ADVANCE PROGRAM
2023 DISPLAY WEEK INTERNATIONAL SYMPOSIUM

May 23-26, 2023 (Tuesday – Friday)
Los Angeles Convention Center
Los Angeles, California, US

Session 1: Annual SID Business Meeting
Tuesday, May 23, 2023 / 8:00 – 8:20 am / Hall G

Session 2: Opening Remarks / Keynote Addresses
Tuesday, May 23, 2023 / 8:20 – 10:20 am / Hall G
Chair: *Wei Yao, Apple, Inc.*
- **2.1:** *Keynote Address 1:* **New Trends and Strategies for the Display Industry**
  Charles Peng, Chairman and Chief Executive Officer, Tianma Microelectronics Co., Ltd.
- **2.2:** *Keynote Address 2:* **Advanced Optics for Immersive AR**
  Kevin Curtis, Senior VP, Head of Hardware, Magic Leap
- **2.3:** *Keynote Address 3:* **Forecasting the Future of the Display Industry Post COVID**
  Ross Young, Co-Founder and CEO, DSCC

Session 3: Emerging Technologies and Techniques I *(Emerging Technologies and Applications)*
Tuesday, May 23, 2023 / 11:10 AM - 12:30 PM / Room 402AB
Chair: *Susan Jones, Nulumina Corp.*
Co-Chair: *John-Ho Hong, Samsung*
- **3.1:** *Distinguished Paper:* **High-Resolution Active-Matrix MicroLED Stretchable Displays**
  Haeyoon Jung, LG Display, Seoul, South Korea
- **3.2:** **Integration of Dye-Sensitized Solar Cell and Liquid-Crystal Display Technologies**
  Yuki Kyoda, Sharp Corporation, Tenri, Japan
- **3.3:** **Large-FoV Fast LiDAR System Based on Electrically Suppressed Helix Ferroelectric Liquid Crystal**
  Yuechu Cheng, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong
- **3.4:** *Invited Paper:* **A 2.5μm Dot-Pitch 0.18-in. OLED Microdisplay on 28nm CMOS Backplane**
  Philipp Wartenberg, Fraunhofer Institute for Organic Electronics, Dresden, Germany
- **3.5:** **Privacy Device Using Peripheral Encoding**
  Timothy Large, Microsoft (UK) Ltd, Reading, United Kingdom

Session 4: MicroLED for AR/VR/MR I *(AR/VR/MR / Emissive, Micro-LED, and Quantum-Dot Displays)*
Tuesday, May 23, 2023 / 11:10 AM - 12:30 PM / Room 408A
Chair: *Jisoo Hong, Korea Electronics Technology Institute*
Co-Chair: *Jean-Jacques Drolet, Osram Opto Semiconductors*
- **4.1:** *Invited Paper:* **Industrializing MicroLED Microdisplays for AR Applications**
  Wei Sin Tan, Jade Bird Display Limited, Shanghai, China
- **4.2:** *Invited Paper:* **Unlocking MicroLED Display Solutions for Consumer AR Glasses**
  Tongtong Zhu, Porotech, Cambridge, United Kingdom
- **4.3:** **MircoLED Display on 300mm CMOS Platform: Crosstalk and Optical Outcoupling**
  Soeren Steudel, MICLEDI microdisplay BV, Leuven, Belgium
- **4.4:** **High-ppi MicroLED Display Driver Circuit and Device Structure**
  Jiao Zhao, BOE Technology Group Co., Ltd., Beijing, China

Session 5: Liquid Crystal AR/VR/MR Applications I *(AR/VR/MR / Liquid Crystal Technology)*
Tuesday, May 23, 2023 / 11:10 AM - 12:50 PM / Room 408B
Chair: *Matthew Sousa, 3M*
Co-Chair: *Philip Chen, National Yang Ming Chiao Tung University*
- **5.1:** *Invited Paper:* **Infinite Display for Meta Quest Pro**
  Linghui Rao, Meta, Redmond, WA US
- **5.2:** *Invited Paper:* **High-Dynamic-Range 2,117ppi LCD for VR Displays**
  Yung-Hsun Wu, Innolux Corporation, Miaoli, Taiwan Roc
- **5.3:** *Invited Paper:* **Development of Fast LCD with MiniLED BLU for VR Application**
  Hao Zhang, BOE Technology Group Co., LTD., Beijing, China
- **5.4:** *Invited Paper:* **High-Performance LCD for Future VR**
  Fenglin Peng, Meta, Redmond, WA US
- **5.5:** **Development of 1500-ppi VR LCD Based on LTPO Process Structure**
  Zhen. Zhang, BOE Technology Group Co., Ltd., Beijing, China

