Room 2

Chair: John Zhong, Apple, Inc.

Co-Chair: Reiner Mauch, Schott AG

- 16.1: **Sub-Micron Transparent Metal-Mesh Conductor for Touch-Screen Displays**
Boris Kobrin, Rolith, Inc., Pleasanton, CA, USA
- 16.2: **Reverse-Offset Printed Single-Layered Metal-Mesh Touch-Screen Panel**
Young-Man Choi, Korea Institute of Machinery and Materials, Daejeon, South Korea
- 16.3: **Printed Touch Sensors Using Carbon NanoBud Material**
Erkki Soininen, Canatu Oy, Helsinki, Finland

Session 17: Plasma Displays (*Emissive Displays*)

Tuesday, June 3 / 3:40 – 5:00 pm / Room 5

Chair: Larry Weber, Consultant

Co-Chair: Ryuichi Murai, Panasonic Co., Osaka, Japan

- 17.1: **Distinguished Student Paper: Origin of Short Statistical Delay of an ACPDP with MgO Nano-Powders**
Seung-Yeol Yang, Hong-ik University, Seoul, South Korea
- 17.2: **Calcium Magnesium Oxide Nano-Crystals for Improving Priming of High-Xe-Content PDPs**

- Qun Yan, Sichuan COC Display Device Co., Ltd., Mianyang, China*
17.3: **First-Principles Study on the Secondary Electron Emission of MgO (200) and (111) Surfaces**
Yan Tu, Southeast University, Nanjing, China
- 17.4: **Fluid Simulations and Experiments for Ultra-Thin Shadow-Mask PDPs**
Lanlan Yang, Southeast University, Nanjing, China

Special Event: Celebration of the 50th Anniversary of Plasma Display Panels

Tuesday, June 3 / 5:00 – 6:30 pm / Room 5

Chair: *Larry F. Weber*

- PDP.1 Invention of the Plasma Display Panel**
Donald I. Bitzer, NC State University, Raleigh, NC, USA
- PDP.2 50 Years of Plasma Display Contributions to the Display Industry**
Larry F. Weber, New Palz, NY, USA
- PDP.3 PDP Technology Version 3.0**
Roger Johnson, Information Technology, Ltd., La Jolla, CA, USA,
- PDP.4 Opening the Super-Large-Area Display World with Flexible-Film Displays**
Tsuta Shinoda, Shinoda Plasma, Kobe, Japan

Plasma Pioneers Reception

Tuesday, June 3 / 6:30 – 8:30 pm / West Terrace

Session 18: Wearable Displays I: Imaging Devices (*Wearable Displays*)

Wednesday, June 4 / 9:00 – 10:30 am / Room 6A

Chair: *Gary Jones, Nanoquantum Corp.*

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

- 18.1: **A 0.23-in. High-Resolution OLED Microdisplay for Wearable Displays**
Reo Asaki, Sony Corp., Kanagawa, Japan
- 18.2: **Color-Filter LCOS with Double-Mirror Structure**
Yuet-Wing Li, Himax Display, Inc., Tainan, Taiwan, ROC
- 18.3: **Fully Integrated CMOS Microdisplays for Wearable Sports and HMD Applications**
Petrus Venter, University of Pretoria, Pretoria, South Africa
- 18.4: ***Invited Paper:* Development of Eyewear Display Systems: A Long Journey**
Mark Spitzer, Google, Mountain View, CA, USA
- 18.5L: ***Late-News Paper:* Front-Lit LCOS for Wearable Applications**
Yuet-Wing Li, Himax Display, Inc., Tainan, Taiwan, ROC

Session 19: Quantum Dots for LCDs (*Liquid-Crystal Technology*)

Wednesday, June 4 / 9:00 – 10:00 am / Room 6B

Chair: *Shui Chih Lien, TCL Group*

Co-Chair: *Gang Xu, Hewlett-Packard Co.*

- 19.1: ***Invited Paper:* Color Workshop on Quantum-Dot-Enhanced Displays**
James Hillis, 3M Co., St. Paul, MN, USA
- 19.2: ***Invited Paper:* Novel Wide-Color-Gamut LED Backlight for 4K x 2K LCD Embedded with Quantum-Dot Technology**
Hirohisa Ishino, Sony Corp., Tokyo, Japan
- 19.3: ***Distinguished Student Paper:* Quantum-Dot-Enhanced LCD Color and Optical Efficiency**
Zhenyue Luo, University of Central Florida, Orlando, FL, USA

Session 20: Flexible AMOLEDs I (*Active-Matrix Devices / e-Paper and Flexible Displays*)

Wednesday, June 4 / 9:00 – 10:20 am / Room 1

Chair: *Kalluri Sarma, Honeywell, Inc.*

Co-Chair: *Hsing-Hung Hsieh, Polyera Taiwan Corp.*

- 20.1: **Flexible AMOLED Display and Gate Driver with Self-Aligned IGZO TFTs on Plastic Foil**
Soeren Steudel, IMEC, Leuven, Belgium
- 20.2L: ***Late-News Paper:* A 4-in. QVGA Flexible AMOLED Driven by Solution-Processed Metal-Oxide TFTs**
Liang Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 20.3L: ***Late-News Paper:* Flexible AMOLED Display Driven by Organic TFTs on a Plastic Substrate**
Charlotte Harrison, Plastic Logic, Cambridge, UK
- 20.4L: ***Late-News Paper:* A Flexible AMOLED Display on a PEN Substrate Driven by Oxide TFTs**
Lei Wang, South China University of Technology, Guangzhou, China

Session 21: Display Manufacturing: Oxide TFTs (*Display Manufacturing*)

Wednesday, June 4 / 9:00 – 10:00 am / Room 2

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

Co-Chair: *Toshiaki Arai, Sony Corp.*

- 21.1: **A 513-ppi FFS-Mode TFT-LCD Using CAAC Oxide Semiconductor Fabricated by A Five-mask Process**
Akio Yamashita, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 21.2: ***Invited Paper:* Manufacture of MOTFT Backpanel for 440-ppi True-Full-Color AMOLED Displays**
Gang Yu, CBRITE, Inc., Goleta, CA, USA
- 21.3: **A 13.5-in. Quad-FHD Flexible CAAC-OS AMOLED Display with Long-Life OLED Device Structure**
Shogo Uesaka, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Session 22: Low-Power and High-Speed Interface (*Display Electronics*)

Wednesday, June 4 / 9:00 – 10:40 am / Room 5

Chair: Dick McCartney, Samsung Display Co., Ltd.

Co-Chair: Taesung Kim, Intel, Inc.

- 22.1: **Invited Paper:** Challenges and Requirements on Power-Saving Techniques on Mobile Platforms
Taesung Kim, Intel, Inc., Santa Clara, CA, USA
- 22.2: **WITHDRAW**
- 22.3: **Invited Paper:** Intra-Panel Interface Technology for High-Resolution Tablet PC Applications
Jae-Youl Lee, Samsung Electronics Co., Ltd., Kyunggi-do, South Korea
- 22.4: **Invited Paper:** A 1.8-Gbps Intra-Panel Interface with Power Reduction and EMI Suppression Schemes for Tablet PC Applications
Kil-Hoon Lee, Samsung Electronics Co., Ltd., Kyunggi-do, South Korea
- 22.5: **A 7-in. Digital Micro-Shutter Display Driven by IGZO TFT**
Taketoshi Nakano, Mie, Japan

Session 23: Wearable Displays II: Optics Design (*Wearable Displays*)

Wednesday, June 4 / 10:40 am – 12:00 pm / Room 6A

Chair: David Eccles, Rockwell Collins

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

- 23.1: **Optical Design of a Compact See-Through Head-Mounted Display with a Light-Guide Plate**
Jui-Wen Pan, National Chiao Tung University, Tainan, Taiwan, ROC
- 23.2: **Binocular Holographic Waveguide Visor Display**
William Bleha, Holoeye Systems, Inc., San Diego, CA, USA
- 23.3: **Quality of Augmented Information for Different Distances on See-Through Near-to-Eye Displays**
Toni Järvenpää, Nokia Research Center, Tampere, Finland
- 23.4: **Augmented Edge Enhancement for Vision Impairment Using Google Glass**
Alex Hwang, Schepens Eye Research Institute, Harvard Medical School, Boston, MA, USA

Session 24: FFS/IPS (*Liquid-Crystal Technology*)

Wednesday, June 4 / 10:40 am – 12:00 pm / Room 6B

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

Co-Chair: Ki Chul Shin, Samsung Display Co., Ltd

- 24.1: **A Method for Analyzing the Eye Strain in Fringe-Field-Switching LCDs under Low-Frequency Driving**
Kung-Ching Chu, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 24.2: **Investigation of Flexoelectric Effect in VA IPS Mode by Low-Frequency Driving**
Cheng-Wei Lai, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 24.3: **Viewing-Angle Property of Single-Domain AH-IPS Liquid-Crystal Mode Optimized with Polymer-Stabilized Polystyrene Alignment Layer**
Hak-Rin Kim, Kyungpook National University, Daegu, South Korea
- 24.4L: **Late-News Paper: High-Performance Advanced Super Dimension Switch (ADS) Mode LCD with Negative Dielectric Anisotropy LC Optimization**
Falu Yang, BOE Optoelectronics Technology Co., Ltd., Sichuan, China

Session 25: Flexible AMOLEDs II (*e-Paper and Flexible Displays/Active-Matrix Devices*)

Wednesday, June 4 / 10:40 am – 12:00 pm / Room 1

Chair: Doug Loy, Intellectual Adventures

Co-Chair: Ki-Yong Lee, Samsung Display Co., Ltd.

