SYMPOSIUM PROGRAM

2013 SID INTERNATIONAL SYMPOSIUM

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

Session 1: Annual SID Business Meeting
Tuesday, May 21, 2013/ 8:00 – 8:20 am / Ballroom C/D

Session 2: Opening Remarks / Keynote Addresses
Tuesday, May 21, 2013 / 8:20 - 10:20 am / Ballroom C/D

2.1: ***Keynote 1:*** **Displays and Innovation: An Exciting Future**
Dr. Kinam Kim, President & CEO, Samsung Display Co., Chungcheongnam-do, Korea

2:2: ***Keynote 2:*** **The Social Life of Devices**
Mr. Bill Buxton, Principal Researcher, Microsoft Research, Microsoft Corp., Redmond, WA, USA

2.3: ***Keynote 3:*** **Exciting Developments in Oxide TFT Technology**
Professor John Wager, Oregon State University, Corvallis, OR, USA

Session 3: Autostereoscopic and Multi-View I *(3D/Display Systems)*
Tuesday, May 21. 2013, / 10:50 - 11:50 am / Ballroom A
Chair: *Kälil Käläntär, Global Optical Solution*
Co-Chair: *Jean-Pierre Guillou, Apple, Inc.*

3.1: **A Novel Architecture for Autostereoscopic 2D/3D Switchable Display Using Dual-Layer OLED Backlight Module**
Yi-Jun Wang, Shanghai Jiao Tong University, Shanghai, China

3.2: **Application of a Flexible LCD in a High Resolution Switchable Autostereoscopic 3D Display**
Shiuan-Iou Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC

3.3: **Optimized Parallax Control of 3D Images on an Autostereoscopic Display**
Takefumi Hasegawa, NLT Technologies, Ltd., Kanagawa, Japan

Session 4: Oxide TFTs I *(Oxide TFTs/Active-Matrix Devices)*
Tuesday, May 21, 2013 / 10:50 - 12:00 Noon / Ballroom B
Chair: *Arokia Nathan, University College London*
Co-Chair: *Junho Song, Samsung Display Co., Ltd.*

4.1: ***Invited Paper:*** **Electronic Structure, Carrier Transport, Defects, and Impurities in Amorphous Oxide Semiconductors**
Toshio Kamiya, Tokyo Institute of Technology, Yokohama, Japan

4.2: ***Invited Paper:*** **Development of High Mobility Zinc-Oxynitride TFT**
Yan Ye, Applied Material, Santa Clara, CA, USA

4.3: ***Invited Paper:*** **High Mobility Oxide TFT for Large Area High Resolution AMOLED Displays**
Sang-Hee Park, ETRI, Daejeon, Korea

4.4L: ***Late News Paper:*** **Modeling Current-Voltage Behavior in Oxide TFTs Combining Trap Limited Conduction with Percolation**
Sungsik Lee, University of Cambridge, Cambridge, UK

Session 5: LCD or OLED? *(Liquid-Crystal Technology)*
Tuesday, May 21, 2013 / 10:50 - 11:50 am / Ballroom C
Chair: *Akihiro Mochizuki, I-CORE Technology, LLC*
Co-Chair: *Hyun Chul Choi, LG Display Co., Ltd.*

5.1: ***Invited Paper:*** **LCD or OLED: Who Wins?**
David Barnes, BizWitz, LLC, Georgetown, TX, USA

5.2: ***Invited Paper:*** **TFT LCDs as the Future Leading Role in FPDs**
Yasuhiro Ukai, Ukai Display Device Institute, Kobe, Japan

5.3: ***Invited Paper:*** **AH-IPS: Superb Display for Mobile Devices**
Joun Ho Lee, LG Display Co., Ltd, Gyeonggi-do, Korea

Session 6: e-Paper I *(e-Paper and Flexible Displays)*
Tuesday, May 21, 2013 / 10:50 am - 12:10 pm / Room 118
Chair: *Makoto Omodani, Tokai University*
Co-Chair: *Yong Taek Hong, Seoul National University*

6.1: ***Invited Paper:*** **e-Paper System Using High Resolution Electrophoretic Display**
Satoshi Nebashi, Seiko-Epson Corp., Nagano, Japan

6.2: **Flexible Electrophoretic Display Driven by Solution Processed OTFTs Manufactured Using All Sputtered Electrodes**
Jung Eun Lee, LG Display R&D Center, Gyeonggi-do, Korea

6.3: ***Distinguished Paper:*** **A 9-in. Flexible Color Electrophoretic Display with Projected-Capacitive Touch Panel and Integrated a-Si Gate Driver**
Yen Lai, AU Optronics Corp., Hsinchu, Taiwan, ROC

6.4: ***Invited Paper:*** **The Effect of Touching Documents in Reading: Comparing Paper and a Touch Based Tablet Device in Intensive Proofreading**
Hirohito Shibata, Fuji Xerox Co., Ltd., Kanagawa, Japan

Session 7: Plasma Display Devices *(Emissive Displays)*
Tuesday, May 21, 2013 / 10:50 - 12:00 Noon / Room 202
Chair: *Larry Weber, Consultant*
Co-Chair: *Qun Yan, Sichuan COC Display Devices Co., Ltd.*

7.1: ***Invited Paper:*** **Progress in Luminous Array Film with Plasma Tube Technology for Seamless-Tiling Super Large Area Display**
Terukazu Kosako, Shinoda Plasma Co., Ltd., Kobe, Japan

7.2: **Determination Method of Pixel Values for Combined Single-Line and Multi-Line Scanning Method for 120-Hz PDP**
Tomokazu Shiga, The University of Electro-Communication, Tokyo, Japan

7.3: **Simulation Study of a Flat Panel Radiation Detector Based on Shadow Mask PDP**
Yan Tu, Southeast University, Nanjing, China

7.4L: ***Late News Paper:*** **New, Thinner Phosphor Layer Fabrication Process for ACPDPs**
Ryuichi Murai, Panasonic AVC Networks Company, Osaka, Japan

Session 8: Emerging Displays *(Applications)*
Tuesday, May 21, 2013 / 10:50 - 11:50 am / Room 205
Chair: *Jean-Noel Perbet, THALES Avionic*
Co-Chair: *Adi Abileah, Planar Systems, Inc.*

8.1: ***Invited Paper:*** **Optical and System Considerations for Mobile Touch Screen Applications**
Steven Bathiche, Microsoft, Redmond, WA, USA

8.2: **Semi-Transparent Inverted Quantum Dot LEDs**
Jin Jang, Kyung Hee University, Seoul, Korea

8.3: **Blur-Free Transparent LCD with Hybrid Transparency**
Chia-Wei Kuo, AU Optronics Corp., Hsinchu, Taiwan

Session 9: Autostereoscopic and Multi-View II *(3D/Display Systems)*
Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Ballroom A
Chair: *Matthew Brennesholtz, Insight Media*
Co-Chair: *Jae Hyeung Park, Chungbuk National University*

9.1: **Frontal Projection Type 3D Display with Enhanced Brightness Uniformity**
Byoungho Lee, Seoul National University, Seoul, Korea

9.2: **A Wide View, High Resolution, 3D Display Using Real Time Rendering Regarding Viewer Position**
Yingbao Yang, Japan Display, Inc., Kanagawa, Japan

9.3: **Round View Display Motion-Parallax Based 3D Display with Super Wide Viewing Angle**
Hidefumi Takamine, Toshiba Corp., Kawasaki, Japan

Session 10: Oxide TFTs II *(Oxide TFTs/Active-Matrix Devices)*
Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Ballroom B
Chair: *Tohru Nishibe, Japan Display Central, Inc.*
Co-Chair: *Hyun Jae Kim, Yonsei University*

10.1: **High Mobility Self-Aligned Top Gate Oxide TFT for High Resolution AMOLEDs**
Narihiro Morosawa, Sony Corp., Kanagawa, Japan

10.2: ***Invited Paper:*** **Development of Advanced Co-Planar Oxide TFT for OLED Displays**
Jong Uk Bae, LG Display Co., Ltd., Gyeonggi-do, Korea

10.3: ***Invited Paper:*** **High Mobility Oxide TFTs for Future LCDs**
Junho Song, Samsung Display Co., Ltd., Gyeonggi-do, Korea

10.4: **Improvement in Stability of a-IGZO LCDs**
Chun Wei Wu, BOE Technology Group Co., Ltd., Beijing, China

Session 11: 4K x 2K Displays *(Liquid-Crystal Technology)*
Tuesday, May 21, 2013 / 2:00 - 3:00 pm / Ballroom C
Chair: *Shui Chih Lien, TCL Group*
Co-Chair: *Matthew Sousa, 3M*

11.1: ***Invited Paper:*** **Development of Largest 110-in. 4K x 2K 3D TFT LCD**
Chung-Yi Chiu, Shenzhen China Star Optoelectronics Technology Co., Ltd., Guangdong, China

11.2: ***Invited Paper:*** **Development of Large Sized Oxide TFT LCD TV with ADSDS Technology**
Ji Zhang , BOE Technology Group Co., Ltd., Beijing, China

11.3: ***Distinguished Paper:*** **High Transmission VA LCD with a Three Dimensionally Shaped Pixel Electrode for 4K x 2K Displays**
Masashi Miyakawa, Sony Corp., Kanagawa, Japan

Session 12: e-Paper II *(e-Paper and Flexible Displays)*
Tuesday, May 21, 2013 / 2:00 - 3:20 pm / Room 118
Chair: *Paul Drzaic, Apple, Inc.*
Co-Chair: *Nick Colaneri, Flexible Display Center*

12.1: ***Invited Paper:*** **Electrofluidic Imaging Films for Brighter, Faster, and Lower Cost e-Paper**
Jason Heinkenfeld, University of Cincinnati, Cincinnati, OH, USA

12.2: ***Invited Paper:*** **Electrochemical Display for Color e-Paper and Dual Mode Display**
Norihisa Kobayashi, Chiba University, Chiba, Japan

12.3: **Development of Electro-Osmotic Color e-Paper**
Alex Henzen, IRX Innovations BV, Son en Breugel, The Netherlands

12.4: **Recent Development of Transparent Electrowetting Display**
Kuo Lung Lo, ITRI, Chutung, Taiwan, ROC

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

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

Chair: *Ryuichi Murai, Panasonic AVC Devices Development Center*

Co-Chair: *Kyung Cheol Choi, KAIST*

13.1: **Improvement of Luminous Efficacy by Applying $Ca_xMg_{1-x}O$ Protecting Layer with High Xe Content Discharge Ga**
Qun Yan, COC Display Device Co., Wallkill, NY, USA