Session 6: ML-Based Defect Detection Techniques *(Machine Learning for Displays / Display Manufacturing)*
Tuesday, May 23, 2023 / 11:10 AM - 12:10 PM / Room 406

11.3: **A Novel e-Privacy LCD Based on a Smart Viewing-Angle Controllable Cell with IPS Electrode Structure**
Yijun Wang, Hefei BOE Optoelectronics Technology Co., Ltd., Hefei, China

11.4: **3.55-Watt Output Power LTPS-TFT DCDC Converter for Actuators on Flexible Substrate Wearable Devices**
Nikolaos Papadopoulos, imec, Heverlee, Belgium

11.5: *Invited Paper:* **Evolving into an Era of Natively Flexible Smart Systems**
Feras Alkhalil, Pragmatic Semiconductor Limited, Sedgefield, United Kingdom

Session 12: MicroLED for AR/VR/MR II *(AR/VR/MR / Emissive, Micro-LED, and Quantum-Dot Displays)*
Tuesday, May 23, 2023 / 2:00 PM - 3:20 PM / Room 408A
Chair: *Jinsoo Jeong, KETI*
Co-Chair: *Chris Bower, X Display Company*

12.1: *Invited Paper:* **Recent Progress on Active-Matrix Addressable MicroLEDs for High-Performance Displays**
Ke Zhang, Shenzhen Sitan Technology Co., Ltd., Shenzhen, China

12.2: *Distinguished Paper:* **High-Efficiency Nanowire LEDs for AR/VR Displays**
Yizhou Qian, University of Central Florida, Orlando, FL US

12.3: *Invited Paper:* **Nanowire MicroLEDs for Augmented-Reality and Virtual-Reality (AR/VR) Displays**
Seth Coe-Sullivan, NS Nanotech, Inc., Ann Arbor, MI US

12.4: *Invited Paper:* **Enhancing microLED Manufacturing with New Horizons in Metrology and High-Throughput EL Inspection**
David Lewis, InZiv, Jerusalem, Israel

Session 13: Liquid Crystal AR/VR/MR Applications II *(AR/VR/MR / Liquid Crystal Technology)*
Tuesday, May 23, 2023 / 2:00 PM - 3:20 PM / Room 408B
Chair: *Linghui Rao, Meta*
Co-Chair: *Yung-Hsun Wu, Innolux*

13.1: *Invited Paper:* **Front-Lit LCOS for AR Displays**
Yuet-Wing Li, Himax Display Inc., Tainan, Taiwan Roc

13.2: *Invited Paper:* **Advanced Patterning Method Exceeding the Lithography Limitation with Resolution Enhancement Technology**
Yoshisuke Toyama, Merck Electronics Ltd., Shizuoka, Japan

13.3: **Full-Color Optical Combiner with Good Imaging Quality and a Wide Angle of Incident Light Acceptance**
Fenglin Xi, Kent State University, Kent, OH US

Session 14: ML-Based Design and Modeling Techniques *(Machine Learning for Displays / Display Manufacturing / Emerging Technologies and Applications / Display Electronics)*
Tuesday, May 23, 2023 / 2:00 PM - 3:20 PM / Room 406
Chair: *Suk-Ju Kang, Sogang University*
Co-Chair: *Fang-Cheng Lin, Apple, Inc.*

14.1: **An Automatic Panel Design Using AI-Based Design Optimization and Standard Design**
Ju-Un Park, LG Display, Seoul, South Korea

14.2: **Angle-Insensitive Meta-Surface Color Filters Designed by Integrating Genetic Algorithm with Artificial Neural Network**
Yun Seon Do, Kyungpook National University, Daegu, South Korea

14.3: **Drop Resistance Optimization Through Post-Hoc Analysis of Chemically Strengthened Glass**
Myunghun Baek, Samsung Display Co., Ltd., Yongin, South Korea

14.4: **Efficient Multi-Stage Bayesian Optimization for Optimal Display Circuit Input Signal Design**
Shuhui Qu, Samsung Semiconductor, Inc., San Jose, CA US

Session 15: Image Quality Improvement Technology *(Display Electronics)*
Tuesday, May 23, 2023 / 2:00 PM - 3:20 PM / Room 404
Chair: *Carlin Vieri, Google*
Co-Chair: *Feng-Ting Pai, Novatek Microelectronics Corp.*

15.1: **New Compression Algorithm to De-Mura Gamma LUT for AMOLED Display**
Yini Zuo, Chengdu BOE Optoelectronics Group Co., Ltd., Chengdu, China