- 25.1: **Tri-Fold Flexible AMOLED with High Barrier Passivation Layers**
Yasuhiro Jimbo, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 25.2: **Repeatedly Bendable Book-Type AMOLED Display**
Ryu Komatsu, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 25.3: **A 9.55-in. Flexible Top-Emission AMOLED with a-IGZO TFTs**
Shiming Shi, BOE Technology Group Co., Ltd., Beijing, China
- 25.4: **Invited Paper: Development of Commercial Flexible AMOLEDs**
Soonkwang Hong, LG Display Co., Ltd., Kyunggi-do, South Korea

Session 26: Applications (*Applications*)

Wednesday, June 4 / 10:40 am – 12:00 pm / Room 2

Chair: Jean-Noel Perbet, THALES Avionics

Co-Chair: Adi Abileah, Consultant

- 26.1: **Distinguished Paper: Single-Layer Fabry-Pérot Interferometric Display for Both Color and Intensity Modulations**
Chao Ping Chen, Shanghai Jiao Tong University, Shanghai, China
- 26.2: **Super-Durable Cover Lens Film**
Richard Pokorny, 3M Co., St. Paul, MN, USA
- 26.3: **Edge Adaptive Method of Image Resampling and Enhancement**
Vladimir Lachine, Qualcomm Canada, Inc., Toronto, Ontario, Canada
- 26.4: **Display Color Error in the Medical Digital Image Workflow**
Paul Boynton, National Institute of Standards and Technology, Gaithersburg, MD, USA

Session 27: Computational Visual Fidelity (*Applied Vision/Human Factors*)

Wednesday, June 4 / 10:40 am – 12:00 pm / Room 5

Chair: James Larimer, ImageMetrics LLC

Co-Chair: Jeffrey Mulligan, NASA Ames Research Center

- 27.1: TBA

- 27.2: **Distinguished Paper:** Modeling Visible Differences: The Computational Observer Model
Joyce Farrell, Stanford University, Stanford, CA, USA
- 27.3: **Computational Approaches to Aberration Compensation for Vision-Correcting Displays**
Fu-Chung Huang, University of California at Berkeley, Berkeley, CA, USA
- 27.4L: **Late-News Paper:** VESA Display Stream Compression: An Overview
Frederick Walls, Broadcom Corp., Grafton, WI, USA

Session 28: Wearable Displays III: Direct View (*Wearable Displays*)

Wednesday, June 4 / 3:30 – 5:10 pm / Room 6A

Chair: Ruiqing Ma, Universal Display Corp.

Co-Chair: Susan Jones, Nulumina Corp.

- 28.1: **OLEDs on Textile Substrates with Planarization and Encapsulation Using Multilayers for Wearable Displays**
Kyung Cheol Choi, KAIST, Daejeon, South Korea
- 28.2: **Genuinely Wearable Display with a Flexible Battery, a Flexible Display Panel, and a Flexible Printed Circuit**
Ryota Tajima, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 28.3: **Flexible Substrate with Low Reflection, Low Haze, Self-Cleaning, and High Hardness by Nano-Structured Hard Coating and Surface Treatment**
Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan, ROC
- 28.4: **Wearable Display for Dynamic Spatial and Temporal Fashion Trends**
Wallen Mphepo, University of Sunderland, Sunderland, UK
- 28.5L: **Late-News Paper:** Wearable-Display Expectations: Enabling Mobile-Display Experiences of the Future
Brian Gally, Qualcomm MEMS Technologies, Inc., San Jose, CA, USA

Session 29: Film and Alignment (*Liquid-Crystal Technology*)

Wednesday, June 4 / 3:30 – 4:50 pm / Room 6B

Chair: Philip Chen, National Chiao Tung University

Co-Chair: Yukito Saitoh, FUJIFILM Corp.

- 29.1: **A New Achromatic Quarter-Wave Film Using Liquid-Crystal Materials for Anti-Reflection of OLEDs**
Yuta Takahashi, FUJIFILM Corp., Kanagawa, Japan
- 29.2: **Distinguished Paper:** Wide-Viewing LCDs Using Novel Microstructure Film
Emi Yamamoto, Sharp Corp., Chiba, Japan
- 29.3: **Performance of Novel LC Photo-Aligning Cinnamoyl Side-Chain Polymers**
Hiroshi Hasebe, DIC Corp., Saitama, Japan
- 29.4: **Polymer-Stabilized Electrically Suppressed Helix Ferroelectric Liquid Crystal**
Abhishek Srivastava, Hong Kong University of Science and Technology, Kowloon, Hong Kong

Session 30: Display Manufacturing: OLEDs (*Display Manufacturing*)

Wednesday, June 4 / 3:30 – 4:50 pm / Room 1

Chair: Greg Gibson, FAS Holdings Group

Co-Chair: Ion Bitu, Qualcomm MEMS Displays, Inc.

- 30.1: **Invited Paper:** A 65-in. Ink-Jet-Printed Organic Light-Emitting Display Panel with High Degree of Pixel Uniformity
PengYu Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 30.2: **Invited Paper:** Advancements in Ink-Jet Printing for OLED Mass Production
Conor Madigan, Kateeva, Inc., Menlo Park, CA, USA
- 30.3: **Invited Paper:** AMOLED Manufacturing: Challenges and Solutions from a Material Makers Perspective.
Sven Murano, Novaled AG, Dresden, Germany
- 30.4: **Distinguished Student Paper:** Development of a Novel Pattern-Coating Technology: Air-Bubble Coating for the Manufacture of OLED Devices
Yu-Wen Hsieh, National Taiwan University, Taipei, Taiwan, ROC

Session 31: Laser Speckle (*Display Measurement / Projection*)

Wednesday, June 4 / 3:30 – 4:50 pm / Room 2

Chair: Chuck Yin, Square, Inc.

Co-Chair: Alan Sobel, Flatscreen Technologies Corp

- 31.1: **Speckle Reduction Due to the Use of Electro-Optical Cell with Helix-Free FLC**
Igor Kompanets, P. N. Lebedev Physical Institute of RAS, Moscow, Russian Federation
- 31.2: **Speckle Contrast Reduction with a Small-Vibrated Reflective Intermediate Screen for a MEMS Scanning Laser Projector**
Shih-Yu Tu, National Taiwan University, Taipei, Taiwan, ROC
- 31.3: **Classification of Subjective Speckle for the Evaluation of a Laser Display**
Makio Kurashige, Dai Nippon Printing Co., Ltd., Chiba, Japan
- 31.4: **Standardization of Speckle Measurement for Large-Screen Laser-Illuminated Video Projection Systems**
Terry Schmidt, Christie Digital Systems, Wellesley, Ontario, Canada

Session 32: Flexible TFTs (*e-Paper and Flexible Displays*)

Wednesday, June 4 / 3:30 – 4:50 pm / Room 5

Chair: Shawn O'Rourke, dpiX, LLC

Co-Chair: Ryoichi Ishihara, Delft University of Technology

- 32.1: **Invited Paper:** Novel Approaches for Fabricating High-Performance Low-Temperature Solution-Processed Metal-Oxide Transistors
Hsing-Hung Hsieh, Polyera Taiwan Corp., Hsinchu, Taiwan, ROC
- 32.2: **Invited Paper:** Integration of Flexible AMOLED Displays Using Oxide Semiconductor TFT Backplanes
Flora Li, TNO/Holst Centre, Eindhoven, The Netherlands

- 32.3: **Invited Paper:** Demonstration of High-Mobility Unisolated Corbino OTFTs with Improved Switching Ratio for Application to Flexible Displays.
Michael Cowin, SmartKem, Ltd., St. Asaph, UK
- 32.4: **Invited Paper:** Solution-Processed Single-Grain Si TFTs on a Plastic Substrate
Ryoichi Ishihara, Delft University of Technology, Delft, The Netherlands

Session 33: Active-Matrix TFTs (Active-Matrix Devices)

Thursday, June 5 / 9:00 – 10:20 am / Room 6A

Chair: Jerzy Kanicki, University of Michigan

Co-Chair: Chien Hung Chen, AU Optronics Corp.

- 33.1: **Channel-Etched C-Axis-Aligned Crystalline Oxide Semiconductor FETs Using Cu Wiring**
Kengo Akimoto, Advanced Film Device, Inc., Tochigi, Japan
- 33.2: **A New Plasma Process and Structure for Oxide Semiconductor LCDs**
Joon-Young Yang, LG Display Co., Ltd., Kyunggi-do, South Korea
- 33.3: **High Mobility and Highly Stable Aluminum-Doped Indium Zinc Tin Oxide TFTs**
Sung Haeng Cho, ETRI, Daejeon, South Korea
- 33.4: **Distinguished Paper:** Oxide-Semiconductor TFTs Using Oxygen Barriers and a Wet-Chemical Back-Channel Etch Step
Marcus Herrmann, University of Stuttgart, Stuttgart, Germany

Session 34: LC Beyond Displays I (Liquid-Crystal Technology)

Thursday, June 5 / 9:00 – 10:20 am / Room 6B

Chair: Terry Scheffer, Motif, Inc.