13.2: **Effects of Sealing Conditions and CaO Contents on Aging Behavior of ACPDP with (Mg,Ca)O Protective Layer**
Yong-Seog Kim, Hong-ik University, Seoul, Korea

13.3: **Secondary Electron Emission of Modified MgO Surfaces in Plasma Displays Based on First Principle**
Yan Tu, Southeast University, Nanjing, China

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

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

Chair: *Jyrki Kimmel, Nokia Research Center*

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

14.1: ***Invited Paper:*** **Sonification: Multimodal and Auditory Display of Data**
Bruce Walker, Georgia Institute of Technology, Atlanta, GA, USA

14.2: ***Invited Paper:*** **Development of Auditory and Cross-Modal Displays for Assistive Technology**
Tony Stockman, Queen Mary University of London, London, UK

14.3: **A Novel Concept for a Blood Vessel Viewer Based on a Bidirectional OLED Microdisplay**
Constanze Großmann, Fraunhofer IOF, Jena, Germany

14.4: **Polychromatic High Frequency Steady State Visual Evoked Potentials for Brain-Display Interaction**
Yu-Yi Chien, National Chiao Tung University, Hsinchu, Taiwan, ROC

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

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

Chair: *Philip Bos, Kent State University*

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

15.1: ***Invited Paper:*** **High Performance Autostereoscopic 2D/3D Switchable Display Using Liquid Crystal Lens**
Shinichiro Oka, Japan Display, Inc., Chiba, Japan

15.2: ***Distinguished Paper:*** **LC GRIN Lens Mode with Wide Viewing Angle for Rotatable 2D/3D Tablet**
Masako Kashiwagi, Toshiba Corp., Kawasaki, Japan

15.3: **A Novel Liquid Crystal Lens for Autostereoscopic 3D Displays**
Sheng-Chi Liu, AU Optronics Corp., Hsinchu, Taiwan

15.4: **Function Integrated LC GRIN Lens for Partially Switchable 2D/3D Display**
Ayako Takagi, Toshiba Corp., Kawasaki, Japan

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

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

Chair: *Yoshitaka Yamamoto, Sharp Corp.*

Co-Chair: *Takatoshi Tsujimura, Konica-Minolta*

16.1: **Negative Bias Photodegradation Mechanism in SnO TFTs**
Masashi Tsubuku, Semiconductor Energy Laboratory Co., Ltd, Kanagawa, Japan

16.2: **A 4.8-in. AMOLED Display Panel Driven by Stable Amorphous InZnO TFT**
Lei Wang, Guangzhou New Vision Opto-Electronic Technology Co., Ltd., Guangzhou, China

16.3: **AC and DC Bias Temperature Stability of Coplanar Homojunction a-InGaZnO TFT**
Eric Yu, University of Michigan, Ann Arbor, MI, USA

16.4: **Photostability Improvement of a-InGaZnO TFTs by Introducing a Transparent UV Shielding Layer**
Min-Yen Tsai, National Chiao Tung University, Hsinchu, Taiwan, ROC

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

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

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

Co-Chair: *Martin Schadt, MS Hightech Consulting*

17.1: ***Invited Paper:*** **Polymer Stabilized Blue Phase LCDs Applying Novel Groove Cell Structure**
Cheng-Yeh Tsai, AU Optronics Corp., Hsinchu, Taiwan, ROC

17.2: **Low Voltage Blue Phase LCD with Red Shifted Bragg Reflection**
Jin Yan, University of Central Florida, Orlando, FL, USA

17.3L: ***Late News Paper:*** **Enhancing the Contrast Ratio of Blue Phase LCDs**
Yifan Liu, University of Central Florida, Orlando, FL, USA

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

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

Chair: *Ruiqing Ma, Universal Display Corp.*

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

18.1: ***Invited Paper:*** **Roll-to-Roll Manufacturing of Printed OLEDs**
Jukka Hast, Oulu, Finland

18.2: **A 3.4-in. Flexible High Resolution Full Color Top Emitting AMOLED Display**
Akihiro Chida, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

18.3: **Flexible Barrier Technology for Enabling Rollable AMOLED Displays and Upscaling Flexible OLED Lighting**
Flora Li, Holst Centre/TNO, Eindhoven, The Netherlands

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

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

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

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

Co-Chair: *Masayuki Nakamoto, Shizuoka University*

19.1: **Efficiency Enhancement of Indium-Phosphide Based Quantum Dot LEDs by Shell Thickness Tuning**
Jiwan Kim, Korea Electronics Technology Institute, Seongnam, Korea

19.2: ***Distinguished Paper:*** **Characterization of Electron-Hole Pair Migration and Trapping in Rare Earth Doped YBO_3 under Vacuum Ultraviolet Excitation**
Anthony Diaz, Central Washington University, Ellensburg, WA, USA

19.3: **Morphology Controlled Single Crystal ZnO Nanostructures Fabricated by a Novel Mist Chemical Vapor Deposition**
Chaoyang Li, Kochi University of Technology, Kami, Japan

19.4L: ***Late News Paper:*** **Development of Stable Alkaline Earth Sulfide LED Phosphors for LCD Backlights**
Ravi Rao, Specialty Phosphors, Inc., Cupertino, CA, USA

19.5L: ***Late News Paper:*** **High Efficiency and Long Lifetime Quantum Dot LEDs for Flat Panel Display Application**
Paul Holloway, University of Florida, Gainesville, FL, USA

19.6L: ***Late News Paper:*** **How to Fabricate Much Brighter AC Electroluminescent Lamps: Optimizing the Alignment of the Emitting ZnS:Cu Phosphor Particles to the AC Field**
Jack Silver, Brunel University, London, UK

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

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

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

Co-Chair: *Allan Kmetz, Consultant*

20.1: **Color Holographic Display Based on Fast-Response Liquid Crystal Cell**
Yikai Su, Shanghai Jiao Tong University, Shanghai, China

20.2: **Enlarged Viewing Angle of Integral Imaging System by Liquid Crystal Prism**
Chih-Wei Chen, National Chiao Tung University, Hsinchu, Taiwan, ROC

20.3: **Novel Adaptive Liquid Lens Actuated by Liquid Crystal Piston**
Su Xu, University of Central Florida, Orlando, FL

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

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

Chair: *Hyun Jae Kim, Yonsei University*

Co-Chair: *Sven Murano, Novaled AG*

21.1: ***Invited Paper:*** **Technological Progress and Commercialization of AMOLED TV**
Chang-Ho Oh, LG Display Co., Ltd., Gyeonggi-do, Korea

21.2: ***Distinguished Paper:*** **A 55-in. AMOLED TV with InGaZnO TFTs Using WRGB Pixel Design**
Woo-Jin Nam, LG Display Co., Ltd., Gyeonggi-do, Korea

21.3: **A 65-in. Amorphous Oxide TFT AMOLED TV Using Side-by-Side and Fine Metal Mask Technology**
Jen-Yu Lee, AU Optronics Corp., Hsinchu, Taiwan, ROC

21.4L: ***Late News Paper:*** **Recent Developments in Carbon Nanotube Enabled Vertical Organic Light-Emitting Transistors for OLED Displays**
Mitchell McCarthy, nVerPix, LLC, and University of Florida, Gainesville, FL, USA

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

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

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

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

22.1: ***Invited Paper:*** **Low Voltage Polymer Stabilized Blue Phase Liquid Crystal**
Yasuhiro Haseba, JNC Petrochemical Corp., Chiba, Japan

22.2: ***Invited Paper:*** **Liquid Crystalline Cubic Blue Phase in Photo-Responsive Bent Core Molecular System**
Suk-Won Choi, Kyung Hee University, Seoul, Korea

22.3: **Polymer System Effect on Polymer Stabilized Blue Phase Liquid Crystal**
Jian Gang Lu, Shanghai Jiao Tong University, Shanghai, China

22.4: **Multi-Stable LCD with Dual Frequency Reverse Mode Polymer Stabilized Cholesteric Texture**
Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan, ROC

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

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

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

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

23.1: ***Invited Paper:*** **Jet Printed TFTs and Circuits for Flexible Electronics**
Robert Street, Palo Alto Research Center, Palo Alto, CA, USA

23.2: ***Invited Paper:*** **Solution Processed Metal Oxide TFTs and Circuits on Plastic by Photochemical Activation Proces**
Sung Kyu Park, Chung-Ang University, Seoul, Korea

23.3: ***Invited Paper:*** **Upgrading Self-Aligned Imprint Lithography (SAIL) in Preparation for Roll-to-Roll Manufacturing of Large Sized High Performance Flexible Electronics**
Han-Jun Kim, Hewlett-Packard Labs, Palo Alto, CA USA

23.4: **Delamination Effect on Flexible LTPS TFTs**
Ssu-Hui Lu, AU Optronics Corp., Hsinchu, Taiwan, ROC

Session 24: Novel Measurements *(Display Measurement)*

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

Chair: *Stephen Atwood, Azonix Corp.*

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

24.1: ***Invited Paper:*** **Photography of Display Surfaces Using Consumer Cameras: Three Regimes and Tristimulus Imagery**
Edward Kelley, KELTEK, Longmont, CO, USA

24.2: ***Distinguished Paper:*** **Viewing Angle Measurements on Flexible Reflective e-Paper Displays**
Dirk Hertel, E Ink Corp., Cambridge, MA, USA

24.3: **Characterization and Modeling of Light-Diffusing Sheet**
Yue Cui, Liquid Crystal Institute, Kent State University, Kent, OH, USA

24.4: **A Novel Measurement Method for Sparkle "Characterization"**
Ellen Kosik-Williams, Corning Incorporated, Corning, NY, USA

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

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

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

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

25.1: ***Invited Paper:*** **Capacitively Coupled 13.56-MHz Resonance Controlled Wireless Power Transfer System for e-Paper Modules**
Reiji Hattori, Kyushu University, Fukuoka, Japan

25.2: ***Invited Paper:*** **ESD and EOS Impact During Module Assembly Processes of Display Panel**
Ming-Dou Ker, National Chiao-Tung University, Hsinchu, Taiwan, ROC

25.3: **Pixel Circuit with Bootstrapping Structure for Blue Phase LCDs**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC

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

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

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

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

26.1: **A Coarse Integral Holographic Display**
Quinn Smithwick, Disney Research, Glendale, CA, USA

26.2: **A Two Step Wave Field Projection Method for Fast Hologram Pattern Generation**
Hocheon Wey, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea

26.3: **Volumetric Display System Using Multiple Mini-Projectors**
Yongtian Wang, Beijing Institute of Technology, Beijing, China