15.2: **A Novel Compensation Algorithm for Multi-Frame Drop on AMOLED Displays**
Shang-Yu Su, Novatek Microelectronics Corporation, Hsinchu, Taiwan Roc

15.3: **Crosstalk Compensation Method Using ELVDD Coupling Modeling in OLED Display for Mobile Application**
Tae-Kon Yu, Samsung Electronics Co. Ltd., Hwaseong, South Korea

15.4: **Improvement of Gradation and Color Shift in Dark Luminance Area with Signal Correction for OLED Displays**
Masafumi Ueno, Sharp Display Technology Corporation, Nara, Japan

Session 16: Integrated Sensors *(Active Matrix Devices)*
Tuesday, May 23, 2023 / 2:00 PM - 3:20 PM / Room 403A
Chair: *James Chang, Apple, Inc.*
Co-Chair: *Mike Hack, Universal Display Corporation*

16.1: *Invited Paper:* **High-Performance Organic/Polymeric Field-Effect Transistors for Intrinsic Flexible Display**
Yunqi Liu, Chinese Academy of Sciences, Beijing, China

16.2: *Invited Paper:* **Ambient Light Sensor Integration in a-Si LCD with Regular Processing**
Dou Shuqian, BOE, Beijing, China

16.3: *Invited Paper:* **Solution-Processed Metal-Oxide Thin-Film Transistors for Flexible Active-Matrix Sensor Arrays**
Bowen Zhu, Westlake University, Hangzhou, China

Session 17: OLED Displays I *(OLEDs)*
Tuesday, May 23, 2023 / 2:00 PM - 3:40 PM / Room 403B

Chair: *Yifan Zhang, Apple, Inc.*
Co-Chair: *Sangmoo Choi, Google LLC*

17.1: *Invited Paper:* **Development of Novel eLEAP AMOLED Display with Breakthrough Panel Performance**
Naoki Shiomi, Japan Display Inc., Chiba, Japan

17.2: **Development of Visionox Intelligent Pixelization Technology in AMOLED Applications**
Yiming Xiao, Hefei Visionox Technology Ltd., Hefei, Anhui, China

17.3: **An 8.3-in. 1,058ppi OLED Display with Side-by-Side Pixel Structure Fully Fabricated by Photolithography**
Shingo Eguchi, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

17.4: **Ultra-High-Resolution Full-Color OLEDs Patterned by Photolithography**
Ryungyu Lee, Soongsil University, Seoul, South Korea

17.5: **Enhancement of Luminance Efficiency of 3,000ppi OLED Microdisplay Using RGB Direct Patterning**
Jae Hoon Jung, APS Research Corporation, Hwasung, South Korea

Session 18: Topics in Display Measurement *(Display Measurement)*
Tuesday, May 23, 2023 / 2:00 PM - 3:20 PM / Room 411

Chair: *Thomas Fiske, Consultant*
Co-Chair: *Jaejoong Kwon, Samsung Display*

18.1: **Combining Annulus and Variable Aperture Source Methods to Separate Specular, Haze, and Lambertian Reflection Components in e-Paper Displays**
Dirk Hertel, E Ink Corporation, Billerica, MA US

18.2: **Equivalent Conditions for Display Sparkle Contrast Measurement with Different Optical Magnification**
Masanobu Isshiki, AGC Inc., Tokyo, Japan

18.3: **Computing Display Color Gamut Volume Using Tetrahedra**
Charles Poynton, Consultant, Toronto, ON Canada

18.4: *Late-News Paper:* **Lambda Capture Method and Applications for Quality Control of Displays and Devices**
Tomonori Nakamura, Hamamatsu Photonics K.K., Hamamatsu, Japan

Session 19: Holographic and 3D Optics *(Emerging Technologies and Applications)*
Tuesday, May 23, 2023 / 3:40 PM - 5:00 PM / Room 402AB

Chair: *Maple Peng, Meta*
Co-Chair: *Adi Abileah, Adi - Displays Consulting LLC*

19.1: *Distinguished Paper:* **Mirror-Transcending Aerial Imaging: An Optical System that Freely Crosses the Boundary Between Mirrored and Real Spaces**
Ayaka Sano, NTT Human Informatics Laboratories, Yokosuka, Japan

19.2: **A Novel 3D Floating Image for Human-Machine Interfaces**
Yi-Hsiang Huang, Industrial Technology Research Institute, Hsinchu, Taiwan Roc

19.3: **Slim Backlights for Holographic 3D Displays Through Advanced Coatings**
Ullrich Hartung, Fraunhofer FEP, Dresden, Germany