Co-Chair: Jian-Gang Lu, Shanghai Jiao Tong University

- 34.1: **Invited Paper:** Slowing Light in Liquid Crystals
Umberto Bortolozzo, INLN, Université de Nice Sophia-Antipolis., Valbonne, France
- 34.2: **Invited Paper:** Active Plasmonic Tunable Metamaterials and Ultra-Fast Non-Linear Optics with Liquid Crystals
Iam Choonk, Pennsylvania State University, University Park, PA, USA
- 34.3: **Invited Paper:** On the Correlation between Electron Polarizability of Molecular Core and Its Input into Optical Anisotropy
Piotr Harmata, Military University of Technology, Warsaw, Poland
- 34.4: **Invited Paper:** THz Devices Based High-Birefringence Liquid Crystals
Yan-qing Lu, Nanjing University, Nanjing, China

Session 35: OLED Materials (OLEDs)

Thursday, June 5, / 9:00 - 10:20 am / Room 1

Chair: Chihaya Adachi, Kyushu University

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

- 35.1: **Invited Paper:** High-Performance OLED materials
Holger Heil, Merck KGaA, Darmstadt, Germany
- 35.2: **Invited Paper:** Improving Efficiency without Compromising Lifetime in Blue Fluorescent OLEDs by ETL Design
Ansgar Werner, Novald AG, Dresden, Germany
- 35.3: **Invited Paper:** The Soluble Hole-Injection Materials and the Inks Applicable to OLED Devices
Kazuhiro Monzen, Nissan Chemical Industries, Ltd., Funabashi, Japan
- 35.4: **Enhancement of Emission Efficiency in a White OLED Device by Highly Efficient Narrow Spectrum Red-Emission Material**
Tomoya Yamaguchi, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Session 36: Light-Field and Multi-View Displays (3D/Display Systems)

Thursday, June 5 / 9:00 - 10:20 am / Room 2

Chair: Nikhil Balram, Ricoh Innovations, Inc.

Co-Chair: Brian Schowengerdt, University of Washington

- 36.1: **Wide-Field-of-View Compressive Light-Field Display Using a Multilayered Architecture and Viewer Tracking**
Gordon Wetzstein, MIT, Cambridge, MA, USA
- 36.2: **Distinguished Paper:** Dual-Layer Three-Dimensional Display with Enhanced Resolution
Na-Young Jo, Inha University, Incheon, South Korea
- 36.3: **Surround-Type Light-Field Display Provide Immersive Experience**
Li Feng, Zhejiang University, Hangzhou, China
- 36.4: **Design and Calibration of 100-Mpixel Multi-Projection 3D Display with an Enhanced Image Quality**
Jin-Ho Lee, Samsung Advancer Institute of Technology, Kyunggi-do, South Korea

Session 37: Novel Measurement Standards and Methods (Display Measurement)

Thursday, June 5 / 9:00 - 10:20 am / Room 5

Chair: Chuck Yin, Apple, Inc.

Co-Chair: Stephen Atwood, Azonix Corp.

- 37.1: **OLED Displays under Ambient Illumination: An Implementation of IEC 62341-6-2**
Michael Becker, Display-Messtechnik & Systeme, Karlsruhe, Germany
- 37.2: **Simplified Ambient Performance Assessment for Mobile Displays Using Easy Measurements**
Thomas Fiske, Qualcomm MEMS Displays, Inc., San Jose, CA, USA
- 37.3: **Viewing-Direction Measurements with Hemispherical Diffuse Illumination on e-Paper Displays**
Dirk Hertel, E Ink Corp., Billerica, MA, USA
- 37.4: **Improved Display Color Measurements with the WP214 Imaging Spectral Colorimeter**
Chad Greene, Westboro Photonics, Ottawa, Ontario, Canada

Session 38: Capacitive Touch (Touch and Interactivity)

Thursday, June 5 / 10:40 - 11:50 am / Room 6A

Chair: *Jeff Han, Microsoft*

Co-Chair: *Joohyung Lee, Samsung Display Co., Ltd.*

- 38.1: **A Fast Readout Circuit for Capacitive Touch-Screen Panels Using A Dual-Mode Sensing Algorithm**
Hyeon-June Kim, KAIST, Daejeon, South Korea
- 38.2: **High-Performance Mutual-Capacitive Touch Screen Using Double-Layered Metal-Mesh Electrodes with Separated Floating Electrodes**
Isao Nojiri, Mitsubishi Electric Corp., Kumamoto, Japan
- 38.3: **One Glass Solution with a Single Layer of Sensors for Projected-Capacitive Touch Panels**
Shi-Yu Liu, Shanghai Jiao Tong University, Shanghai, China

Session 39: LC Beyond Displays II (Liquid-Crystal Technology)

Thursday, June 5 / 10:40 am - 12:00 pm / Room 6B

Chair: *Shin Tson Wu, University of Central Florida*

Co-Chair: *Terry Scheffer, Motif, Inc.*

- 39.1: **Invited Paper: Emerging Areas for Liquid-Crystal Technologies Beyond Displays**
Sin-Doo Lee, Seoul National University, Seoul, South Korea
- 39.2: **Invited Paper: Stimuli-Responsive Cholesteric-Liquid-Crystal Composites for Optics and Photonics**
Timothy White, AFRL, Wright-Patterson AFB, Dayton, OH, USA
- 39.3: **Invited Paper: Recent Advances on Liquid-Crystal-on-Silicon Spatial Light Modulators**
Haruyoshi Toyoda, Hamamatsu Photonics K.K., Hamamatsu, Japan
- 39.4: **Invited Paper: Liquid Crystal for Ophthalmic Lenses and Biosensing Applications**
Yi-Hsin Lin, National Chiao Tung University, Hsinchu, Taiwan, ROC

Session 40: OLED Devices II (OLEDs)

Thursday, June 5 / 10:40 am - 12:00 pm / Room 1

Chair: *Yasunori Kijima, Sony Corp.*

Co-Chair: *Jang Hyuk Kwon, Kyung Hee University*

- 40.1: **Novel Two-Mask AMOLED Display Architecture**
Michael Hack, Universal Display Corp., Ewing, NJ, USA
- 40.2: **Building Up Electrical Modeling of a White Fluorescent Top-Emitting OLED: Material Parameter Extraction and Impact of Poole Frenkel and ECDM Mobility Models**
Karim Bouzid, CEA-LETI, Grenoble, France
- 40.3: **One FMM Solution for Achieving AMOLED with 413-ppi Real Pixel Density**
Meng-Ting Lee, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 40.4: **Design Tool for Light-Scattering Enhancement in OLEDs**
Stéphane Altazin, Fluxim AG, Winterthur, Switzerland

Session 41: Autostereoscopic Systems and Measurement (3D / Display Systems / Display Measurement)

Thursday, June 5 / 10:40 am - 12:00 pm / Room 2

Chair: *Jae Hyeung Park, Inha University*

Co-Chair: *Bill Cummings, Qualcomm MEMS Displays*

- 41.1: **High-Resolution Glassless 3D with Head-Tracking System**
Takeo Koito, Japan Display, Inc., Kanagawa, Japan
- 41.2: **Invited Paper: An UHD Active-Barrier 3D module**
Yanbing Wu, BOE Technology Group Co., Ltd., Beijing, China
- 41.3: **Image Quality Factors for Designs of an Autostereoscopic Display**
Yun-Ting Cheng, National Taiwan University, Taipei, Taiwan, ROC
- 41.4: **Characterization of Multi-View Autostereoscopic Displays Using a Fourier Optics Viewing-Angle Instrument and Video-Luminance Meter**
Pierre Boher, ELDIM, Herouville, France

Session 42: Human Vision and Measurements for Lighting Systems (Lighting / Display Measurement / Applied Vision)

Thursday, June 5 / 10:40 am - 12:20 pm / Room 5

Chair: *Ingrid Heynderickx, Eindhoven University of Technology*

Co-Chair: *Tom Fiske, Qualcomm MEMS Displays*

- 42.1: **Invited Paper: Optimization and Evaluation of Automotive Displays under Bright Ambient Light Using Novel Image-Enhancement Algorithms**
Karlheinz Blankenbach, Pforzheim University, Pforzheim, Germany
- 42.2: **Invited Paper: Analysis of Background Illuminance Levels During Television Viewing**
Kyle Sills, California Lighting Technology Center, Davis, CA, USA
- 42.3: **Invited Paper: Progress in the Soft Metrology of Appearance: The Contribution of Digital Image Representations**
Frédéric Leloup, KU Leuven, KAHO Sint-Lieven, Gent, Belgium
- 42.4: **Sparkle Measurement Revisited: A Closer Look at the Details**
Michael Becker, Display-Messtechnik & Systeme, Karlsruhe, Germany
- 42.5: **Cross Media Color Reproduction of Real Lighting Environment Using CIECAM02**
Ronnier Luo, University of Leeds, Leeds, UK

Session 43: Novel Interactivity (*Touch and Interactivity*)

Thursday, June 5 / 1:30 - 2:30 pm / Room 6A

Chair: Bob Senior, Canatu Oy

Co-Chair: Deuksu Lee, LG Display Co., Ltd.

- 43.1: **Invited Paper:** Touch-Technology Diversity in Commercial Applications
Joel Kent, Elo Touch Solutions, Milpitas, CA, USA
- 43.2: **Optical Multi-Touch on a Circular Device**
Richard Berglind, Neonode, Stockholm, Sweden
- 43.3: **Electrostatic Tactile Display Using a Beat Phenomenon of Voltage Waveforms**
Hiroshi Haga, NLT Technologies, Ltd., Kawasaki, Japan

Session 44: Ultra-High-Resolution Displays (*Active-Matrix Devices*)

Thursday, June 5 / 1:30 - 2:50 pm / Room 6B

Chair: Tohru Nishibe, Japan Display, Inc.

Co-Chair: Norbert Fruehauf, University of Stuttgart

- 44.1: **Distinguished Paper:** A 13.3-in. 8K x 4K 664-ppi OLED Display Using CAAC-OS FETs
Susumu Kawashima, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 44.2: **512-ppi Mobile Displays with High Aperture Ratio, Slim Border, and Wide Color Gamut**
Ming-Hsien Lee, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 44.3: **A 513-ppi LCD Using a C-Axis-Aligned Crystalline Oxide Semiconductor with a Narrow Bezel and an Aperture Ratio Greater than 50%**
Kouhei Toyotaka, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- 44.4L: **Late-News Paper:** Large-Area-Display Backplane Using Embedded Single-Crystal-Silicon Particles
Douglas Dykaar, DifTek Lasers, Inc., Waterloo, Ontario, Canada

Session 45: OLED Devices III (*OLEDs*)

Thursday, June 5 / 1:30 - 2:30 pm / Room 1

Chair: Michael Weaver, Universal Display Corp.