Session 27: OLED Displays I *(OLEDs)*

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

Chair: *Sven Murano, Novaled AG*

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

27.1: **A 13.3-in. CAAC IGZO FET OLED Display with Narrow Driver Area Using a Highly Efficient Deep Blue Device**
Tsunenori Suzuki, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

27.2: **The Study of Picture Quality of AMOLED TV with WRGB OLED Structure.**
Jong-Kun Yoon, LG Display Co., Ltd., Gyeonggi-do, Korea

27.3L: ***Late News Paper:*** **Subpixel Structured OLED Microdisplay**
Rigo Herold, Fraunhofer COMEDD, Dresden, Germany

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

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

Chair: *Anthony Lowe, Lambent Consultancy*

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

28.1: ***Distinguished Student Paper:*** **High Performance Fringe-Field Switching with a Negative Dielectric Anisotropy Liquid Crystal**
Yuan Chen, University of Central Florida, Orlando, FL, USA

28.2: **Driving Method of FFS Mode Oxide LCD for Reducing Eye Strain**
Ryo Hatsumi, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

28.3: **A Novel Vertically Aligned IPS LCD Mode with a Charge-Shared Structure**
Sau-Wen Tsao, AU Optronics Corp., Hsinchu, Taiwan, ROC

28.4: **A Novel Liquid Crystal Mode with High Picture Quality**
Mei-Ju Lu, AU Optronics Corp., Hsinchu, Taiwan, ROC

28.5L: *Late News Paper:* **Wide Color Gamut and Wide Viewing Angle Color Reflective LCD with Novel Anisotropic Diffusion Layer**
Takahiro Ishinabe, Tohoku University, Sendai, Japan

Session 29: Flexible Barriers and Substrates *(e-Paper and Flexible Displays)*
Wednesday, May 22, 2013 / 10:40 - 11:40 am / Room 118
Chair: *Kevin Gahagan, Corning Incorporated*
Co-Chair: *Ryoichi Ishihara, Delft University of Technology*

29.1: **Ultra-High Barriers for Encapsulation of Flexible Displays and Lighting Devices**
John Fahlteich, Fraunhofer Institute for Electron Beam and Plasma Technology FEP, Dresden, Germany

29.2: **Atomic Layer Deposition of Al_2O_3/ZrO_2 Nanolaminate on Plastic Substrates for Flexible Displays**
Hyun Gi Kim, Kyung Hee University, Yongin, Korea

29.3: *Invited Paper:* **The Mechanical Reliability of Flexible ALD Barrier Film**
Samuel Graham, Georgia Institute of Technology, Atlanta, GA, USA

29.4: *Invited Paper:* **Paper Electronics: A Challenge for the Future**
Rodrigo Martins, Universidade Nova de Lisboa (UNL), Caparica, Portugal

Session 30: Challenges in 3D Characterization, Motion-Blur Analysis, and Monitor Calibration *(Display Measurement)*
Wednesday, May 22, 2013 / 10:40 - 11:50 am / Room 202
Chair: *Thomas Fiske, Qualcomm MEMS Technology*
Co-Chair: *Chuck Yin, Apple, Inc.*

30.1: *Invited Paper:* **Techniques and Challenges in the Measurement of Stereoscopic Displays**
Adi Abileah, Planar Systems, Beaverton, OR, USA

30.2: **Driving Scheme Required for Blur-Free Motion of a Target Moving at 480 pps**
Owen Watson, Lockheed Martin Corp., Gaithersburg, MD, USA

30.3: **Comparison of On-Screen Display Based and ICC Profile Based Calibration for OLED Displays**
Wei-Chung Cheng, U.S. Food and Drug Administration, Silver Spring, MD, USA

30.4L: *Late News Paper:* **A High Resolution Method for Measuring 3D Crosstalk Spatial Uniformity**
John Penczek, NIST, Boulder, CO, USA

Session 31: High Speed Driver Technologies *(Display Electronics)*
Wednesday, May 22, 2013 / 10:40 am - 12:00 Noon / Room 205
Chair: *Dick McCartney, Samsung Display Co.*
Co-Chair: *Taesung Kim, Apple, Inc.*

31.1: **A 3.5-Gbps/Lane Intra-Panel Interface with a PVT Robust VCO-Based CDR for UD TV Applications in 0.18-µm High Voltage CMOS Technology**
Young-Hwan Chang, Samsung Electronics Co., Ltd., Yongin, Korea

31.2: **Power Efficient 5.0-in. 440-ppi Full HD a-Si TFT LCD Single Chip Driver IC**
Young-Sun Na, LG Electronics, Seoul, Korea

31.3: **A 10-bit CMOS DAC with Logarithmic Time Interpolation**
Young-Chan Jang, Kumoh National Institute of Technology, Gyungbuk-do, Korea

31.4: **A 3.4-Gbps/Lane Low Overhead Clock Embedded Intra-Panel Interface for High Resolution and Large Sized TFT LCDs**
Woon-Taek Oh, Samsung Electronics Co., Ltd., Yongin, Korea

Session 32: Light-Field Display *(3D/Display Systems)*
Wednesday, May 22, 2013 / 3:30 - 4:50 pm / Ballroom A
Chair: *Brian Schowengerdt, University of Washington*
Co-Chair: *Jae Hyeung Park, Chungbuk National University*

32.1: **Optimal Projector Configuration Design for a 300-Mpixel Light Field 3D Display**
Jin-Ho Lee, Samsung Institute of Advanced Technology, Gyeonggi-do, Korea

32.2: **360° Floating Light Field 3D Display Based on a High Frame Rate Color Projector**
Xu Liu, Zhejiang University, Hangzhou, China

32.3: **Light Field Approximation Using Basic Display Layer Primitives**
Nicola Ranieri, ETH Zurich, Zurich, Switzerland

32.4: **A Scalable, Collaborative, Interactive Light Field Display System**
Michael Klug, Zebra Imaging, Inc., Austin, TX, USA

Session 33: OLED Displays II *(OLEDs)*
Wednesday, May 22, 2013 / 3:30 - 4:50 pm / Ballroom B
Chair: *Chihaya Adachi, Kyushu University*
Co-Chair: *Chishio Hosokawa, Idemitsu Kosan Co., Ltd.*

33.1L: *Late News Paper:* **High Resolution 4.4-in. AMOLED Display with 413-ppi Real Pixel Density**
Chung-Chia Chen, AU Optronics Corp., Hsinchu, Taiwan, ROC

33.2: **Spatial Resolution Characteristics of OLED Displays: A Comparative Analysis of MTF for Handheld and Workstation Formats**
Asumi Yamazaki, U.S. Food and Drug Administration, Silver Spring, MD, USA

33.3L: *Late News Paper:* **Optimizing Nanostructures to Enhance Optical Outcoupling of OLED Microdisplays**
Richard Pfeifer, Fraunhofer COMEDD, Dresden, Germany

33.4L: *Late News Paper:* **High Resolution Vacuum Patterning of Organic and Metal Layers for Organic Electronic Devices**
Markus Burghart, VON ARDENNE Anlagentechnik GmbH, Dresden, Germany

Session 34: Fast Switching LCDs *(Liquid-Crystal Technology)*
Wednesday, May 22, 2013 / 3:30 - 4:30 pm / Ballroom C
Chair: *Philip Chen, National Chiao Tung University*
Co-Chair: *Michael Wand, LC Vision, LLC*

34.1: **Novel Super Fast Response Ultra-Wide Temperature Range VA LCD**
Yosuke Iwata, Sharp Corp., Nara, Japan

34.2: ***Distinguished Student Paper:*** **A Nematic LCD with Submillisecond Gray-to-Gray Response Time**
Daming Xu, University of Central Florida, Orlando, FL, USA

34.3: **Dual π-Cell Fast Response LCD for 3D Application**
Philip Bos, Kent, OH, USA

Session 70: Late News Papers: Flexible OLEDs and Printing Electronics *(e-Paper and Flexible Displays)*
Wednesday, May 22, 2013 / 3:30 - 4:20 pm / Room 118
Chair: *Makoto Omodani, Tokai University*
Co-Chair: *Rashmi Rao, Apple, Inc.*

70.1L: ***Late-News Paper:*** **10.2-in. WUXGA Flexible AMOLED Display Driven by Amorphous-Oxide TFTs on Plastic Substrate**
Nobuyoshi Saito, Toshiba Corp., Kawasaki, Japan

70.2L: ***Late News Paper:*** **14.7-in. Active Matrix PhOLED Displays on Temporary Bonded PEN Substrates with Low Temperature IGZO TFTs**
Barry O'Brien, Arizona State University, Flexible Display Center, Tempe, AZ, USA

70.3L: ***Late News Paper:*** **All Wet Processable Barrier Film for Flexible OLED Displays**
Tomoyuki Kikuchi, Samsung Yokohama Research Institute, Yokohama, Japan

70.4L: ***Late News Paper:*** **Flexible PIN Diode Sensor Array with InGaZnOx Transistor**
Michael Marr, Arizona State University, Flexible Display Center, Tempe, AZ, USA

70.5L: ***Late News Paper:*** **Low Temperature Curable Cu Ink and Fine Ink Jet Printed Patterning**
Miyako Fukuda, Asahi Glass Co., Ltd., Tokyo, Japan

Session 35: OLED Pixel and Driving *(Display Electronics)*
Wednesday, May 22, 2013 / 3:30 - 4:50 pm / Room 205
Chair: *Hyoungsik Nam, Kyung Hee University*
Co-Chair: *Seung Woo Lee, Kyung Hee University*

35.1: **High Resolution AMOLED Pixel Using Negative Feedback Structure for Improving Image Quality**
Oh-Kyong Kwon, Hanyang University, Seoul, Korea

35.2: **A New Feedback Programming Architecture Compatible with 2T1C AMOLED Displays**
Thoma Charisouli, Lehigh University, Bethlehem, PA, USA

35.3: **A 10-bit Linear R-String DAC Architecture for Mobile Full HD AMOLED Driver IC**
Ki-Duk Kim, KAIST, Daejeon, Korea

35.4: **Programmable Pulse Width LTPS TFT Shift Register for High Resolution and High Frame Rate Active Matrix Flat Panel Display**
Hyoungsik Nam, Kyung Hee University, Seoul, Korea

Session 36: Perception in 3D Display *(3D/Applied Vision/Human Factors)*
Thursday, May 23, 2013 / 9:00 - 10:20 am / Ballroom A
Chair: *Yi-Pai Huang, National Chiao Tung University*
Co-Chair: *David Hoffman, Samsung Display*

36.1: **Visual Comfort and Viewing Time of S3D Content on Mobile Device**
Takashi Shibata, Tokyo University of Social Welfare, Gunma, Japan