19.4: **Improving Defocus Blur in Holographic Displays**
Janos Keresztes, University College London, London, United Kingdom

Session 20: AR/VR /MR Visual Experience *(AR/VR/MR / Applied Vision)*
Tuesday, May 23, 2023 / 3:40 PM - 5:20 PM / Room 408A

Chair: *David Hoffman, Google*
Co-Chair: *Scott Murdison, Facebook Reality Labs*

20.1: *Invited Paper:* **Rethinking Display Requirements for e-Sports and High Interactivity Applications**
Joohwan Kim, NVIDIA Corporation, Santa Clara, CA US

20.2: *Distinguished Paper:* **Local Pupil Swim in VR/AR: Root Cause and Perception Model**
Jerry Jia, Meta Reality Labs, Menlo Park, CA US

20.3: **The Study of Ambient Contrast Ratio of Transparent MicroLED Displays for Applied Field Extension**
Chien-Huang Liaw, AUO Corporation, Hsinchu, Taiwan Roc

20.4: **An AI-Driven Aquarium Guide System for Museum**
Te-Chih Liu, Industrial Technology Research Institute, Zhudong Township, Hsinchu County, Taiwan Roc

20.5: **Novel Interactive Mixed-Reality System Based on Dual-Depth Camera Gesture Recognition for Human-Computer Interaction**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan Roc

Session 21: MicroLED Color Conversion *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Tuesday, May 23, 2023 / 3:40 PM - 5:20 PM / Room 408B

Chair: *Michele Ricks, EMD Electronics*
Co-Chair: *Jonathan Steckel, ST Microelectronics*

21.1: *Invited Paper:* **Technology Trends and Challenges for Large MicroLED Display Applications**
Chen-Ke Hsu, Sanan Optoelectronics Co., LTD, Xiamen, China

21.2: **Full-Color Micro-LED Displays Based on Quantum Dots**
Yanzhen Yin, Southern University of Science and Technology, Shenzhen, China

21.3: **Quantum-Rod Color Filter with Higher Display Ambient Contrast Ratio**
Yiyang Gao, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

21.4: **Elevating the Light Output Power Density of Scaling-Down AlGaN Ultraviolet-C MicroLEDs**
Feng Feng, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

21.5: **Far-Field Native Emission Patterns of Various MicroLED Structures**
Khaled Ahmed, Intel Corporation, Santa Clara, CA US

Session 22: ML-Based High Quality Image Techniques *(Machine Learning for Displays / Display Electronics / Display Measurement)*
Tuesday, May 23, 2023 / 3:40 PM - 5:00 PM / Room 406

Chair: *Prof. Hyoungsik Nam, Kyung Hee University*
Co-Chair: *Prof. Soo-Yeon Lee, Seoul National University*

22.1: **Novel Gamma Prediction Algorithm for FDC Region of AMOLED Panel Based on CNN Model**
Chaofan Xu, Chengdu BOE Optoelectronics Grop Co., Ltd., Chengdu, China
22.2: **Low-Power-Consumption Optimization Using Conformalized Quantile Regression**
Kyongtae Park, Samsung Display Co., Ltd., Yongin, South Korea
22.3: **An Adaptive Frequency Domain De-Moiré Method for Display Test Images**
Gang Xu, Jince Electronics, USA, San Jose, CA US
22.4: *Invited Paper:* **Deep Learning-Based Image Deblurring for Display Vision Inspection**
Suk-Ju Kang, Sogang University, Seoul, South Korea

Session 23: Thermal Modeling and High Speed Interface *(Display Electronics)*
Tuesday, May 23, 2023 / 3:40 PM - 4:40 PM / Room 404
Chair: *Darren Kim, Google LLC*
Co-Chair: *Moon-Sang Hwang, Samsung Display Co., Ltd.*

23.1: **OLED Panel Power Consumption and Heat-Generation Modeling According to Driving Environment**
Daegwang Jang, Samsung Display, Yongin, South Korea
23.2: **Operation Method of Dynamic Data Rate for High-Speed Signal Transmission on Display System**
Chien-Hao Li, Novatek Microelectronics Corporation, Hsinchu, Taiwan Roc
23.3: *Distinguished Paper:* **A Clock Embedded Intra-Panel Interface with 1.96% Data Overhead for Beyond 8K Displays**
Yong-Yun Park, Samsung Electronics Co. Ltd., Hwasung, South Korea