Co-Chair: Yusin Lin, AU Optronics Corp.

- 45.1: **An Improved Method for Lifetime Prediction Based on the Decoupling of the Joule Self-Heating Effect from Coulombic Degradation in Accelerated Aging Tests of OLEDs**
Tetsuo Tsutsui, Chemical Materials Evaluation and Research Base (CEREBA), Tsukuba, Japan
- 45.2: **Extraction-Efficiency Enhancement of an AMOLED Display with Acceptable Blur by Attaching Trapezoid Array Film**
Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan, ROC
- 45.3: **Distinguished Student Paper:** High-Efficiency Tandem Top-Emitting OLEDs
Jang Hyuk Kwon, Kyung Hee University, Seoul, South Korea

Session 46: Holographic Display Systems (*3D / Display Systems / Applications*)

Thursday, June 5 / 1:30 - 3:00 pm / Room 2

Chair: Ian Underwood, University of Edinburgh

Co-Chair: K. Käläntär, Global Optical Solutions

- 46.1: **Colorful Holographic Display Using Variable Spatial Sampling**
Chenliang Chang, Southeast University, Nanjing, China
- 46.2: **Plasmonic Hologram Based on Bilayer Metallic Nanowire Gratings**
Zhi-cheng Ye, Shanghai Jiao Tong University, Shanghai, China
- 46.3: **Improvement of Holographic Video Display Using a Super-Fast Refresh and Non-Pixelated Liquid-Crystal Film**
Hongyue Gao, Shanghai University, Shanghai, China
- 46.4: **Influence of Space-Variant Effect on Axial Error in Digital Holography**
Chao Ping Chen, Shanghai Jiao Tong University, Shanghai, China
- 46.5L: **Late-News Paper:** Waveguide Display System with Variable Output Intensity
Nannan Zhang, Beijing Institute of Technology, Beijing, China

Session 47: OLED Lighting I (*Lighting/OLEDs*)

Thursday, June 5 / 1:30 - 2:50 pm / Room 5

Chair: Jang Hyuk Kwon, Kyung Hee University

Co-Chair: Denis Kondakov, DuPont

- 47.1: **Invited Paper:** Color Tunable Phosphorescent White-OLED Lighting Panel
Michael Weaver, Universal Display Corp., Ewing, NJ, USA
- 47.2: **Invited Paper:** Efficient Tandem Hybrid White OLEDs for Solid-State Lighting Applications
Yuan-Sheng Tyan, First O-Lite, Inc., Nanjing, China
- 47.3: **Invited Paper:** Performance Improvement of Blue Phosphorescent OLEDs by Designing an Intermolecular and Interlayer Combination
Kunimasa Hiyama, Konica-Minolta, Inc., Tokyo, Japan
- 47.4: **Distinguished Paper:** Realization of Outstandingly High-Efficacy White OLED by Controlling Evanescent Mode and Wide Angular Incident Light
Kazuyuki Yamae, Panasonic Eco Solutions Company, Osaka, Japan

Session 48: Touch Display Manufacturing (*Touch and Interactivity / Display Manufacturing*)

Thursday, June 5 / 3:10 - 4:30 pm / Room 6A

Chair: Willem Den Boer, Guardian Industries

Co-Chair: Bradley Bowden, Corning Incorporated

- 48.1: **Invited Paper:** Design and Manufacture of a Slim Notebook-Embedded Touch Panel
Ching Cheng, AU Optronics Corp., Hsinchu, Taiwan, ROC

- 48.2: **Cover-Glass Strength Design for Industrial Use PCAP LCD Module**
Hiroshi Teramoto, Mitsubishi Electric Corp., Kumamoto, Japan
- 48.3: **Novel Fracture Resistant Glass for a Mobile-Display Cover**
Shusaku Akiba, Asahi Glass Co., Ltd., Kanagawa, Japan
- 48.4: **The Mirror Constant of Glass Substrates by 4PB Testing**
Mao-Hsing Lin, Innolux Corp., Tainan City, Taiwan, ROC

Session 49: Active-Matrix Design (Active-Matrix Devices)

Thursday, June 5 / 3:10 – 4:50 pm / Room 6B

Chair: *Roger Stewart, Sourland Mountain Associates*

Co-Chair: *Kazuyoshi Omata, Konica Minolta*

- 49.1: **Flexible Flat-Panel-Display Designs with Gate Driver Circuits Integrated within the Pixel Area**
Hidefumi Yoshida, Sharp Corp., Nara, Japan
- 49.2: **Corbino TFTs for Large-Area AMOLED Displays**
Mallory Mativenga, Kyunghee University, Seoul, South Korea
- 49.3: **High-Resolution Active-Matrix Imager Using Poly-Si Phototransistors in a Magnifying Viewer**
Mutsumi Kimura, Ryukoku University, Otsu, Japan
- 49.4L: **Late-News Paper: Novel Pixel Structure for Quadrupling of Pixel Voltage**
Dahye Sim, LG Display Co., Ltd., Kyunggi-do, South Korea
- 49.5L: **Late-News Paper: An Organic TFT Backplane for Foldable Displays Fabricated by Scalable and Low-Cost Processes**
Mao Katsuhara, Sony Corp., Kanagawa, Japan

Session 50: Advanced OLED Driving (Display Electronics)

Thursday, June 5 / 3:10 - 4:30 pm / Room 1

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

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

- 50.1: **Invited Paper: Technological Progress of Pixel Compensation for OLED TVs**
Hong-Jae Shin, LG Display Co., Ltd., Kyunggi-do, South Korea
- 50.2: **Real-Time TFT Compensation through Power-Line Current Sensing for High-Resolution AMOLED Displays**
Jun-Suk Bang, KAIST, Daejeon, South Korea
- 50.3: **A Novel Power-Saving Technology for OLED TVs with External TFT Compensation**
Tae-Gung Kim, LG Display Co., Ltd., Kyunggi-do, South Korea
- 50.4: **Perception-Optimized Signal Scaling for OLED Power Saving**
Min Dai, Qualcomm, Inc., San Diego, CA, USA

Session 51: Liquid-Crystal Lens and Doping for 3D (3D / Liquid-Crystal Technology)

Thursday, June 5 / 3:10 - 4:30 pm / Room 2

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

Co-Chair: *Jenn Jia Su, AU Optronics Corp.*

- 51.1: **Real-Time Holographic Display Using Quantum-Dot Doped Liquid Crystal**
Yikai Su, Shanghai Jiao Tong University, Shanghai, China
- 51.2: **Large-Angle Image Steering Using a Liquid-Crystal Device**
HsienHui Cheng, Liquid Crystal Institute, Kent State University, Kent, OH, USA
- 51.3: **Design for Reducing Autostereoscopic Display Crosstalk Using a Liquid-Crystal Gradient-Index Lens**
Masahiro Kasano, Panasonic Corp., Osaka, Japan
- 51.4: **Dielectric-Force-Induced Liquid-Crystal Lenticular Microlenses**
Hong Ren, Chonbuk National University, Jeonju, South Korea

Session 52: OLED Lighting II (Lighting/OLEDs)

Thursday, June 5 / 3:10 - 4:30 pm / Room 5

Chair: *Chin Hsin (Fred) Chen, Guangdong Aglaia Optoelectronic Materials Co., Ltd.*

Co-Chair: *Lee-Mi Do, ETRI*

- 52.1: **Invited Paper: Highly Efficient Transparent OLEs with An Internal Random Nano-Structured Scattering Layer**
Jeong-Ik Lee, ETRI, Daejeon, South Korea
- 52.2: **Invited Paper: Development and Manufacture of OLED Lighting Panels for Health-Care Application**
John Hamer, OLEDDWorks LLC, Rochester, NY, USA
- 52.3: **Understanding Extrinsic Degradation in Phosphorescent OLEDs**
Hitoshi Yamamoto, Universal Display Corp., Ewing, NJ, USA
- 52.4: **Highly Efficient Single-Unit White OLED Device with Emission from Both Singlet and Triplet Excitons**
Takahiro Ishisone, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Session 53: OLED TV I (OLED TV/OLEDs)

Friday, June 6 / 9:00 - 10:20 am / Room 6A

Chair: *Sven Murano, Novaled AG*

Co-Chair: *Michael Weaver, Universal Display Corp.*

- 53.1: **Development of Oxide-TFT OLED-TV Technologies**
Yu-Hsin Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 53.2: **Invited Paper: Advanced Technologies for Large-Sized OLED TV**
Chang-Wook Han, LG Display Co., Ltd., Kyunggi-do, South Korea
- 53.3: **Structural Advantage of WRGB OLED Displays for Edge Enhancement**
Taeseong Han, LG Display Co., Ltd., Kyunggi-do, South Korea
- 53.4: **Color Optimization for OLED Displays**
Sang Choi, Samsung Display Co., Ltd., Kyunggi-do, South Korea

Session 54: e-Paper I (e-Paper and Flexible Displays)

Friday, June 6 / 9:00 - 10:20 am / Room 6B

Chair: *Chao-Yuan Chen, Jiangsu Hecheng Display Technology*

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

- 54.1:** **Invited Paper:** **Structural Colors for Display and e-Paper Applications**
L. Guo, University of Michigan, Ann Arbor, MI, USA
- 54.2:** **Reliable and High-Performance Transparent Electrowetting Displays**
Ruo-Lan Chang, ITRI, Hsinchu, Taiwan, ROC
- 54.3:** **Human and Mechanical Writing Performance of eWriters**
Clinton Braganza, Kent Displays, Inc., Kent, OH, USA
- 54.4L:** **Late-News Paper:** **Single-Mirror Interferometric Display: A New Paradigm for Reflective Display Technologies**
John Hong, Qualcomm MEMS Technologies, Inc., San Jose, CA, USA