36.2: **Age Differences in the Use of Binocular Disparity and Pictorial Depth Cues in 3D Graphics Environment**
Ken Kihara, Kagoshima University, Kagoshima, Japan

36.3: **Effects of 3D Display System on Convergence and Accommodation**
Takehito Kojima, Nagoya University, Nagoya, Japan

36.4: **Comparison between Different Rating Scales for 3D TV**
Kjell Brunnström, Acreo Swedish ICT AB, Kista, Sweden

Session 37: OLED Materials *(OLEDs)*
Thursday, May 23. 2013 / 9:00 - 10:20 am / Ballroom B
Chair: *Yasunori Kijima, Sony Corp.*
Co-Chair: *Denis Kondakov, DuPont*

37.1: ***Invited Paper:*** **Third Generation OLED by Hyper Fluorescence**
Chihaya Adachi, Kyushu University, Fukuoka, Japan

37.2: **Efficiency Improvement of Fluorescent Blue Device by Molecular Orientation of Blue Dopant**
Hitoshi Kuma, Idemitsu Kosan Co., Ltd., Chiba, Japan

37.3: **Air Stable Electron Transport Materials for Low Voltage OLEDs**
Tobia Canzler, Novaled AG, Dresden, Germany

37.4: ***Invited Paper:*** **Molecular Triplet Emitters: From Design to Assembly and Functions**
Vivian Yam, The University of Hong Kong, Clear Water Bay, Hong Kong

Session 38: Film and Alignment *(Liquid-Crystal Technology)*
Thursday, May 23, 2013 / 9:00 - 10:20 am / Ballroom C
Chair: *Birendra Bahadur, Rockwell Collins*

Co-Chair: *Gang Xu, Tianma Microelectronics*

38.1: ***Invited Paper:*** **Innovation of Optical Films Using Polymerized Discotic Materials: Past, Present, and Future**
Yoji Ito, FUJIFILM Corp., Tokyo, Japan

38.2: **Comparative Analysis of Polyimide Film Alignment Using Near Edge X-Ray Adsorption**
Musun Kwak, LG Display Co., Ltd., Gyeonggi-do, Korea

38.3: **Fast Ferroelectric Liquid Crystal Modes Based on Photoaligning Technology**
Vladimir Chigrinov, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

38.4: **Novel Photoalignment Layer for IPS Mode LCD Using 313-nm UV Light**
Kohei Goto, Nissan Chemical Industries, Ltd., Funabashi, Japan

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

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

Chair: *Steven Bathiche, Microsoft*

Co-Chair: *Reiner Mauch, Schott AG*

39.1: ***Invited Paper:*** **The Next Touch Evolution Advancing the Consumer Experience in Other Realms: Tasks and Tough Environment**
Donald Norman, Norman Neilsen Group, Fremont, CA, USA

39.2: ***Invited Paper:*** **Natural and Intuitive User Interfaces: Technologies and Applications**
Achintya Bhowmik, Intel Corp., Santa Clara, CA, USA

39.3: ***Invited Paper:*** **The Need for Speed in Touch Systems**
Albert Ng, Microsoft, Mountain View, CA, USA

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

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

Chair: *Akihiro Tagaya, Keio University*

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

40.1: ***Invited Paper:*** **Head-Up Display for Car Navigation System**
Osami Utsuboya, Pioneer Corp., Saitama, Japan

40.2: **Automotive Display Visibility Consideration**
Paul Weindorf, Visteon, Van Buren Twp., MI, USA

40.3: **High Efficiency Dual Mode Head-Up Display System for Vehicle Application**
I-Hsuan Shao, National Tsing Hua University, Hsinchu, Taiwan, ROC

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

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

Chair: *Sakuichi Ohtsuka, Kagoshima University*

Co-Chair: *Miyoshi Ayama, Utsunomiya University*

41.1: ***Distinguished Paper:*** **Viewer Preferences for Shadow, Diffuse, Specular, and Emissive Luminance Limits of High Dynamic Range Displays**
Scott Daly, Dolby Laboratories, Sunnyvale, CA, USA

41.2: **Evaluation on the Colorfulness of Displays**
Takehiro Nakatsue, Sony Corp., Kanagawa, Japan

41.3: **Evaluating the Effects of Environmental Illuminance on the Readability of e-Books**
Tastsuya Koizuka, Nagoya University, Nagoya, Japan

41.4: **Subjective Image Quality of Viewing Angle beyond the Color Difference Metric in FPDs**
Chao-Hua Wen, National Taiwan University of Science and Technology, Taipei, Taiwan, ROC

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

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

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

Co-Chair: *John Parker, Retired*

42.1: **A Real Time 3D Multi-View Rendering from a Real Time 3D Capture**
Didier Doyen, Technicolor, Sévigné, France

42.2L: ***Late-News Paper:*** **Real Time Up-Converter from HDTV to 4K with Super High Resolution**
Seiichi Gohshi, Kogakuin University, Tokyo, Japan

42.3: **Efficient Multi-View Input Data Format for Glasses-Free 3D Display**
Jia-Fen Hung, AU Optronics Corp., Hsinchu, Taiwan, ROC

42.4L: ***Late News Paper:*** **Footprint of Scalable 3D Telecommunication System: Using Integral Light Field Display and Kinect Based Capture**
Yifan Peng, Zhejiang University, Hangzhou, China

Session 43: OLED Devices I *(OLEDs)*

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

Chair: *Denis Kondakov, DuPont Display*

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

43.1: ***Invited Paper:*** **Demonstrating Ideal Injection Efficiency and Enabling Cost Effective Manufacturing with Solution Processed Hole Injection Layer**
Mathew Mathai, Plextronics. Inc., Pittsburgh, PA, USA

43.2: ***Invited Paper:*** **Light Outcoupling for OLEDs: Doubling the Efficiency while Keeping the Dark Current Low**
Guillaume Lecamp, Saint-Gobain Recherche, Aubervillier, France

43.3: **Inverted Top Emitting White OLEDs with Improved Optical and Electrical Characteristic**
Tobia Schwab, TU Dresden, Insitut für Angewandte Photophysik, Dresden, Germany

43.4: ***Invited Paper:*** **Non-Isotropic Emitter Orientation in OLED**
Tobia Schmidt, University of Augsburg, Augsburg, Germany

Session 44: Liquid Crystals with Reactive Mesogen *(Liquid Crystal Technology)*
Thursday, May 23, 2013 / 10:40 am - 12:00 Noon / Ballroom C
Chair: *Jae Hoon Kim, Hanyang University*
Co-Chair: *Deng-Ke Yang, Kent State University*

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

44.2: **Critical Effect of Polymer Bumps in PS Vertically Aligned LCDs**
Xinhui Zhong, Shenzen China Star Optoelectronics Technology Co., Ltd., Shenzen, China

44.3: **Characterization of Intra-Molecular Energy Transfer in Reactive Mesogen Liquid Crystal Mixture**
Chung-Ching Hsieh, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

44.4: **Development of Fast Response 4.3-in. WVGA FFS LCD Using Alignment Layer Mixed with Reactive Mesogen**
Jae-Hoon Kim, Hanyang University, Seoul, Korea

Session 45: Touch Integration and Controller *(Touch and Interactivity)*
Thursday, May 23, 2013 / 10:40 - 11:40 am / Room 118
Chair: *Jeff Han, Microsoft*
Co-Chair: *Byeong Koo Kim, LG Display Co., Ltd.*

45.1: ***Distinguished Paper:*** **12.2-in. 1920 x RGBW x 720 IPS LCD Integrating In-Cell Touch Panel for Automotive Use**
Chihiro Tanaka, Japan Display, Inc., Kanagawa, Japan

45.2: **A Capacitive Touch Screen Controller IC with Noise Based Hybrid Sensing Scheme**
Ki-Duk Kim,Samsung Electronics Co., Gyeonggi-do, Korea

45.3: **High Intensity Radiated Field Effect on Projected-Capacitive Touch Screen**
Philippe Coni, THALES Avionics, Le Haillan, France

Session 46: OLED and Oxide TFT Manufacturing *(Oxide TFTs/Display Manufacturing)*
Thursday, May 23, 2013 / 10:40 am - 12:10 pm / Room 202
Chair: *Toshiaki Arai, Sony Corp.*
Co-Chair: *Tian Xiao, CBRITE, Inc.*

46.1: ***Invited Paper:*** **Ink Jet Printed 17-in. AMOLED Display with Amorphous IGZO TFT Backplane**
Ze Liu, BOE Technology Group Co., Ltd., Beijing, China

46.2: ***Invited Paper:*** **Micron Patterned Deposition through Shadow Masks with High Precision Alignment for OLED and e-Paper Application**
Thomas Ambrose, Advantech US, Inc., Pittsburgh, PA, USA

46.3: **Development of Source/Drain Electrodes for Amorphous IGZO TFTs**
Chengyuan Dong, National Engineering Lab for TFT-LCD Materials and Technologies, Shanghai Jiao University, Shanghai, China

46.4: **Self-Aligned Bottom Gate Amorphous IGZO TFT Using the Back Side Exposure Technique**
Sang-Moo Park, LG Display Co. Ltd., Gyeonggi-do, Korea

46.5L: ***Late News Paper:*** **Large Area Sputtered Al_2O_3 Films for High Mobility Active Matrix TFT Backplanes on PVD Array System**
Andrea Kloeppel, Applied Materials GmbH & Co. KG, Alzenau, Germany

Session 47: Human Factors on Lighting *(Lighting/Applied Vision)*
Thursday, May 23, 2013 / 10:40 am - 12:00 Noon / Room 205
Chair: *Ingrid Heynderickx, Philips Research Laboratories*
Co-Chair: *James Larimer, ImageMetrics, LLC*

47.1: ***Invited Paper:*** **Displays as Light Sources: Resolving the Conflict between Gamut and Color Rendering**
Lorne Whitehead, University of British Columbia, Vancouver, British Columbia, Canada

47.2: **Novel Measurement Method of Bright Light Contrast Ratio Based on Binocular Vision**
Karlheinz Blankenbach, Pforzheim University, Pforzheim, Germany

47.3: **The Impact of Watching Television on Evening Melatonin Levels**
Mariana Figueiro, Rensselaer Polytechnic Institute, Troy, NY, USA

47.4: ***Invited Paper:*** **Opportunities with LEDs for Increasing the Visual Benefits of Lighting**
Mark Rea, Rensselaer Polytechnic Institute, Troy, NY, USA

Session 48: 3D Applications *(3D/Applications)*
Thursday, May 23, 2013 / 1:30 - 2:50 pm / Ballroom A
Chair: *Ian Underwood, University of Edinburgh*
Co-Chair: *Bao-Jen Pong, Industrial Technology Research Institute*