Session 24: Novel Driving Circuits *(Active Matrix Devices)*
Tuesday, May 23, 2023 / 3:40 PM - 5:00 PM / Room 403A
Chair: *Jae-Hoon Lee, Samsung Display Co*
Co-Chair: *Takahashi Nakamura, Japan Display Inc.*

24.1: *Invited Paper:* **A Novel Algorithm for Eliminating Abnormal Detection Data in Ultra-Large 95-in. 8K OLED Panels with External Compensation**
Xuehuan Feng, Hefei BOE Joint Technology Co., Ltd., Hefei, China
24.2: **Facile Design of Gate Driver Integrated Circuit with Self-Aligned InGaZnO TFTs Using Multi-Outputs and Common Bootstrapped Driving for High-Resolution WOLED Displays**
Hyun Jae Kim, Yonsei University, Seoul, South Korea
24.3: *Invited Paper:* **PAM and PWM Driving Comparison for MicroLED Display**
Yangen Wu, AUO Corporation, Hsinchu, Taiwan Roc
24.4: *Invited Paper:* **Flickering in Low-Frame-Rate Driven AMOLEDs**
Kook Chul Moon, Gachon University, Seongnam, South Korea

Session 25: OLED Displays II *(OLEDs)*
Tuesday, May 23, 2023 / 3:40 PM - 5:00 PM / Room 403B
Chair: *DZ Peng, Tianma*
Co-Chair: *Ji Ho Baek, LG Display*

25.1: *Distinguished Paper:* **Novel Ultra-Large OLED Display for Premium TVs**
Hong Jae Shin, LG Display, Paju, South Korea
25.2: **Subpixel Optimization in AMOLED Displays by Self-Assembled Patterning of a Secondary Cathode**
Zhibin Wang, OTI Lumionics Inc., Mississauga, ON Canada
25.3: **Design and Fabrication of Under-Display Camera OLED Panel**
Ming Yang, BOE Technology Group Co., Ltd., Beijing, China
25.4: **High-Resolution Top-Emission OLED Device Fabricated by Inkjet Printing Process**
Huifeng Wang, Hefei BOE Joint Technology Co., Ltd., Hefei, China

Session 26: Automotive Display Measurements *(Automotive/Vehicular Displays and HMI Technologies / Display Measurement)*
Tuesday, May 23, 2023 / 3:40 PM - 5:00 PM / Room 411
Chair: *Karlheinz Blankenbach, Pforzheim University*
Co-Chair: *Stephen Atwood, Consultant*

26.1: *Invited Paper:* **Overall Performance Measurement of Automotive Autostereoscopic Displays**
Achim Pross, Mercedes-Benz AG, Sindelfingen, Germany
26.2: **Quantitative Evaluation of Display Readability in a Car Simulator Under Ambient Light Conditions**
Michael Linder, Corning GmbH, Wiesbaden, Germany
26.3: **Assessing Vehicle Driver Performance in Dual-Depth Head-Up Displays**
Tzu An Chou, National Taiwan University Of Science And Technology, Taipei, Taiwan Roc
26.4: *Late-News Paper:* **Preferred White Point for a System of Mixed Technology Displays Cockpit**
Pooshpanjan Roy Biswas, Renault, Guyancourt, France

Session 27: Emerging Integrated Sensors *(Emerging Technologies and Applications)*
Wednesday, May 24, 2023 / 9:00 AM - 10:20 AM / Room 402AB
Chair: *Adi Abileah, Adi - Displays Consulting LLC*
Co-Chair: *Abhishek Srivastava, Hong Kong University of Science & Technology*

27.1: **A Low-Noise 17 x 17-in. IGZO X-Ray Sensor Panel**
Ray Chen, AU Optronics Corporation, Hsinchu, Taiwan Roc
27.2: **Field Emission Beyond Information Displays**
Salvador Barranco Cárceles, University of Edinburgh, Edinburgh, United Kingdom
27.3: **Deformed Helix Ferroelectric Liquid-Crystal Based Threshold-Less Passive Vibration Sensing System**

Abhishek Srivastava, Hong Kong University of Science and Technology, Hong Kong, Hong Kong
27.4: **Development of a Novel Glass-Cell FAIMS Olfactory Sensor and Measurements of Complex Odors**
Reshan Abeysinghe, Sharp Display Technology Corporation, Nara, Japan