Session 55: Human Factors for 3D Displays (3D / Applied Vision/Human Factors)

Friday, June 6 / 9:00 - 10:20 am / Room 1

Chair: *Sakuichi Ohtsuka, Kagoshima University*

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

- 55.1:** **Distinguished Paper:** **Motion Artifacts on 240-Hz OLED Stereoscopic 3D Displays**
Paul Johnson, University of California at Berkeley, Berkeley, CA, USA
- 55.2:** **Luminance Asymmetry in Stereoscopic Content: Binocular Rivalry or Luster**
Marja Salmimaa, Nokia Research Center, Tampere, Finland
- 55.3:** **Enhance Users' Air-Touch Accuracy with 3D Virtual References for 3D Display User Interface**
Chih-Hung Ting, National Chiao Tung University, Hsinchu, Taiwan, ROC
- 55.4:** **Optimized Parallax Control of Arbitrary Viewpoint Images with Motion Parallax on Autostereoscopic Displays**
Takefumi Hasegawa, NLT Technologies, Ltd., Kanagawa, Japan

Session 56: Projection Components and System Configurations (Projection)

Friday, June 6 / 9:00 - 10:40 am / Room 2

Chair: *Frederic Kahn, Kahn International, Inc.*

Co-Chair: *Ming Hsien Wu, Hamamatsu Corp.*

- 56.1:** **Distinguished Paper:** **A Higher-Contrast Ghost-Ray-Deflecting Total-Internal-Reflection Light Separator for LED DLP Projectors**
Jui-Wen Pan, National Chiao Tung University, Tainan, Taiwan, ROC
- 56.2:** **DPR Recycling Collar for Simpler and Brighter RGBW Pico Projectors**
Kenneth Li, Wavien, Inc., Valencia, CA, USA
- 56.3:** **High-Power Laser-Excited-Phosphor Suspension in Liquid for Digital Projection**
Kenneth Li, Wavien, Inc., Valencia, CA, USA
- 56.4:** **A Head-Up-Display Illuminator Design and Virtual-Image Estimation Method**
Tzu Niu, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 56.5L:** **Late-News Paper:** **A Real 3D Image Projected "Out-of-the-Box" Using Dual Parabolic Reflectors**
Kenneth Li, Wavien, Inc., Valencia, CA, USA
- 56.6L:** **Late-News Paper:** **Modular Multi-Projection Multi-View Autostereoscopic Display Using MEMS Laser Projectors**
Kaan Akşit, Koç University, Istanbul, Turkey

Session 57: Advanced Backlighting Technology (Display Systems)

Friday, June 6 / 9:00 - 10:10 am / Room 5

Chair: *Masaru Suzuki, SKC Haas Display Films*

Co-Chair: *Akihiro Tagaya, Keio University*

- 57.1:** **Directional BLU for Full-Resolution Field-Alternative Autostereoscopic 3D/2D and 2D/3D LCDs**
K. Kälantär, Global Optical Solutions, Tokyo, Japan
- 57.2:** **Enhancing LCD Optical Efficiency with a Linearly Polarized Backlight and Polarization-Preserving Light-Guide Plate**
Zhenyue Luo, University of Central Florida, Orlando, FL, USA
- 57.3:** **Invited Paper:** **A Wide-Color-Gamut Display Using Laser Light Sources**
Koji Minami, Mitsubishi Electric Corp., Kyoto, Japan
- 57.4:** **Late-News Paper:** **Intelligent Backlight: A Controllable Illumination System for High-Efficiency and Sunlight-Readable Mobile Displays**
Michael Robinson, RealD Inc., Boulder, CO, USA

Session 58: OLED TV II (OLED TV / OLEDs / Active-Matrix Devices)

Friday, June 6 / 10:40 am - 11:40 am / Room 6A

Chair: *Hyun Jae Kim, Yonsei University*

Co-Chair: *Mike Hack, Universal Display Corp.*

- 58.1:** **A 31-in. FHD AMOLED Display Using Amorphous-IGZO TFTs and RGB Fine Metal Mesh**
Sai-Chang Liu, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- 58.2:** **A 55-in. OLED TV Using Optimal Driving Method for Large-Sized Panel Based on InGaZnO TFTs**
Joong-Sun Yoon, LG Display Co., Ltd., Kyunggi-do, South Korea
- 58.3:** **Invited Paper:** **Highly Reliable InGaZnO TFT Backplane for 55-in. 4K x 2K OLED Displays**
Hiroshi Hayashi, Panasonic AVC Networks Company, Himeji, Japan

Session 59: e-Paper II (*e-Paper and Flexible Displays*)

Friday, June 6 / 10:40 am - 12:00 pm / Room 6B

Chair: Makoto Omodani, Tokai University

Co-Chair: Bo-Ru Yang, Sun Yat-Sen University

- 59.1: **Invited Paper:** Electrophoretic Display Platform Comprising BWR Particles
Michael McCreary, E Ink Corp., Billerica, MA, USA
- 59.2: **The Contributions of Built-In Light on the Readability of e-Paper Devices**
Tatsuya Koizuka, Nagoya University, Nagoya, Japan
- 59.3: **Invited Paper:** Developing e-Paper Standards for the Mobile Age
John Penczek, Luminex Technologies, Boulder, CO, USA
- 59.4L: **Late-News Paper:** A First Demonstration of the Bi-Primary Color System for e-Paper with Complementary-Color Dual-Particle Electrophoretic Dispersions
Jason Heikenfeld, University of Cincinnati, Cincinnati, OH, USA

Session 60: 3D and Augmented-Reality Electronics (*3D / Display Electronics*)

Friday, June 6 / 10:40 am - 12:00 pm / Room 1

Chair: Achin Bhowmik, Intel Corp.

Co-Chair: Haruhiko Okumura, Toshiba Corp.

- 60.1: **Invited Paper:** 3D Model-Based Camera Tracking Technology for Augmented Reality
Koji Makita, National Institute of AIST, Tsukuba, Japan
- 60.2: **Efficient Light-Field Rendering Using Depth Map**
Young Ju Jeong, Samsung Advanced Institute of Technology, Giheung-gu, South Korea
- 60.3: **3D Glasses-Free Display with Dead-Zone Optimization for Multi-Users**
Yi Yen, AU Optronics Corp., Hsinchu, Taiwan, ROC
- 60.4: **Overdriving LC GRIN Lens to Stabilize Lens Profile for 2D/3D Display**
Shinichi Uehara, Toshiba Corp., Kawasaki, Japan

Session 61: Projectors (*Projection*)

Friday, June 6 / 10:40 am - 12:10 pm / Room 2

Chair: Fujio Okumura, NEC Corp.

Co-Chair: Sergei Yakovenko, LensVector, Inc.

- 61.1: **Invited Paper:** How High-Frame-Rate Dual-Projector 3-D Made Its Movie Debut at the World Premiere of The Hobbit
Terry Schmidt, Christie Digital Systems, Wellesley, Ontario, Canada
- 61.2: **Reflective Multi-View Screen and Mobile Projectors for Communication Displays**
Munekazu Date, NTT Media Intelligence Laboratories, Nippon Telegraph and Telephone Corp., Kanagawa, Japan
- 61.3: **High-Contrast Remodulation Projector with Constant Brightness and System Adjustments**
David Eccles, Rockwell Collins, Salt Lake City, UT, USA
- 61.4: **New 4000-lm Hybrid Solid-State Light-Source Data Projector**
Tsuneharu Nomura, Sony Corp., Kanagawa, Japan
- 61.5L: **Late-News Paper:** Latest Developments in 3D Projection Mapping Systems
John Vieth, Christie Digital Systems, Kitchener, Ontario, Canada

Session 62: Novel Displays (*Display Systems*)

Friday, June 6 / 10:40 am - 12:00 pm / Room 5

Chair: Bill Cummings, Qualcomm MEMS Displays

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

- 62.1: **Distinguished Paper:** Multi-View 3D Display System Using Arrayed Beam-Steering Devices
Yunhee Kim, Samsung Electronics Co., Ltd., Kyunggi-do, South Korea
- 62.2: **High-Performance Transmissive Electrowetting Display Based on Bilayered Metallic Nanowire Gratings**
Zhi-cheng Ye, Shanghai Jiao Tong University, Shanghai, China
- 62.3: **Hand-Waving Steganography by Using a High-Frame-Rate LED Panel**
Hirotugu Yamamoto, University of Tokushima, Tokushima, Japan
- 62.4L: **Late-News Paper:** Light-Emitting Memory: A Modular LED Panel with 10K True-Color Frame Rate for 3D Display Applications
Bo Zhou, Altera Corp., San Jose, CA, USA

Poster Session

Thursday, June 5 / 4:00 – 7:00 pm / Exhibit Hall A

Active-Matrix Devices

- P.1: **Distinguished Poster:** Fabrication of a Self-Aligned ZrInZnO TFT Using Polypropylene Carbonate Solution
H. T. C. Tu, Japan Advanced Institute of Science and Technology, Ishikawa, Japan
- P.2: **High-Mobility Zinc Oxynitride TFT for AMOLED Displays**
Meili Wang, BOE Technology Group Co., Ltd., Beijing, China
- P.3: **Hybrid-Type Temperature Sensor Using TFTs**
Mutsumi Kimura, Ryukoku University, Otsu, Japan
- P.4: **Nitrous-Oxide Plasma Pre-Treatment Effect on High-Mobility Indium-Tin-Zinc-Oxide TFT Bias Temperature Stress**
Tsung-Hsiang Shih, AU Optronics Corp., Hsinchu, Taiwan, ROC
- P.5: **Pseudo-CMOS Circuits Using Amorphous In-Sn-Zn-O TFTs**
Mutsumi Kimura, Ryukoku University, Otsu, Japan
- P.6: **Static Reliability of Bridged-Grain Poly-Si TFTs**
Meng Zhang, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.7: **High-Speed a-IGZO TFT-Based Circuits Using Back-Channel Etched Structure**
Jin Jang, Kyung Hee University, Seoul, South Korea