48.1: **Research on the Fringe Electric Field Effect of a Liquid Crystal Phase Modulator for Digital Holography**
Qing Li, Southeast University, Nanjing, China

48.2: **Light Field Rendering of Multi-View Contents for High-Density Light Field Displays**
J. Park, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea

48.3: **Viewer's Eye Position Estimation Using a Single Camera**
Seong-Hwan Ju, LG Display Co., Ltd., Gyeonggi-do, Korea

48.4: **Dead Zone Free 2D/3D Switchable Barrier Type 3D Display**
Hsuan-Yi Wu, AU Optronics Corp., Hsinchu, Taiwan, ROC

Session 49: OLED Devices II *(OLEDs)*
Thursday, May 23, 2013 / 1:30 - 2:40 pm / Ballroom B
Chair: *Tariq Ali, eMagin Corp.*
Co-Chair: *Michael Weaver, Universal Display Corp.*

49.1: ***Invited Paper:*** **Solution Processed OLED Displays: Advantages and Challenge**
Shiva Prakash, DuPont Display, Santa Barbara, CA, USA

49.2: **A Study on Electron Injecting and Surface Modifying Layer for Transparent OLEDs**
Jang Hyuk Kwon, Kyung Hee University, Seoul, Korea

49.3: **Highly Efficient OLED Device with Device Architecture for Reducing Drive Voltage**
Yoshiharu Hirakata, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

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

Session 50: Low Power and Sensor Integrated Display *(Active Matrix Devices)*
Thursday, May 23, 2013 / 1:30 - 2:30 pm / Ballroom C
Chair: *Kalluri Sarma, Honeywell, Inc.*
Co-Chair: *Kenichi Takatori, NLT Technologies, Ltd.*

50.1: **Innovative 5-in. FHD and 7-in. WQXGA Displays for Next Generation Smart Phones and Tablet**
Toshiki Kaneko, Japan Display, Inc., Mobara, Japan

50.2: **Adding Depth Sensing Capability to an OLED Display System Based on Coded Aperture Imaging**
Sungjoo Suh, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea

50.3: **Low Power High Image Quality Color Reflective LCDs Realized by Memory-in-Pixel Technology and Optical Optimization Using Newly Developed Scattering Layer**
Yoko Fukunaga, Japan Display, Inc., Kanagawa, Japan

Session 51: Touch Application *(Touch and Interactivity)*
Thursday, May 23, 2013 / 1:30 - 2:30 pm / Room 118
Chair: *John Zhong, Apple, Inc.*
Co-Chair: *Bob Senior, IsiQiri Interface Technologies GmbH*

51.1: **Integrated Touch Sensing and Front Lit Device and Applications**
Ion Bita, Qualcomm MEMS Technologie, San Jose, CA, USA

51.2: **Touch Mura Mechanisms and Its Suppression by Use of Cover Glass**
Tomohiro Ishikawa, Corning Incorporated, Corning, NY, USA

51.3: **Pulling Force Sensing Unit for 3D Image Movement**
Tsun-Yi Chen, National Tsing Hua University, Hsinchu, Taiwan, ROC

Session 52: Oxide TFT Manufacturing *(Oxide TFTs/Display Manufacturing)*
Thursday, May 23, 2013 / 1:30 - 2:50 pm / Room 202
Chair: *Fang Chen Luo, AU Optronics Corp.*
Co-Chair: *Jerzy Kanicki, University of Michigan*

52.1: ***Invited Paper:*** **High Performance Metal Oxide TFT on Flexible Plastic Substrates**
Chan-Long Shieh, CBRITE, Inc., Goleta, CA, USA

52.2: ***Invited Paper:*** **Advanced Sputtering Technologies and Targets for Oxide Semiconductor TFT**
Masasuke Matsudai, ULVAC, Inc., Kanagawa, Japan

52.3: **Development of the Back Channel Etched TFT Using C Axis Aligned Crystalline InGaZn Oxide**
Takuya Hirohashi, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

52.4: ***Distinguished Paper:*** **Electrical Properties of Amorphous InGaZnO TFTs Prepared by Magnetron Sputtering Using Kr and Xe Gas**
Tetsuya Goto, Tohoku University, Sendai, Japan

Session 53: Lighting Design *(Lighting/Applications)*
Thursday, May 23, 2013 / 1:30 - 2:50 pm / Room 205
Chair: *Gary Jones, Nanoquantum Corp.*
Co-Chair: *Susan Jones, Nulumina Corp.*

53.1: ***Invited Paper:*** **Drivers in the Adoption Speed of Solid-State Lighting**
Coen Liedenbaum, Philips Research Laboratories, Eindhoven, The Netherlands

53.2: **An Optimization Design Method of an LED Freeform Lens for Uniform Circular Illumination**
Zhenrong Zheng, Zhejiang University, Hangzhou, China

53.3: **Properties of a Field Emission Lighting Device Employing Highly Crystallized Single Wall Carbon Nanotube**
Toshimasa Hojo, Tohoku University, Miyagi, Japan

53.4: **U-Shaped Daytime Running Light Using Textured TIR Lens**
Kuan-Yu Chen, Chilin Technology Co., Ltd., Tainan, Taiwan, ROC

Session 54: Projection Screens *(3D/Projection)*
Thursday, May 23, 2013 / 3:10 - 4:30 pm / Ballroom A
Chair: *Sergei Yakovenko, LensVector, Inc.*
Co-Chair: *Alan Sobel, Flatscreen Technologies Corp.*

54.1: **Achieving High Stereo Contrast Ratio in Polarization Based 3D Front Projection**
Gary Sharp, RealD, Inc., Boulder, CO, USA

54.2: ***Invited Paper:*** **High Efficiency Polarization Preserving Cinema Projection Screen**
Dave Coleman, RealD, Inc., Boulder, CO, USA

54.3: **Full Color High Contrast Front Projection on a Black Emissive Screen**
Ted Sun, Superimaging, Fremont, CA, USA
54.4: **Novel Transparent Emissive Display on Optically Clear Phosphor Screen**
Minghua Zhu, California State University, East Bay, CA, USA

Session 55: OLED Manufacturing *(OLEDs)*
Thursday, May 23, 2013 / 3:10 - 4:10 pm / Ballroom B
Chair: *Chin Hsin (Fred) Chen, National Chaio Tung University*
Co-Chair: *Yasunori Kijima, Sony Corp.*

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

Session 56: TFT Application *(Active Matrix Devices)*
Thursday, May 23, 2013 / 3:10 - 4:30 pm / Ballroom C
Chair: *James Chang, Apple, Inc.*
Co-Chair: *Tohru Nishibe, Japan Display Central, Inc.*

56.1: ***Invited Paper:*** **Development of IGZO TFT and Creation of New Devices Using IGZO TFTs**
Hajime Imai, Sharp Corp., Kameyama, Japan
56.2: **Investigating IGZO TFT Performance under Gate Bias Stress with and without Light Illumination for 4K x 2K 65-in. Display**
Bo-Liang Yeh, AU Optronics Corp., Hsinchu, Taiwan, ROC
56.3: **Performance Improvement of Compensation Circuit Using p-Type SPC TFT for AMOLED Driving**
Jungmin Lee, LG Display Co., Ltd., Gyeonggi-do, Korea
56.4L: ***Late News Paper:*** **2.1-in. WXGA TFT LCDs Driven by Solution Processed Metal Oxide TFTs**
Liang-Yu Lin, AU Optronics Corp., Hsinchu, Taiwan, ROC
56.5:L ***Late News Paper:*** **All Printed Oxide TFT Arrays for High Resolution Active Matrix Displays**
Shinji Matsumoto, Ricoh Co., Ltd., Yokohama, Japan

Session 57: Touch Sensors, Materials, and Manufacturing *(Touch and Interactivity/Display Manufacturing)*
Thursday, May 23, 2013 / 3:10 - 4:10 pm / Room 118
Chair: *Willem Den Boer, Guardian Industries Corp.*
Co-Chair: *Lauren Palmateer, Subtle Energy Design*

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

Session 58: Advanced Substrates and Manufacturing on Flex *(Display Manufacturing/e-Paper and Flexible Displays)*
Thursday, May 23, 2013 / 3:10 - 4:30 pm / Room 202
Chair: *Greg Gibson, FAS Holdings Group*
Co-Chair: *Ryoichi Ishihara, Delft University of Technology*

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

Session 59: Novel Backlighting System *(Display Systems)*
Thursday, May 23, 2013 / 3:10 - 4:10 pm / Room 205
Chair: *Masaru Suzuki, SKC Haas Display Film*
Co-Chair: *Akihiro Tagaya, Keio University*

59.1: **A Backlight System with a Phosphor Sheet to Provide 90% NTSC Gamut with Improved Optical Efficiency**
Yasushi Ito, Dexerials Corp., Kanuma, Japan
59.2: **A Novel LED Backlight System with Tilted Cylindrical Surfaces on the Light Guide Plate**
Kazutada Takaira, Mitsubishi Electric Corp., Kumamoto, Japan

59.3: **Compact LED Pixelized Backlight for LCDs**
Chin Sher, National Tsing Hua University, Hsinchu, Taiwan, ROC
59.4: **WITHDRAWN**

Session 60: Projection Light Source *(Projection)*
Friday, May 24, 2013 / 9:00 - 10:30 am / Ballroom A
Chair: *David Eccles, Rockwell Collins*
Co-Chair: *Fujio Okumura, NEC Corp.*

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

Session 61: OLED Lighting I *(Lighting/OLEDs)*
Friday, May 24, 2013 / 9:00 - 10:20 am / Ballroom B
Chair: *Franky So, University of Florida*
Co-Chair: *Mike Lu, Acuity Brands Lighting*

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

Session 62: TFTs for Mobile Displays *(Active Matrix Devices)*
Friday, May 24, 2013 / 9:00 - 10:20 am / Ballroom C
Chair: *Kenichi Takatori, NLT Technologies, Ltd.*
Co-Chair: *Yoshitaka Yamamoto, Sharp Corp.*

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

Session 63: Mechanical Reliability Testing for Displays *(Display Manufacturing)*
Friday, May 24, 2013 / 9:00 - 10:10 am / Room 202
Chair: *Bradley Bowden, Corning Incorporated*
Co-Chair: *Don Carkner, Research In Motion*

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

Session 64: Near-to-Eye, Transparent, and Floating Displays *(Display Systems)*
Friday, May 24, 2013 / 9:00 - 10:00 am / Room 205
Chair: *Bill Cumming, Qualcomm MEMS Technology*
Co-Chair: *W. Hendrick, Rockwell Collins Optronic*