Session 28: AR/VR/MR Optical Systems *(AR/VR/MR / Display Systems)*
Wednesday, May 24, 2023 / 9:00 AM - 10:40 AM / Room 408A
Chair: *W. Hendrick, Collins Aerospace*
Co-Chair: *Jean-Pierre Guillou, Apple, Inc.*
28.1: **Foveated Imaging for AR Displays Based on Polarization Selective Flat Lenses**
Qian Yang, University of Central Florida, Orlando, FL US
28.2: **Eyebox-Expanded Maxwellian-View Augmented-Reality Display with a Color Holographic Optical Element**
Xinxing Xia, Shanghai University, Shanghai, China
28.3: *Distinguished Paper:* **Optimizing Microdisplay Requirements for Pancake VR Applications**
En-Lin Hsiang, University of Central Florida, Orlando, FL US
28.4: **1.50-in. 3,207ppi OLED Display and Optical System for VR Use**
Hisao Ikeda, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
28.5: **Anamorphic DLP Illumination System Design with a Freeform Surface Lens**
Jui-Wen Pan, National Yang Ming Chiao Tung University, Tainan, Taiwan Roc

Session 29: MicroLED Device & Efficiency *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Wednesday, May 24, 2023 / 9:00 AM - 10:40 AM / Room 408B
Chair: *Prof. Zhaojun Liu, Southern University of Science and Technology*
Co-Chair: *Ioannis Kymissis, Columbia University*
29.1: *Invited Paper:* **Emitters for Flat-Panel MicroLED Displays**
Matthew Meitl, X Display Company, Inc., Research Triangle Park, NC US
29.2: *Invited Paper:* **Temporal Study of MicroLED Arrays for Potential High-Efficiency Driving**
Qun (Frank) Yan, Fuzhou University, Fuzhou, China
29.3: **Exploring the Temperature Dependence of GaN-on-GaN Homoepitaxy MicroLEDs**
Zichun Li, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong
29.4: **Higher External Quantum Efficiency with Lower Current Density Injection of <10μm Pixel Size Arrays for Display Application**
Yibo Liu, Hong Kong University of Science and Technology, Hong Kong, Hong Kong
29.5: *Invited Paper:* **Progress in MicroLEDs: Materials, Device Performance, and Reliability**
Brendan Moran, Lumileds LLC, San Jose, CA US

Session 30: LED Displays *(Outdoor Displays / Display Systems / Emissive, Micro-LED, and Quantum-Dot Displays)*
Wednesday, May 24, 2023 / 9:00 AM - 10:30 AM / Room 406
Chair: *Karlheinz Blankenbach, Pforzheim University*
Co-Chair: *Samantha Phenix, Phenix Consulting*
30.1: *Invited Paper:* **High-Resolution Outdoor dvLED Displays and Their Potential to Replace Outdoor LCDs**
James Wickenhiser, SiliconCore Technology, Inc., Milpitas, CA US
30.2: *Late-News Paper:* **LED Outdoor Display - The New Advertising Column - Challenges and Requirements**
Gunnar Grieser, Stroeer Media Deutschland GmbH, Koeln, Germany
30.3: **Open Standard Software Defines AV over IP Framework for LED Video Wall System**
Benjamin Cope, Intel Corporation, Marlow, UNK United Kingdom
30.4: *Distinguished Paper:* **Design of Outdoor LED Ground Display System in Major Scenes**
Yu Chao, BOE Technology Group, Beijing, China
30.5: *Late-News Paper:* **Development of a highly reliable Mini-LED display module using simultaneous transfer and bonding (SITRAB) technology**
Jiho Joo, Electronics and Telecommunications Research Institute, Daejeon, South Korea

Session 31: Capacitive Force, Touch, and Stylus Sensing *(Interactive Displays and Systems)*
Wednesday, May 24, 2023 / 9:00 AM - 10:20 AM / Room 404
Chair: *Patrick Worfolk, AMD*
Co-Chair: *Deuk-Su Lee, LG Display*
31.1: **Active Stylus Application Using Self-Capacitive Touch with OLED TDDI**
Yu-Ying Tang, Novatek Microelectronics Corp., Hsinchu, Taiwan Roc
31.2: **An Asynchronous Single-Ended Touch-Sensing Method for Y-OCTA Using Adaptive TX Duty Control Method**
Jin-Chul Lee, Samsung Electronics, Hwaseong, South Korea
31.3: **In-Cell Touch-Supported Novel Reflective LCD Mode Development**
Shinichi Terashita, Sharp Display Technology Corporation, Nara, Japan
31.4: **Sharp Force Touch for On-Screen User Interface in LCD and Foldable OLED Display Application**
Takuma Yamamoto, Sharp Display Technology Corporation, Nara, Japan

