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

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 Optronics 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 Optronics 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 (JAPERA), Tsukuba, Japan

6.3: **Application of Nanocoposite 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**
Takatoshi 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 – 3:30 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 Session: 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**
Tsutae Shinoda, Shinoda Plasma, Kobe, Japan

Reception: Celebration of the 50th Anniversary of Plasma Display Panels

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: **Novel Narrow-Bezel LCD with Improved Power Consumption in a-Si Gate Driver Circuit**
Byeong Seong So, LG Display Co., Ltd., Kyunggi-do, South Korea

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: ***Invited Paper:*** **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 Caifornia 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 Mphepö, 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 Bita, Qualcomm MEMS Displays, Inc.*

30.1: **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-Birefringince 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, Novaled 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 llumination: 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 pm / Room 6A

Chair: *Jefferson 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, Univeristy of Leeds, Leeds, UK

Session 43: Novel Interactivity *(Touch and Interactivity)*
Thursday, June 5 / 1:30 - 2:50 pm / Room 6A
Chair: *Bob Senior, Canatu Oy*
Co-Chair: *Deuksu Lee, LG Display Co., Ltd.*

43.1: **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-Pixilated 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 Chuao 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: *Franky So, University of Florida*

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, OLEDWorks 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. Käläntär, Global Optical Solutions, Tokyo, Japan

57.2: **Enhancing LCD Optical Efficiency with a Linearly Polarized Backlight and Polarization-Preserving Light-Guide Plate**
Zhenyue Luo, Universityof 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 pm / 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**
Hirotsugu 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 Stereoscopy 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 $CuInS_2$ 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 ACEL 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 $BaSi_2O_2N_2:Eu^{2+}$ Phosphor for LEDs**
Jongsu Kim, Pukyong National University, Busan, South Korea

P.179L: ***Late-News Poster:*** **Chemical-Stability Enhancement of $K_2SiF_6:Mn^{4+}$ 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, Liechtnstein

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 Univeristy 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

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

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