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

Session 65: Projection Display Components *(Projection)*
Friday, May 24, 2013 / 10:40 - 12:00 Noon / Ballroom A

Chair: *Frederic Kahn, Kahn International, Inc.*
Co-Chair: *Ming Hsien Wu, Hamamatsu Corp*

65.1: **A Vertically Aligned LCOS with Submillisecond Response Time for Color-Field-Sequential Projection Display**
Yuan Chen, University of Central Florida, Orlando, FL, USA

65.2: **Blue Phase Liquid Crystals for Color Field Sequential Projection Displays**
Linghui Rao, University of Central Florida, Orlando, FL, USA

65.3: **Phase-Modulation LcoS Display System with Off-Axis LED Reconstruction Light**
Li-Yuan Liao, National Tsing Hua University, Hsinchum Taiwan, ROC

65.4: **Speckle Suppression by Limited Phase Range in Laser Projection System**
Yan-Shuo Chang, National Taiwan University, Taipei, Taiwan, ROC

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

Friday, May 24, 2013 / 10:40 - 12:00 Noon / Ballroom B
Chair: *Michael Weaver, Universal Display Corp.*
Co-Chair: *Chin Hsin (Fred) Chen, National Chaio Tung University*

66.1: ***Invited Paper:*** **Outcoupling Efficiency Enhancement Strategies in OLED Lighting Panel**
Min-Hao Lu, Acuity Brands Lighting, Berkeley, CA, USA

66.2: ***Invited Paper:*** **Highly Efficient White OLEDs with Over 100-lm/W for General Lighting**
Kazuyuki Yamae, Panasonic Eco Solutions Company, Osaka, Japan

66.3: **Highly Improved Light Out-Coupling of OLEDs by Utilizing a Simple and Easy Process Based on a Nano-Scale Random Light Extraction Structure**
Young Wook Park, Korea University, Seoul, Korea

66.4: **Large Sized Flexible Display with Highly Efficient OLED**
Nobuharu Ohsawa, Advanced Film Device, Inc., Tochigi, Japan

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

Friday, May 24, 2013 / 10:40 am - 12:00 Noon / Ballroom C
Chair: *Roger Stewart, Sourland Mountain Associates*
Co-Chair: *Norbert Fruehauf, University of Stuttgart*

67.1: ***Distinguished Student Paper:*** **A 40-µm-pitch IGZO TFT Gate Driver for High Resolution Rollable AMOLED Displays**
Jin Jang, Kyung Hee University, Seoul, Korea

67.2: **Novel Driving Method to Compensate RC Delays in Ultra-Large Sized and High Resolution LCDs**
Seung-Woo Lee, Kyung Hee University, Seoul, Korea

67.3: **New Driving Method for Reducing Eye Strain Technology (REST) in Displaying Still Images Using C Axis Aligned Crystalline IGZO LCDs**
Hiroyuki Miyake, Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

67.4: **Compensating Threshold Voltage Circuit in the Transient State for AMOLED Displays Collocated with Uni-Type GOA Driving**
Shih-Song Cheng, AU Optronics Corp., Hsinchu, Taiwan, ROC

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

Friday, May 24, 2013 / 10:40 am - 12:00 Noon / Room 202
Chair: *Ion Bita, Qualcomm MEMS Technologies*
Co-Chair: *Elliott Schlam, Elliott Schlam Associates*

68.1: ***Invited Paper:*** **Quantum Dot Manufacturing Requirements for the High Volume LCD Market**
Seth Coe-Sullivan, QD Vision, Inc., Lexington, MA, USA

68.2: ***Invited Paper:*** **Development of Novel Optical Bonding Process and Materials for Flat Panel Display Modules**
Kozaburo Hayashi, Dexerials Corp., Tochigi, Japan

68.3: **Liquid Optically Clear Adhesives for Next Generation Display Applications**
Daniel Lu, Henkel China, Shanghai, China

68.4: **Minimizing the Impact of Bonding-Induced Defect**
Grace Yeh, DuPont, Taoyuan, Taiwan, ROC

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

Friday, May 24, 2013 / 10:40 am - 12:00 Noon / Room 205
Chair: *Wei Chen, Apple, Inc.*
Co-Chair: *Haruhiko Okumura, Toshiba Corp.*

69.1: **Image Quality Assessment of Ultra-High Resolution Mobile Display Utilizing New RGBW Method**
Akira Sakaigawa, Japan Display, Inc., Ebina, Japan

69.2: **Compact Color Filter and Polarizer Based on Nanowire Grating for Energy Efficient Displays**
Zhicheng Ye, Shanghai Jiao Tong University, Shanghai, China

69.3: **Balancing Luminance Boosting and Color Breakup Reduction for a Color Sequential Display**
Martin Hammer, TP Vision, Eindhoven, The Netherlands

69.4: ***Invited Paper:*** **Extending Battery Life of Ultrabook through Use of Panel Self-Refresh Technology**
Kamal Shah, Intel Corp., Hillsboro, OR, USA

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

3D

P.1: ***Distinguished Student Poster Paper:*** **Submillisecond Response Time Liquid Crystal Cylindrical Microlens Array for 3D Display**
Jie Sun, University of Central Florida, Orlando, FL, USA

P.2: **New Approach of Flexible e-Paper with Single Particles**
Seung Yong Jeong, Korean Institute of Industrial Technology, Cheonan, Kore

Active-Matrix Devices

P.3: **3D Stacked Complementary TFT Devices Using n-Type a-IGZO and p-Type F8T2 TFTs: Operation Confirmation of NOT and NAND Logic Circuits**
Mutsumi Kimura, Ryukoku University, Otsu, Japan

P.4: **WITHDRAWN**

P.5: **Highly Uniform Solid Phase Crystallized Bridged-Grain Poly-Si TFT**
Wei Zhou, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

P.6: **An Integrated a-Si:H Gate Driver Circuit Design for Large Sized TFT LCD Applications**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC

P.7: **New Pixel Structure with High Gray-to-Gray Response Time for Large Sized and High Resolution AMOLED TVs.**
Joong-Sun Yoon, LG Display Co., Ltd., Gyeonggi-do, Korea

P.8: **Trap States in Amorphous-ITZO TFTs Analyzed Using the Dependence on Channel Thicknes**
Mutsumi Kimura, Ryukoku University, Otsu, Japan

P.9: **Power Saving Sunlight Readable TFT LCD**
Yao-Dong Ma, MacroDisplay Inc., Richardson, TX, USA

P.10: **WITHDRAWN**

P.11: **Recognition of Existence of n-Type IGZO Layer in CAAC IGZO Film under a Source and Drain Electrode Made of Tungsten**
Ryo Tokumaru, Kanagawa, Japan

P.12: **Development of Novel Post-Annealing Process for Flexible Oxide TFTs**
Po-Tsun Liu, National Chiao Tung University, Hsinchu, Taiwan, ROC

P.13: **Rollable a-IGZO TFTs with Nanocomposite Dielectric on PEN Substrate**
Zingway Pei, National Chung Hsing University, Taichung, Taiwan, ROC

P.14: ***Distinguished Poster Paper:*** **Separate Extraction Technique of Intrinsic Donor and Acceptor Like Density of States over Full Energy Range Sub-Bandgap in Amorphous Oxide Semiconductor TFTs by Using One Shot Monochromatic Photonic Capacitance-Voltage Characteristic**
Dong Kim, Kookmin University, Seoul, Korea

P.15: **Influence of Photo-Thermal Pre-Treatment on Electrical Charateristics and Reliability of ZnSnO TFTs**
Ting-Chang Chang, National Sun Yat-Sen University, Kaohsiung, Taiwan, ROC

P.16: **Dynamic Supply Voltage Scaling of Pixel Circuits for Static Power Reduction in AMOLED Displays**
Xiaojun Guo, Shanghai Jiao Tong University, Shanghai, China

P.17: **Integration of Solution Processed Oxide TFTs with Normal Structure OLEDs for Low Voltage Operation Top Emitting AMOLED Display**
Xiaojun Guo, Shanghai Jiao Tong University, Shanghai, China

P.18: **Effects of Interface and Bulk States on the Stability of Amorphous-InGaZnO TFTs under Gate Bias and Temperature Stress**
Runze Zhan, Shanghai Jiao Tong University, Shanghai, China

P.19: **Density-of-States Based Device Circuit Co-Design Platform for Solution Processed Organic Integrated Circuit**
Dae Kim, Kookmin University, Seoul, Korea

P.20: **Transfer Characteristic-Based Electro-Optical Technique for Characterization of Carrier Lifetimes with Associated Physical Mechanisms in Polymer-Based Organic TFTs**
Dong Kim, Kookmin University, Seoul, Korea

P.21: **High Input Impedance Active Pixel Sensing Circuit with Threshold Voltage Compensation Implemented by Dual Gate IGZO TFTs**
Lu-Sheng Chou, National Chiao Tung University, Hsinchu, Taiwan

P.22: **Improving Switching Characteristics of Amorphous $InGaZnO_4$ TFTs by Dual Gate Driving**
Jin Jang, Kyung Hee University, Seoul, Korea

P.23: **Nano-Si Optical Pixel Sensor Array Using TFT Technology as Image Scan/Fingerprint Panel**
An-Thung Cho, AU Optronic Corp., Hsinchu, Taiwan, ROC

P.157L: ***Late News Poster:*** **Characterization of Asymmetrical Negative Bias Stress Effect on the Density of States and Parasitic Resistances in a-IGZO TFTs**
Dong Kim, Kookmin University, Seoul, Korea

Applied Vision

P.24: **Relationship between Recognition of Illumination and Depth Perception**
Hiroyuki Kaji, Utsunomiya University, Utsunomiya, Japan

P.25: **The Effect of Environmental Illumination and Screen Brightness on Accommodation and Convergence**
Yuki Okada, Nagoya University, Nagoya, Japan

P.26: **Constant *vs.* Non-Constant Luminance Video Signals for UHDTV**
Seo Young Choi, SAIT, Yongin, Korea

P.27: **Effect of Blue Primary Color on Preference and Colorfulness of Display**
Seung Hyun Kim, LG Display Co., Ltd., Gyeonggi-do, Korea

P.28: **Hue Blending Method: Improved Red-Green Color Segregation Capability for Dichromacy Support**
Sakuichi Ohtsuka, Kagoshima University, Kagoshima, Japan

P.29: ***Distinguished Poster Paper:*** **Perception of Sparkle in Anti-Glare Display Screen**
Jame Ferwerda, Rochester Institute of Technology, Rochester, NY, USA