Session 32: Novel Processes *(Active Matrix Devices)*
Wednesday, May 24, 2023 / 9:00 AM - 10:20 AM / Room 403A
Chair: *Junho Song, Korea University*
Co-Chair: *Sang Hee Park, KAIST*
32.1: *Invited Paper:* **Mask-Reduction Process with Innovative Undercut for Large AMOLED Display**
Jiayang Fei, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co. Ltd., China, Shenzhen, China
32.2: **Mask-Reducing Backplane Architecture for Advanced MicroLED Display**
Kai Zhou, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co. Ltd., Shenzhen, China
32.3: *Late-News Paper:* **Development of 540Hz LCD with Low-Resistance Gate LTPS Technology**
Jia-Hong Ye, AUO Corporation, Hsinchu, Taiwan Roc

32.4: *Late-News Paper:* **A 1.03-in. 2,560 x 2,560 3,514ppi Low-Power OLEDoS Backplane with In-Pixel Up-Scaling Technique**
Dongsoon Jung, Raontech Inc., Seongnam, South Korea

Session 33: OLED Materials I *(OLEDs)*
Wednesday, May 24, 2023 / 9:00 AM - 10:20 AM / Room 403B
Chair: *Hitoshi Kuma, Idemitsu Kosan Co., Ltd.*
Co-Chair: *Larry Liao, Soochow University*
33.1: *Invited Paper:* **Development of Deuteration Technology to Improve Lifetime of OLED EX and Identification of Stability of Deuterated Materials**
Young-Jun YU, LG Display, Seoul, South Korea
33.2: *Invited Paper:* **Multiple-Resonance Boron-Nitrogen Materials: Effective Emitters for High-Performance Green-Emission OLEDs**
Xudong Cao, Jiangsu Sunera Technology Co., Ltd., Wuxi, China
33.3: *Invited Paper:* **Shaping the Emissive Layer of Green Phosphorescent OLEDs: High-Performance Hosts for Various Dopants and Applications**
Sebastian Stolz, Merck Electronics KGaA, Darmstadt, Germany
33.4: **Supramolecules in Thin Films and OLED Efficiencies**
Hadi Abroshan, Schrödinger, Inc., Portland, OR US

Session 34: Automotive HUDs and Driver Monitoring *(Automotive/Vehicular Displays and HMI Technologies)*
Wednesday, May 24, 2023 / 9:00 AM - 10:20 AM / Room 411
Chair: *Haruhiko Okumura, Toshiba Corporation*
Co-Chair: *David Hermann, Volvo Car Corporation AB*
34.1: *Invited Paper:* **Future AR-HUD System**
Younghoon Han, Hyundai Mobis, Yongin, South Korea
34.2: **Dual-Focal-Plane Augmented-Reality Head-Up Display Using Polarization Multiplexing**
Zong Qin, Sun Yat-sen University, Guangzhou, China
34.3: **Vehicle-Mounted Projection Display with Local Dimming Effect**
Weining Chi, BOE Optoelectronics Technology Co., Ltd., Beijing, China
34.4: *Late-News Paper:* **Augmented Information by Graphics Pillar-to-Pillar RGB LED Display at the Base of the Windscreen: Design, Measurements & Evaluation**
Karlheinz Blankenbach, Pforzheim University Display Lab, Pforzheim, Germany

Session 35: Novel Technologies and Systems *(Emerging Technologies and Applications)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 402AB
Chair: *Jim Zhuang, Meta*
Co-Chair: *Maple Peng, Meta*
35.1: **Retroreflective ZBD LCD for High-Brightness Digital License Plate**
Guy Bryan-Brown, New Vision Display, Malvern, United Kingdom
35.2: **Front-Light Source Module Adapted for Reflective LCD**
Tingxiu Hou, Beijing BOE Optoelectronics Technology Co. Ltd., Beijing, China
35.3: **Metasurface-Based Color Filter with Optical Cavity for High Color Purity Displays**
Yun Seon Do, Kyungpook National University, Daegu, South Korea
35.4: **Carbon Nanotube Thin-Film Transistors for Active-Matrix Micro-LED Display – Device Performances, Bias Stress Stability and Compact Modeling**
Yujia Gong, Peking University, Beijing, China

Session 36: Glasses-Free 3D *(AR/VR/MR / Display Systems)*
Wednesday, May 24, 2023 / 10:40 AM - 11:40 AM / Room 408A
Chair: *Shinichi Uehara, AGC Inc.*
Co-Chair: *Zong Qin, Sun Yat-Sen University*
36.1: **360-Degree Transparent Light-Field Display with Highly Directional Holographic Screens for Fully Volumetric 3D Video Experience**
Tomoharu Nakamura, Sony Group Corporation, Atsugi, Japan
36.2: **Coarse Integral Imaging Displays with Interleaved Fresnel Lenses**
Hideki Kakeya, University of Tsukuba, Tsukuba, Japan
36.3: **Design and Analysis of Brightness Enhancement Integral Imaging-Based 3D Light-Field Normal Display and Optical See-Through Light-Field Display by Discrete Lenslet Array**
Chia-Yuan Chang, National Taiwan University, Taipei, Taiwan Roc