- P.8: High-Resolution a-IGZO TFT-LCD Panel Fabricated with Lower Annealing Temperature**
Shin-Chuan Chiang, Chunghwa Picture Tubes, Ltd., Taoyuan, Taiwan, ROC
- P.9: Study of the Origin of Major Donor States in Oxide Semiconductors**
Masashi Oota, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
- P.10: Oxide-TFT Fabrication by Using Nanorheology Printing for Display Application**
Hiroaki Koyama, Japan Advanced Institute of Science And Technology, Ishikawa, Japan
- P.11: Development of Easy-Debonding IGZO TFT Array on a Flexible PI Substrate at Low Temperature**
Jianhua Zhang, Shanghai University, Shanghai, China
- P.12: An a-Si:H TFT Gate Driver with Shared Dual Pull-Down Units for Large-Sized TFT-LCD Applications**
Shengdong Zhang, Peking University, Shenzhen, China
- P.13: A Simple LTPS Pixel Circuit Composed of Two Transistors and One Capacitor for AMOLED Displays**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC
- P.14: High-Mobility BCE a-Oxide TFT Fabricated Using Mixed-Acid Mo/Al/Mo Etchant**
Sang-Hee Park, ETRI, Daejeon, South Korea
- P.15: High-Performance Fully Transparent Hafnium-Doped Zinc Oxide TFTs Fabricated at Low Temperature**
Dedong Han, Peking University, Beijing, China
- P.16: Effect of TFT Mobility, Sub-Threshold Swing, and Threshold Voltage on AMOLED-Display Resolution**
Tsz Kin Ho, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.17: Development of Amorphous-Oxide TFTs Fabricated by a Total-Solution Process for Display Application**
Phan Tue, Japan Advanced Institute of Science And Technology, Ishikawa, Japan
- P.18: A Low-Power Scan Driver Using Depletion-Mode a-IGZO TFTs for High-Resolution Displays**
Oh-Kyong Kwon, Hanyang University, Seoul, South Korea
- P.19: A New Pixel Circuit to Compensate for Panel Non-Uniformity and OLED Degradation of Large IGZO AMOLED Panels**
Chun-Chieh Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC
- P.20: Performance Improvement of High-Mobility Amorphous Indium-Zinc-Tin-Oxide TFTs**
Po-Tsun Liu, National Chiao Tung University, Hsinchu, Taiwan, ROC
- P.21: n-Type Organic TFTs with High Operational Stability**
Changhee Lee, Seoul National University, Seoul, South Korea
- P.22: Top-Gate TFT with ZnO:N Channel Fabricated by Room-Temperature RF Magnetron Sputtering**
Meng Zhang, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.23: A New LCD Pixel Circuit with Low Refresh Rate Using Memory TFTs**
Seung-Woo Lee, Kyung Hee University, Seoul, South Korea
- P.24: IGZO-TFT Latch Circuit with High Stability and Full-Swing Output for System-on-Panel**
Congwei Liao, Peking University, Shenzhen, China
- P.25: Top-Gate Amorphous In-Ga-Zn-O TFTs Fabricated on Soda-Lime-Silica Glass Substrates**
Gwanghyeon Baek, University of Michigan, Ann Arbor, MI, USA
- P.26: A Low-Power Gate Driver Using Depletion-Mode a-IGZO TFTs**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC
- P.27: RF-Sputtered Metal-Oxide TFTs and Circuits on Aluminum Substrates with an Organic Coating**
Forough Mahmoudabadi, Lehigh University, Bethlehem, PA, USA
- P.28: Study on one Infrequent Influencing Factor of TFT-LCD Lifetime**
Bin Feng, BOE Technology Group Co., Ltd., Beijing, China

Applications

- P.29: DNA Sensing Systems on Flexible Substrate Using Solution-Processed Oxide TFTs**
Hyun Jae Kim, Yonsei University, Seoul, South Korea
- P.173L: *Late-News Poster*: A High-Quality Steerable Planar Collimator**
Hyungseok Bang, LG Display Co., Ltd., Kyunggi-do, South Korea

Applications and 3D

- P.185L: *Late-News Poster*: Polarization-Dependent Cylindrical Fresnel Lens Using the Reactive Mesogen Aligned by Nano-Groove Structure for 2D/3D Switchable Display**
Cheolho Lee, Kyungpook National University, Daegu, South Korea
- P.186L: *Late-News Poster*: Novel Optical Layout of Autostereoscopic Display that Simultaneously Reproduces Two Image Elements in Each Display Pixel**
Vasily Ezhov, A.M. Prokhorov General Physics Institute, Moscow, Russian Federation
- P.187L: *Late-News Poster*: Improved 3D with Super Stereoscopic Technique**
Kaan Akşit, Koç University, Istanbul, Turkey
- P.188L: *Late-News Poster*: Design for a Flexible Autostereoscopic Display with Different Radius of Curvature**
Yun-Ting Cheng, National Taiwan University, Taipei, Taiwan, ROC

Applied Vision / Human Factors

- P.30: A Novel Analytical Method for Moiré Phenomenon in Autostereoscopic Displays**
Ren-wei Liao, AU Optronics Corp., Hsinchu, Taiwan, ROC
- P.31: Investigation of the Actual Viewing Conditions in the Chinese Home**
Xuefei Zhong, Southeast University, Nanjing, China
- P.32: Mura-Grade Evaluation Based on S-CIELAB Color System**
Toshio Asano, Hiroshima Institute of Technology, Hiroshima, Japan
- P.33: Which Color-Gamut Metric Best Predicts Human Display Preference?**
James Hillis, 3M Co., Maplewood, MN, USA
- P.34: Evaluation of Readability for Tablet Devices by the Severity of Cataract Cloudiness**
Yuki Ishii, Nagoya University, Nagoya, Japan
- P.35: How to Obtain Optimum Overdrive Values of LCDs Only by the Human Eye**
Seung-Woo Lee, Kyung Hee University, Seoul, South Korea
- P.36: The Effects of 4K High-Resolution Displays on the Sway of the Human Body: A Comparison of 2D and 3D Images**
Kazuki Yoshikawa, Nagoya University, Aichi, Japan
- P.37: Readability of Displays in Bright Outdoor Surroundings**
Kjell Brunnström, Acreo Swedish ICT AB, Kista, Sweden

- P.38: Paired Comparison to Assess Dependency of Visibility on Panel Boundary Division in Weather Forecast Maps**
Sakuichi Ohtsuka, Kagoshima University, Kagoshima, Japan
- P.39: A Novel Color-Gamut Quantization Method for Wide-Color-Gamut Displays**
Kuei-Yin Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC
- P.40: Eye Movement While Reading e-Books**
Hideaki Takahira, Tokai University, Tokyo, Japan
- P.174L:Late-News Poster: Analysis of the Fundamental Characteristics of the Movement of Gaze and Hand When Holding an e-Book in the Hand**
Kei Kikuchi, Tokai University, Tokyo, Japan
- P.189L:Late-News Poster: Determination of Depth Enhancement through Assessments of Perceived Blur in 3D Displays**
Chao-Hua Wen, National Taiwan University of Science and Technology, Taipei, Taiwan, ROC
- P.193L:Late-News Poster: Optimal Tone Curve Characteristics of Transparent Display for Preferred Image Reproduction**
Youngshin Kwak, UNIST, Ulsan, South Korea