P.30: **Effect of the Correlated Color Temperature of Light on Overhead Glare in Office Environment**
Yan Tu, Southeast University, Nanjing, China

P.134L: ***Late News Poster:*** **Resolution Limits for Smartphones: Video Playback**
Lee Spencer, Sharp Devices Europe, Oxford, UK

Display Electronics

P.31: **Image Compression for Color Sequential LCOS with Decompression at the Retina**
Andrew Russell, Syndiant, Inc., Dallas, TX, USA

P.32: **A New a-IGZO AMOLED Pixel Circuit Design to Improve the OLED Luminance Degradation in 3D Display**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC

P.33: **Homogeneous Backlight Distribution Algorithm for SCC Local Dimming Edge-Lit LCD**
Tobia Jung, Saarland University, Saarbruecken, Germany

P.34: **A Video Signal Coding Method Based on an Absolute Color Space for Saving Bit Depth**
Senfar Wen, Yuan Ze University, Chung-Li, Taiwan, ROC

P.35: **Charge Recycling Match Technique for Low Power Display Column Driver**
Ke-Horng Chen, National Chiao Tung University, Hsinchu, Taiwan, ROC

Display Manufacturing

P.36: **Analysis of Rubbing Mura in Fringe Field Switching LCD**
Wei Zhang, BOE Optoelectronics Technology Co., Ltd., Beijing, China

P.37: **Novel Gray-Toneless Technology for Mask Reduction in High Aperture FFS Mode**
Seung-Jin Choi, BOE Technology Group Co., Ltd., Being, China

P.38: **Estimate of the Distribution of Contrast Ratio in Optically Compensated IPS Mode Using the Response Surface Method**
Koji Yonemura, Mitsubishi Electric Corp., Kumamoto, Japan

P.39: **Study of Uncured Sealant Contamination of Liquid Crystal in One Drop Filling Process for TFT LCDs**
Ang Xiao, BOE Optoelectronics Technology Co., Ltd., Beijing, China

P.40: **Encapsulated Flexible OLEDs: Progress toward a Simple and Cost Effective Contact Printing Technique**
Byeong-Kwon Ju, Korea University, Seoul, Korea

P.41: **Display Component Quality and Process Control with Advanced Automated Optical Inspection**
Jochen Koenig, Dr. Schenk Inspection Systems, Woodbury, MN, USA

P.149L: ***Late News Poster:*** **Behavior of OLED Panel During Four Point Bending**
Tzu-Chi Tseng, AU Optronics Corp., Hsinchu, Taiwan, ROC

P.154L: ***Late News Poster:*** **Establishment of Evaluation Method of Surface Fracture mode with Front-Side Origin for Cover Glass**
Aya Nakagawa, Asahi Glass Co.,Ltd., Kanagawa, Japan

Display Measurement

P.42: **Estimation and Evaluation of Image Sticking on OLED Devices**
Kyongho Lim, LG Display Co., Ltd., Gyeonggi-do, Korea

P.43: **Model Development for Cell Gap Induced Mura to Improve Quality of Glass Substrates to Display Manufacturers**
Michal Mlejnek, Corning Incorporated, Corning, NY, USA

P.44: **Display Aspect Simulation Using Measured Emissive and Reflective Display Imperfection**
Pierre Boher, ELDIM, Herouville, France

P.45: **The Study of LCD Panel Touch Mura**
John Liang, Corning Incorporated, Corning, NY, USA

Display Systems

P.46: **Enhanced Single Viewing Zone Integral Imaging Display Based on Medium Packing Technique**
Qiong-Hua Wang, Sichuan University, Chengdu, China

P.47: **Integral Imaging Display Based on Space Multiplexed Elemental Image Array**
Qiong-Hua Wang, Sichuan University, Chengdu, China

P.48: **Flat Panel Autostereoscopic Display with Wide Viewing Zone Using Time Division Multiplexing Backlight**
Shuta Ishizuka, University of Tsukuba, Tsukuba, Japan

P.49: **Light Diffusing Films Using Two Step UV Irradiation for Various Displays**
Kentaro Kusama, LINTEC Corp., Warabi, Japan

P.50: **Design of a Novel Hybrid Light Guide Plate for Viewing-Angle Switchable Backlight Module**
Jui Pan, National Chiao Tung University, Tainan, Taiwan, ROC

P.51: **Local Gamma Adjustment for High Frame Rate LCDs**
Hyun-Dae Lee, Samsung Display Co., Gyeonggi-do, Korea

P.52: **A Colorful Holographic Display System with Enlarged Viewing Zone Using Multiplex SLM**
Juan Liu, Beijing Institute of Technology, Beijing, China

P.53: **Low Dynamic Crosstalk in Scanning Liquid Crystal Prism Type 3D Display**
Jian Gang Lu, Shanghai Jiao Tong University, Shanghai, China

P.54: **Light Field Integral Display Using LCD and Eye Tracking Technique**
Han Wang, Zhejiang University, Hangzhou, China

P.55: **Study of Optimal Viewing Distance in an Autostereoscopic 3D (AS3D) Display**
Hsu-Wan Hsuan, National Taiwan University, Taipei, Taiwan

P.56: **X-Shaped Pixel Alignment in Large Scale Image Display System**
Satoshi Yamanaka, Mitsubishi Electric Corp., Kyoto, Japan

P.57: **Transmissive and Reflective Dual Operational Mode Display Device**
Ju-Ai Ruan, NOVA MEMS Display, Plano, TX, USA

P.147: **Adaptive Anisotropic Diffusion for Depth Map Enhancement in 3D Video Coding**
Ilsoon Lim, Samsung Advanced Institute of Technology, Gyeonggi-do, Korea

P.148L: ***Late News Poster:* 3D Integral Imaging Display System Using Eye Tracking Method**
Yiying Pu, TCL Corporate Research, Shenzhan, Guangdong, China

Emissive Displays

P.58: **Quantitative Assessment of Host-to-Activator Energy Transfer Efficiency of Multiple d-Orbital Trap States for Microcrystalline $YBO_3:Tb^{3+}$**
Max Wallace, Central Washington University, Ellensburg, WA, USA

P.59: **New Synthesis of Novel Phosphor for LED Technology: Synthesizing $Sr_3Y_2(BO_3)_4:Eu^{2+}$ from Strontium Borate Precursor**
Troy Kilburn, Central Washington University, Ellensburg, WA, USA

e-Paper and Flexible Displays

Flexible TFTs

P.60: **Thermally Stable Organic Semiconductor for Solution Processed Field Effect Transistors with High Mobilitie**
Takashi Fukuda, Tosoh Corp., Yokkaichi, Japan

P.61: **Negative Mold Transfer-Patterned Conductive Polymer Electrode for Flexible OLED Displays**
Byeong-Kwon Ju, Korea University, Seoul, Korea

P.62: **Effects of Amorphous-InGaZnO TFTs with Various Buffer Layers on a Polyimide Substrate under Negative Bias Temperature Stress**
Jin-Seong Park, Dankook University, Cheonan, Korea

P.63: **Low Temperature Oxide TFTs on Plastic Films for Flexible Display Application**
Wei-Ting Lin, AU Optronic Corp., Hsinchu, Taiwan, ROC

P.64: **WITHDRAWN**

P.65: **The Effect of Surface Polarity of Gate Dielectric Buffer Layer on Operational Stability of Organic TFTs**
Changhee Lee, Seoul National University, Seoul, Korea

e-Paper

P.66: **An Electrowetting Light Valve Using ODF Assembly Process**
In-cha Hsieh, National Chung Hsing University, Taichung, Taiwan, ROC

P.67: **Reflective Color Displays Using Photonic Crystal**
Zhenyue Luo, University of Central Florida, Orlando, FL, USA

P.68: **Reflective Interferometric Modulator Display with Temporal Color Modulation**
Ji Zhong, Jiaxing Unipel Display Technologies, Ltd., Zhejiang, China

P.69: **Large Area Seamlessly Tiled Flexible eBoard**
Erica Montbach, Kent Display, Kent, OH, USA

P.70: **Durability and Reliability of an eWriter**
Clinton Braganza, Kent Display, Kent, OH, USA

P.135L: ***Late News Poster:* Development of Novel Cell Design for Flexible e-Paper Using Single Type Particle**
Sangkug Lee, Korea Institute of Industrial Technology (KITECH), Cheonan-do, Korea

P.136L: ***Late News Poster:* Using Independent Component Analysis for Colorant Estimation in Electrophoretic Displays**
Yen-Hsing Lu, National Chiao Tung University, Hsinchu, Taiwan, ROC

P.150L: ***Late-News Poster:* Conformal Display**
Huan Yang, ITRI, Hsinchu, Taiwan, ROC

Lighting Applications

P.71: **High Efficiency and High Uniformity Modularized Street Lamp Light Engine with a Single LED Source**
Kuan-Yu Chen, Chilin Technology Co., Ltd., Tainan, Taiwan, ROC

P.72: **Glass Based Color Conversion Multilayer for White LEDs and Its Angular Color Performance**
Li-Yin Chen, National Sun Yat-sen University, Kaohsiung, Taiwan, ROC

P.73: **WITHDRAWN**

Liquid-Crystal Technology

Blue Phase

P.74: **Polymer Stabilized Double Twist Cylinders of Blue Phase Liquid Crystal for Reduced Hysteresis and Operating Voltage**
Seung Hee Lee, Nano·Science and Engineering, Jeonju, Korea

P.75: **Temperature Dependence of Dielectric and Electro-Optical Properties and Disordered Structure in Polymer Stabilized Blue Phases at Low Temperature**
Gihwan Lim, Kyushu University, Kasuga, Japan

P.76: **Threshold Temperature Effect on Phase Transition of Blue Phase Liquid Crystal**
Jian Gang Lu, Shanghai Jiao Tong University, Shanghai, China

P.77: **High Transmittance Blue Phase LCD with a Floating Electrode**
Yifan Liu, University of Central Florida, Orlando, FL, USA

P.78: **A Tunable Microlens Using Two Blue Phase Liquid Crystal Layers with Different Kerr Constant**
Yan Li, University of Central Florida, Orlando, FL, USA

P.79: **WITHDRAWN**
Tsung-Hsien Lin, National Sun Yat-Sen University, Kaoshiung, Taiwan, ROC

P.80: **Analysis of Polymer Network Structure of Polymer Stabilized Blue Phase**
Musun Kwak, LG Display Co., Ltd., Gyeonggi-do, Korea

P.81: **A Time Multiplexed Dual View Display Using Blue Phase Liquid Crystal**
Qiong-Hua Wang, Sichuan University, Chengdu, China

P.82: **Entire Spectrum Measurement of Kerr Constant and Birefringence Dispersion in a Polymer Stabilized Blue Phase Liquid Crystal Composite**
Hongqing Cui, infoVision Optoelectronics (Kunshan) Co., Ltd., Kunshan, China

P.137L: ***Late News Poster:*** **Polymer Dispersed Blue Phase Liquid Crystal**
Emine Kemiklioglu, Kent State University, Liquid Crystal Institute, Kent, OH, USA

Fast Switching

P.83: **Electrically Suppressed Helix Ferroelectric LC Field Sequential Color Display**
Abhishek Srivastava, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

P.84: **Increasing the Light Modulation Frequency Due to the Increase in FLC Viscosity**
Igor Kompanet, P. N. Lebedev Physical Institute, Moscow, Russia

P.85: **Fast Switching of an IPS Cell at Low Temperature by Forming Polymer Network**
Tae-Hoon Yoon, Pusan National University, Busan, Korea

P.86: **A Novel Bistable LCD Having Memory Display Mode and High Speed Switching Mode**
Taiju Takahashi, Kogakuin University, Tokyo, Japan

P.87: **The Study of Improvements in the Flatness of an LCD Panel Using an Advanced Polarizer**
Seong Han Hwang, LG Display Co., Ltd., Gyeonggi-do, Korea

P.88: **A Novel Design of a Polarizer with a Parallel Absorb Axis**
Chih-Tsung Kang, Shenzhen China Star Optoelectronics Technology Co., Shenzhen, Guangdong, China

P.156L: ***Late News Poster:*** **Real Time Dynamic Color Holographic Display Using a Super-Fast-Response Liquid Crystal Thin Film**
Hongyue Gao, Virginia Tech, Blacksburg, VA, USA

LCD Optical Characteristics

P.89: **Direct Measurements of Asymmetric Pretilt Angles of Optically Compensated Bend (OCB) Nematic Liquid Crystal Cell**
Sheng-Ya Wang, National Chiao Tung University, Tainan, Taiwan, ROC

P.90: **Optical Properties of LC Cells with Hybrid Orientation and Negative Birefringence**
V Belyaev, Moscow Region State University, Moscow, Russia

P.91: **Adobe RGB LCD Monitor with Three Primary Colors by Using Deep-Green Color Filter Technology**
Seung Hoon Ji, LG Display Co., Ltd., Gyeonggi-do, Korea

P.92: **Characterization of Complex Liquid Crystal Polarization Gratings at Oblique Incidence Using Extended Jones Matrix Method**
Li Tan, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

Polymer Dispersed Liquid Crystal

P.93: **Optically Isotropic Polymer Dispersed Liquid-Crystal Composite for High Contrast Ratio and Fast Response Time**
Seung Hee Lee, Chonbuk National University, Jeonju, Korea

P.94: **A High-Sensitivity PDLC Based Electro-Optic Modulator for TFT Array Inspection**
Chang-Jae Yu, Hanyang University, Seoul, Korea

P.95: **Process Technology of Flexible and Transparent Display by Stacking OLED and PDLC Embedded with OPV**
Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan, ROC

P.96: **Synthesis of Reactive Mesogen and Its Stabilizing Characteristics in Polymer Stabilized Vertically Aligned LCD**
Seung Hee Lee, Chonbuk National University, Jeonju, Korea

Surface and Alignment

P.97: **Low Driving Voltage and Gray Scale Capability of Nanostructure Enhanced Cholesteric Liquid Crystal Device**
Yi-Fan Liang, National Chiao Tung University, Hsinchu, Taiwan, ROC

P.98: **Novel Composite Photo-Alignment Layer for Ferroelectric LCD**
Qi Guo, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

P.99: **Alignment Peculiarities of Cholesteric Liquid Crystals on the Surfaces Processed by Plasma Beam**
Oleg Yaroshchuk, Institute of Physics, National Academy of Science Ukraine, Kyiv, Ukraine

P.100: **Multi-Domain Vertical Alignment of Liquid Crystals through Control of the Anchoring Energy**
Tae-Hoon Yoon, Pusan National University, Busan, Korea

P.146L: ***Late News Poster:*** **Practical Approach of New Photoalignment Material for High Quality Competitive Retardation Film**
Gyo-jic Shin, Korea Institute of Industrial Technology (KITECH), Cheonan-do, Korea

P.155L: ***Late News Poster:*** **Surface Monolayer Stabilized Vertically Aligned Liquid Crystals for Display Applications**
Shin-Woong Kang, Chonbuk National University, Jeonju, Korea

Wide-Viewing

P.101: **Investigation on Flexoelectric Effect in the Fringe Field Switching Mode**
Seung Hee Lee, Chonbuk National University, Jeonju, Korea

P.102: **Improvement of Gamma Curve Distortion in VA LCDs by Using an Optical Film-Patterned Retarder**
Gi Dong Lee, Dong-A University, Busan, Korea

P.103: **High Transmittance LC Mode Based on Fringe Field Switching of Vertically Aligned Negative LC**
Tae-Hoon Yoon, Pusan National University, Busan, Korea

P.104: **Two Face Viewable Display Using Dye Doped Liquid Crystal**
Chao Ping Chen, Shanghai Jiao Tong University, Shanghai, China

P.105: **Normally Black Electrically Controlled Birefringence Mode with Slit Electrode Structure**
Jin Seog Gwag, Yeungnam University, Gyeonggi-do, Korea

OLEDs

P.106: **Magnetic Resonant Wireless Power Transmission to Thin OLED Lighting Panel**
Yong-Hae Kim, ETRI, Daejeon, Korea

P.107: **New Emissive Materials for Mixed Host Architectures to Achieve Longer Lifetime for Green-to-Red Phosphorescent OLED Displays and Lighting Application**
Cheng Yao, E-Ray Optoelectronics Technology Co., Ltd., Chungli, Taiwan, ROC

P.108: **Organic Wrinkles as Optical Scattering Source**
Jaehyun Moon, ETRI, Daejeon, Korea

P.109: Improvement of the Outcoupling Efficiency of Blue OLEDs
Kyung Cheol Choi, KAIST, Daejeon, Korea

P.110: High Efficiency OLEDs Based on the Gradient Doping in Transport Layer
Gufeng He, Shanghai Jiao Tong University, Shanghai, China

P.111: Double Hybrid Tandem White OLEDs Employing a Novel Charge Generation Unit
Gufeng He, Shanghai Jiao Tong University, Shanghai, China

P.112: High Efficiency Blue Phosphorescence OLED Device with Novel CbzTAZ Host
Tien-Lung Chiu, Yuan Ze University, Chung-Li, Taiwan, ROC

P.113: Luminous Efficiency Improvement of Photovoltaic Device Integrated OLED with Dual Function Guiding-Mode Resonance Structure
ChiaYu Shen, National Taiwan University, Taipei, Taiwan, ROC

P.114: Cl-2 Plasma Treated Indium-Tin-Oxide Electrodes with High Work Function for OLEDs
Kyung Bok Choi, Korea University, Seoul, Korea

P.115: Micropyramid Array with Antireflective Nanostructure Surfaces for Light Extraction Efficiency Enhancement of OLED Devices
Pei-Kuen Wei, Academia Sinica, Taipei, Taiwan, ROC

P.116: Light Extraction Improvement of Flexible Top Emitting OLED Devices by Using Nanoimprinted Periodically Corrugated Polycarbonate Substrate
Pei-Kuen Wei, Academia Sinica, Taipei, Taiwan, ROC

P.117: Orientation of fillers in CNT/Polymer Composite Interfacial Layer for Enhancing Charge Transportation
Rubaiya Rahman, University of California at Berkeley, Berkeley, CA, USA

P.118: Improvement of the Quantum Efficiency in OLEDs Using Stochastic Metallic Nanostructure
Sangho Park, Seoul National University, Seoul, Korea

P.119: Improved Performance of Polymer LEDs Using a Conjugated Polyelectrolyte and Ag Electrode
Changhee Lee, Seoul National University, Seoul, Korea

P.120: P-Doped Hole Transporting Layers for Improving Power Efficiency of OLEDs
Changhee Lee, Seoul National University, Seoul, Korea

P.121: Good Color Stable Phosphorescent White OLEDs with Double Emissive Layer Structure
Jang Hyuk Kwon, Kyung Hee University, Seoul, Korea

P.122: Optical Control of Surface Plasmon Loss in Transparent OLED Devices Coupled with Optical Compensation Layer
Akiyoshi Mikami, Kanazawa Institutre of Technology, Nonoichi, Japan

P.123: Electroluminescence Properties of WOLED with a New Yellow Fluorescent Material
Dong Myung Shin, Hong-ik University, Seoul, Korea

P.124: Ultra-Thin Flexible Graphene Oxide/PDDA Encapsulation Layer for OLED Displays
Jin-Nam Jeon, Hong-ik University, Seoul, Korea

P.125: Color Characterization Models for OLED Displays
Pei-Li Sun, National Taiwan University of Science & Technology, Taipei, Taiwan, ROC

P.126: New Polymerizable Liquid Crystal and Its Reverse Wavelength Dispersion Property
Kei Sakamoto, ZEON Corp., Kanagawa, Japan

P.138L: ***Late News Poster:*** **Accurate Evaluation of Light-Extraction Efficiency for OLEDs with Light Out-Coupling Layer**
Hironori Wakana, Hitachi, Ltd., Tokyo, Japan

P.139L: ***Late News Poster:*** **The Advantage of Ambient Contrast Ratio in WRGB OLED Displays**
Hyun Seung Kim, LG Display Co., Ltd., Gyeonggi-do, Korea

P.140L: ***Late News Poster:*** **Highly Efficient Inverted OLED with Air Stable Electron Injection Layer**
Hirohiko Fukagawa, NHK Science and Technology Research Laboratory, Tokyo, Japan

P.141L: ***Late News Poster:*** **ALD Based Multilayer Encapsulation of PIN OLED: On the Stability of the Organic Layer in 85°C / 85%RH Storage Conditions**
Tony Maindron, CEA-LETI, Grenoble, France

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Satoru Watanabe, Asahi Glass Co., Ltd., Yokohama, Japan

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Jongwook Park, Catholic University of Korea, Bucheon, Korea

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Jun Yeob Lee, Dankook University, Yongin, Korea

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Stephane Altazin, Fluxim AG, Feusisberg, Switzerland

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Sheng Hao Chen, National Taiwan University, Taipei, Taiwan, ROC

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Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan, ROC

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Dong-Hee Yeo, LG Display Co., Ltd., Pohang, Korea

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Sheng-Po Wang, ITRI, Chutung, Taiwan, ROC