Display Electronics

- P.41: Active-Matrix Display with In-Pixel D/A Conversion Driven by Digital Pulse Width Modulation**
Ya-Hsiang Tai, National Chiao Tung University, Hsinchu, Taiwan, ROC
- P.42: A New Driving Method for PS-BP LCD**
Xinhui Zhong, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- P.43: A Novel TFT Pixel Design for Active-Matrix FLC with Gray-Scale Generation**
Tsz Kin Ho, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.44: Master-Slave Pixel Concept Used for Improved Sensor Display Array Circuits**
Nikolas Papadopoulos, University of Waterloo, Waterloo, Ontario, Canada
- P.45: A Feedback Method for Assuring Reliable Visual Quality of Locally Dimmed LCDs**
Daniel Schäfer, Saarland University, Saarbruecken, Germany
- P.46: A Real-Time Computer-Generated Integral-Imaging System Based on Multiple Orthographic Frustum Combining**
Qiong-Hua Wang, Sichuan University, Chengdu, China
- P.47: New Signal-Processing Method to Improve Image Quality of RGBW Display**
Masaaki Kabe, Japan Display, Inc., Kanagawa, Japan
- P.48: Development of a Novel RGBW Mobile Display with a Local-Dimming Backlight System**
Tsutomu Harada, Japan Display, Inc., Kanagawa, Japan
- P.49: New Blue-Phase LCD Driving Pixel Circuit for a-IGZO TFT with Large Operational Voltage**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC
- P.50: Driving System for RGBW AMOLED Display**
Szu-Heng Tseng, BOE Technology Group Co., Ltd., Beijing, China
- P.51: a-IGZO TFT Based Operational Amplifier and Comparator Circuits for the Adaptive DC-DC Converter**
Hojin Lee, Soongsil University, Seoul, South Korea
- P.52: A New Dynamic Headroom Controller Using Storage Delay Time of BJT for Low-Power-Consumption LED Backlight**
Jin Huh, KAIST, Daejeon, South Korea
- P.53: Real-Time Super-Resolution for 4K x 2K TVs Using Edge-Directed Unsharp Masking Sharpening Method**
Fang-Cheng Lin, National Chiao Tung University, Hsinchu, Taiwan, ROC
- P.54: Image Segmentation Using Densely Constructed Mean Shift Vectors**
HanJoo Cho, Pohang University of Science and Technology, Pohang, South Korea
- P.55: Adaptive Noise-Reduction Method Using Variable Window Size Based on Region Analysis**
Jae Hwan Lim, Pohang University of Science and Technology, Pohang, South Korea
- P.56: A Single-Inductor Bipolar-Output DC/DC Converter with High Efficiency Over Wide Load Range for Active Matrix OLED**
Ke-Horng Chen, NCTU, Hsinchu, Taiwan, ROC
- P.57: Pixel Design of 5-in. Full-HD IPS-LCD Using Wall Electrodes**
Takato Hiratsuka, Japan Display, Inc., Chiba, Japan
- P.175L:Late-News Poster: A 2.0-Gbps Intra-Panel Interface with Automatic Calibration for Chip-on-Glass Super-High-Definition TFT-LCD Applications**
Yohei Ishizone, CerebrEX, Inc., Osaka, Japan
- P.176L:Late-News Poster: A 3.7-Gb/sec Clock-Embedded Intra-Panel Interface for Large-Sized UHD 120-Hz LCD-TV Application**
Hyun-Kyn Jeon, Silicon Works Co., Ltd., Daejeon, South Korea
- P.190L:Late-News Poster: Low-Frequency-Driving Display to Reduce Logic Power in LCDs**
Oh Dae Seok, LG Display Co., Ltd., Kyunggi-do, South Korea

Display Manufacturing

- P.58: Frame-Type Backcover Design of Large-Sized LCD Modules**
Chengling Lv, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- P.59: Electrically High Stable, Flexible, Transparent, and Conductive Hybrid Electrodes Using an Indium-Doped Zinc Oxide Buffer Layer on Silver Nanowires**
Byeong Kwon Ju, Korea University, Seoul, South Korea
- P.60: Basic Design for Halftone Performance of Organic-Insulation Negative PAC for a Novel IPS Structure**
Chul Ho Park, LG Display Co., Ltd., Kyunggi-do, South Korea
- P.61: WITHDRAWN**
- P.62: Brightness and Contrast Improvement of a Display Panel by Using Anti-Reflection Films Nanoimprinted by Density-Graded Nanoporous Silicon**
Pei-Kuen Wei, Academia Sinica, Taipei, Taiwan, ROC
- P.63: Highly Transparent and Rub-Resistive Nanostructured Diamond-Like Carbon Protective Coatings for Display Applications**
Da-Hua Wei, National Taipei University of Technology, Taipei, Taiwan, ROC
- P.64: Eliminating Buckling in Vertical Four-Point Bend Testing**
K. Hemanth Vepakomma, Corning Inc., Corning, NY, USA
- P.65: Study on Resin as the Passivation Layer of Retina Displays for Mobile-Phone Screens**
Changjiang Yan, BOE Optoelectronics Technology Co., Ltd., Beijing, China
- P.66: The Mechanical Properties of Aluminosilicate Glass with Chemical Strengthening**
Kuo Chou Chang, G-Tech Optoelectronics Corp., Miaoi, Taiwan, ROC
- P.67: Research on Thermal Mura in Edge-Type LCD Module and Improvement by Heat-Sink Design**

- Chengling Lv, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- P.68: Analysis of Movable Mura and Improvement in LCD Cells**
Chengling Lv, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- P.69: A Study of Image Sticking for Automotive Displays**
Chang-Hoon Kim, LG Display Co., Ltd., Kyunggi-do, South Korea
- P.177L: *Late-News Poster*: Development of High-Strength Chemically Strengthened Glass**
Kosuke Kawamoto, Nippon Electric Glass Co., Ltd., Shiga, Japan
- P.192: Evaluation of Dimensional Stability During Low-Temperature Poly-Si TFT Fabrication Process Using a Ultra-Low Thermal-Shrinkage Glass Substrate**
Kazutaka Hayashi, Asahi Glass Co., Ltd., Kanagawa, Japan

Display Measurement

- P.70: Multilayered Silicon and Silicon Oxide Subwavelength Grating as a Reflective Polarizer in the Visible Region**
Su Pan, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.71: Simulation and Experimental Study on Light Leakage Caused by Glass Retardation in ADS Modes**
Yafeng Yang, BOE Technology Group Co., Ltd., Beijing, China
- P.72: Novel Color-Gamut Area Specification**
Wei-Wei Zheng, TCL Corporate Research, Shenzhen, China
- P.73: Brightness Inversion of the Polymer-Sustained-Alignment (PSA) Mode of Curved Displays**
Shang-wei Hsieh, AU Optronics Corp., Hsinchu, Taiwan, ROC

Display Systems

- P.74: Adaptable Light Beaming and Shaping with Lens Array**
Yuning Zhang, Southeast University, Nanjing, China
- P.75: Viewing-Zone Expansion for Autostereoscopic Display with Directional Backlight Using Linear Fresnel-Lens Array**
Takuya Mukai, University of Tsukuba, Tsukuba, Japan
- P.76: *Distinguished Student Poster*: Viewing-Angle-Switchable Display with a Compact and Directional Backlight Module**
Yi-Jun Wang, Shanghai Jiao Tong University, Shanghai, China
- P.77: Roll-to-Roll Manufacturing of RGB Phosphor Sheets for Solid-State Lighting and Large-Area Flexible Displays**
Hisham Menkara, PhosphorTech, Kennesaw, GA, USA
- P.78: An Interactive 360° Floating 3D Display Based on Gesture Recognition**
Li Feng, Zhejiang University, Hangzhou, China
- P.79: An Autostereoscopic Display Structure Based on Diffractive Optical Elements and Tunable Refractive Elements**
Chiao-Wei Hsu, National Taiwan University, Taipei, Taiwan, ROC
- P.80: Intelligent Remote Light-Emitting Systems Using PMMA and CuInS₂ Nanocrystals Composite Films**
Haizheng Zhong, Beijing Key Laboratory of Nanophotonics and Ultrafine Optoelectronic Systems, Beijing, China
- P.81: Local Dimming Using a Grid-Shaped Reflector in Large-Sized LED-Backlit LCD TVs**
Zong Qin, National Chiao-Tung University, Hsinchu, Taiwan, ROC
- P.82: Holographic Display System Based on Complex Amplitude Modulation**
Nannan Zhang, Beijing Institute of Technology, Beijing, China
- P.83: Large-Depth Integral Imaging Using Plano-Convex Micro-Lens Array and Flat-Panel Array**
Qiong-Hua Wang, Sichuan University, Chengdu, China
- P.191L: *Late-News Poster*: Analysis of Backlight Structure Based on Different LCD Eigenmode**
Jin-ku Lv, BOE Display Technology Co., Ltd., Beijing, China

Emissive Displays

- P.84: Towards a Complete Understanding of the Electronic Characteristics of Powder ACCEL Lamps**
Chris Winscom, Brunel University, Uxbridge, UK
- P.85: ZnO Thin-Film Phosphor Prepared on Different Substrates by Novel Multiple Reducing Annealing**
Chaoyang Li, Kochi University of Technology, Kami, Japan
- P.86: Improved Performance of Quantum-Dot LEDs by Using a Charge-Blocking Layer**
Changhee Lee, Seoul National University, Seoul, South Korea
- P.87: All-Solution Process for Color-Tunable Quantum-Dot LEDs**
Jing Chen, Southeast University, Nanjing, China
- P.88: All-Inorganic Quantum-Dot Light-Emitting Devices Prepared by Solution-Process Route**
Jing Chen, Southeast University, Nanjing, China
- P.89: Development of 51-in. PDPs**
Qun Yan, Sichuan COC Display Device Co., Ltd., Mianyang, China
- P.178L: *Late-News Poster*: Blue-Green BaSi₂O₂N₂:Eu²⁺ Phosphor for LEDs**
Jongsu Kim, Pukyong National University, Busan, South Korea
- P.179L: *Late-News Poster*: Chemical-Stability Enhancement of K₂SiF₆:Mn⁴⁺ by Metal (Oxide) Coating**
Jongsu Kim, Pukyong National University, Busan, South Korea

e-Paper and Flexible Displays

- P.90: Advancing Behavior of Fluids over Patterned Hydrophobic Surface for Electrowetting Displays**
Jun Xia, Southeast University, Nanjing, China
- P.91: What Is the Ideal ITO Composition for Touch- Sensor Deposition on a Flexible Substrate Made with Rotary Cathodes ?**
Paul Lippens, UMICORE Thin Film Products, Balzers, Liechtenstein
- P.92: Encapsulation Adhesive Possessing High Water Barrier and Low Corrosive Properties for a Flexible Electronic Device**
Satoshi Naganawa, Lintec Corp., Saitama, Japan
- P.93: Highly Conductive and Uniform Graphene Hybrid Electrode through Chemical Reduction for Flexible OLEDs**
Gufeng He, Jiao Tong University, Shanghai, China
- P.94: Ultra-Thin Graphene Oxide/Polymer Multi-Layer Encapsulation for Flexible OLED Displays**
Hwa-Yong Lee, Hong-ik University, Seoul, South Korea
- P.95: Newly Discovered Property of Electric and Magnetic Dual-Driven Twisting Ball Display**
Yusuke Komazaki, The University of Tokyo, Tokyo, Japan
- P.96: A Debonding Technique with Inorganic Buffer Layer on Flexible Display Panel**
Chien-Ying Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC

Liquid-Crystal Technology

3D

- P.97:** A Novel Fresnel-Type Liquid-Crystal Lens for Autostereoscopic 3D Display
I-Wei Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC
- P.98:** Autostereoscopic 2D/3D Switchable Display Using Liquid-Crystal Lenticular Lens
Qiao-Sheng Liao, Shenzhen China Star Optoelectronics Co., Ltd., Shenzhen, China
- P.99:** 2D/3D Switchable, 3D Rotatable, and 2D/3D Coexistent Autostereoscopic Display Using Multi-Functional Liquid-Crystal Lens Array
Tai-Hsiang Jen, National Chiao Tung University, Hsinchu, Taiwan, ROC
- P.100:** A 2D/3D Switchable Display with Dramatically Reduced Crosstalk
Ruidong Zhu, University of Central Florida, Orlando, FL, USA
- P.101:** Liquid-Crystal Fresnel Zone Lens Based on Single-Sided Patterned Photoalignment Layer
Xiaoqian Wang, Hong Kong University of Science and Technology, Kowloon, China
- P.102:** Research on Adaptive Modal LC Lens with Central Electrode Structure and ITO High-Resistance Layer
Qing Li, Southeast University, Nanjing, China

Alignment

- P.103:** Nanomesh Aluminum Films for LC Alignment: Theoretical and Experimental Modeling
Victor Belyaev, Moscow Region State University, Moscow, Russian Federation
- P.104:** Bistable Nano-Structured Alignment Surface by Nanoimprint Lithography
Chung Yung Lee, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.105:** Modelling of Liquid Crystals at the Pixel Edge
Zijun Nie, University College London, London, UK
- P.106:** Pretilt Angles and Liquid-Crystal Director-Deformation Profiles of Inverse TN-LC Cells
Sheng-Ya Wang, National Chiao Tung University, Tainan, Taiwan, ROC

Blue Phase

- P.107:** Spatial-Multiplexed Dual-View Display Using Blue-Phase Liquid Crystal
Qiong-Hua Wang, Sichuan University, Chengdu, China
- P.108:** WITHDRAWN
- P.109:** **Distinguished Student Poster:** Diluter Effects on High-Dielectric-Anisotropy Blue-Phase Liquid Crystals
Yuan Chen, University of Central Florida, Orlando, FL, USA
- P.110:** Stabilizing Blue-Phase Liquid Crystal by Stabilization of Double-Twist Cylinders with Photo-Reactive Chiral Mesogen
Seung Hee Lee, Chonbuk National University, Jeonju, South Korea
- P.111:** Polymer Effect on Polymer-Stabilized Blue-Phase Liquid Crystals
Emine Kemiklioglu, Liquid Crystal Institute, Kent State University, Kent, OH, USA

FFS/IPS

- P.112:** Electrode Surface Modified VA-IPS Liquid-Crystal Device
Jian-Siang Huang, National Chiao Tung University, Hsinchu, Taiwan, ROC
- P.113:** Photoalignment Technology for High-Performance IPS-LCDs: IPS-NEO Technology
Noboru Kunimatsu, Japan Display, Inc., Mobara, Japan
- P.114:** A Liquid-Crystal Mode with Combined Fringe and In-Plane-Switching Fields by Using a Bottom Floating Electrode
Hak-Rin Kim, Kyungpook National University, Daegu, South Korea
- P.115:** A Super Fringe-Field-Switching Pixel Structure with Low Driving Voltage
Sikun Hao, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
- P.116:** Novel Approach to Achieve Conventional Polyimide-Less IPS/FFS LCDs
Seung Hee Lee, Chonbuk National University, Jeonju-si, South Korea
- P.117:** Investigation on the Movement of Ions in the Fringe-Field-Switching Mode Depending on the Resistivity of the Alignment Layer and Dielectric Anisotropic Sign of Liquid Crystal
Seung Hee Lee, Chonbuk National University, Jeonju-si, South Korea

Films and Backlight

- P.118:** Ellipsoidal Light-Diffusing Film with a Narrow-Louver Micro-Structure of Refractive Index
Baku Katagiri, LINTEC Corp., Saitama, Japan
- P.119:** High-Efficiency LCDs Using Quantum-Dot Films
Jeff Yurek, Nanosys, Milpitas, CA, USA
- P.180L:** **Late-News Poster:** Achromatic Polarizer Using Novel Dichromatic Dye for Low-Power Display Applications
Takahiro Ishinabe, Tohoku University, Sendai, Japan

Other LCD Modes

- P.120:** Nucleation-Controlled Bistable Twisted-Nematic Display
Man Chun Tseng, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.121:** Electro-Optical Properties of Inverse-Twisted-Nematic Cells with Different Pretilt Angles
Chia-Yi Lin, National Chiao Tung University, Tainan, Taiwan, ROC
- P.122:** Improvement in a PDLC with Low Driving Voltage and High Contrast Ratio for Transparent Displays
Chia-Sheng Hsieh, Chunghwa Picture Tubes, Ltd., Taoyuan, Taiwan, ROC
- P.123:** Oblique Light Incidence onto Hybrid Aligned Nematic (HAN) Cells for Optical Compensators
Victor Belyaev, Moscow Region State University, Moscow, Russian Federation
- P.124:** Submillisecond-Response-Time Polymer-Network Liquid Crystal for Next-Generation Spatial Light Modulators
Jie Sun, University of Central Florida, Orlando, FL USA
- P.125:** Optimization of the Mechanical Stability and Rewriting Speed of Optically Rewritable e-Paper
Jiatong Sun, Hong Kong University of Science and Technology, Kowloon, Hong Kong
- P.126:** Photo-Controllable Multi-Stable Liquid-Crystal Optical Switch
Tsung-Hsien Lin, National Sun Yat-Sen University, Kaohsiung, Taiwan
- P.127:** Fast Switching of VA Negative Liquid Crystals by Using Three-Terminal Electrodes
Tae-Hoon Yoon, Pusan National University, Pusan, South Korea

P.181L: *Late-News Poster:* A Novel Optically Compensated Tunable Birefringence (OCTB) Liquid-Crystal Electro-Optical Device Exhibiting High-Speed Response

Shunsuke Kobayashi, Tokyo University of Science, Yamaguchi, Japan

P.182L: *Late-News Poster:* Polarizer-Free Liquid-Crystal Lens Imaging

Mao Ye, SuperD Co., Ltd., Shenzhen, China

PS-VA

P.128: Improved Picture Quality on Analog Dual-Data-Type Multi-Domain Polymer Sustained Alignment LCD Technology

Kun-Cheng Tien, AU Optronics Corp., Hsinchu, Taiwan, ROC

P.129: Fast Switching of a VA -LC Cell by Forming Polymer Networks at a Low Temperature

Tae-Hoon Yoon, Pusan National University, Pusan, South Korea

P.130: Fabrication of Liquid-Crystal Cell with Corrugated and Parallel Electrodes

Wei-Fu Chang, National Taiwan University, Taipei, Taiwan, ROC

P.131: Surface Anchoring of VA- LCDs Enhanced by Surface Polymer Stabilization

Libo Weng, Liquid Crystal Institute, Kent State University, Kent, OH, USA

P.132: Novel Pixel Design for Super-Multi-Domain Polymer Sustained Alignment LCD Technology

Kun-Cheng Tien, AU Optronics Corp., Hsinchu, Taiwan, ROC

P.183L: *Late-News Poster:* Time-Sharing Gamma for Improving Off-Axis Image Quality of LCDs

Jong-su Park, Samsung Display Co., Ltd., Kyunggi-do, South Korea

Reflective

P.133: Implementation of Colorful Active-Matrix TFT Transparent Display by Cholesteric Liquid Crystal

Chien Hua Chen, Chunghwa Picture Tubes, Ltd., Taoyuan, Taiwan, ROC

P.134: A Spatial Light Modulator with a Two-Dimensional Array of Liquid-Crystal Bubbles

Andrii Varanytsia, Liquid Crystal Institute, Kent State University, Kent, OH, USA

P.135: Reflective LCD without Flicker for Reduced Eye Strain

Shuji Fukai, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

P.136: Electrical Color and Intensity Tuning in Cholesteric Reflective Display

Hossein Nemati, Liquid Crystal Institute, Kent State University, Kent, OH, USA

P.184L: *Late-News Poster:* An Effective Way to Achieve Full-Color Cholesteric LCDs with a Single Liquid-Crystal Mixture and Layer

Yan Jin, Hoseo University, Asan, South Korea

OLEDs

P.137: Large-Area Deposition of a Light Out-Coupling Layer Stack on Soda Glass

Tukaram Hatwar, Guardian Industries Corp., Carleton, MI, USA

P.138: WITHDRAWN

P.139: A Scalable Seamless Color PMOLED Display

Yan Jian, Sichuan CCO Display Technology Co., Ltd., Chengdu, China

P.140: Hybrid A/D Driving Method for High-Definition AMOLED Displays

Shuming Chen, South University of Science and Technology of China, Shenzhen, PR China

P.141: WITHDRAWN

P.142: Highly Efficient Inverted Phosphorescence OLEDs Based on Ultrathin Emitting Layer

Gufeng He, Jiao Tong University, Shanghai, China

P.143: Realization of High-Efficiency Green Phosphorescent Top-Emitting OLEDs by Employing Ultra-Thin Non-Doped Emissive Layer

Gufeng He, Jiao Tong University, Shanghai, China

P.144: OLED Fabricated on a Nanostructured AZO: A Low-Cost Method towards Enhanced Light Extraction for Large-Area Lighting Applications

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