Session 37: MicroLED Manufacturing *(Emissive, Micro-LED, and Quantum-Dot Displays / Display Manufacturing)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 408B
Chair: *Chris Bower, X Display Company*
Co-Chair: *Chiwoo Kim, APS Holdings*
37.1: *Invited Paper:* **Manufacturing Readiness of High-Efficiency and Low-Cost MicroLED Displays**
Mingwei Zhu, Applied Materials, Santa Clara, CA US
37.2: *Distinguished Paper:* **Efficiency Enhancement of Submicron-Size Light-Emitting Diodes by Triple Dielectric Layers**
Hyunmin Cho, Samsung Display Co., Ltd., Yongin, South Korea
37.3: **Defect Detection of MicroLED Displays by Simultaneous Visual and Thermal Imaging**
Mikyung Lim, Korea Institute of Machinery and Materials (KIMM), Daejeon, South Korea
37.4: *Invited Paper:* **Toward Small, Ultra-High-Definition MicroLED Displays Using Monolithic Vertically Stacked RGB LEDs**
Yasufumi Fujiwara, Osaka University, Osaka, Japan

Session 38: Smart Windows *(Outdoor Displays / Display Systems / Liquid Crystal Technology)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 406
Chair: *Samantha Phenix, Phenix Consulting*

Co-Chair: *David Eccles*

38.1: *Invited Paper:* **Smart Glass Application of Display Technology**
Anthony Slack, eLstar Dynamics, Eindhoven, Netherlands

38.2: **Ubiquitous Display with High Transparency Phosphor-Dot Projection Film**
Cheng-Huan Chen, National Yang Ming Chiao Tung University, Hsinchu, Taiwan Roc

38.3: **Design of Random Depolarization Films Based on Modulation Transfer Function Measurements**
Shizuki Sasaki, Keio University, Kawasaki, Japan

38.4: **High Transmittance MiniLED Panel with Improved See-Through Imaging Quality**
Zhiqiang Xu, BOE, Beijing, China

Session 39: Optical Fingerprint Sensing Displays *(Interactive Displays and Systems)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 404
Chair: *Martin Grunthaner, Apple*
Co-Chair: *Hiroshi Haga, Tianma Japan*

39.1: **Optical Structure of In-Cell Fingerprint Identification Unit for OLED Display with Thick Cover Glass**
Cheng-Huan Chen, National Yang Ming Chiao Tung University, Hsinchu, Taiwan Roc

39.2: **Ultra-Thin Integration of Optical Array Sensors with Displays and Any Transparent Surface for Fingerprint Imaging and Beyond: Toward a Universal Sensor for Displays**
Chi-Hao Lin, Harvest Intelligence Technology Co., Tainan, Taiwan Roc

39.3: **Pinhole Matrix Fingerprint-on-Display Technology for CFOT OLED Display**
Yang Zeng, Shanghai Tianma Microelectronics, Shanghai, China

39.4: **Analysis of Large-Area Optical Fingerprint Recognition Technology Under OLED Screen**
Guiyang Zhang, TCL China Star Optoelectronics Technology Co., LTD (TCL CSOT), Wuhan, China

Session 40: Novel TFTs *(Active Matrix Devices)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 403A
Chair: *Norbert Fruehauf, University of Stuttgart*
Co-Chair: *Hyun Jae Kim, Yonsei University*

40.1: *Invited Paper:* **Thin-Film Transistor Modeling**
John Wager, Oregon State University, Corvallis, OR US

40.2: *Invited Paper:* **High-Performance p-Type TFT with Metal Halide Semiconductors**
Myung-Gil Kim, Sungkyunkwan University, Suwon, South Korea

40.3: *Distinguished Paper:* **Reliable Low-Power High-Performance Low-Temperature Polycrystalline Silicon Thin-Film Transistor Technologies in Bottom Gate-Controlled Device Architectures for AMOLED Displays**
Keunwoo Kim, Samsung Display, Yongin, South Korea

40.4: *Invited Paper:* **Self-Aligned Top-Gate Amorphous In-Ga-Zn-O Thin-Film Transistors with Hafnium-Induced Source/Drain Regions**
Jiye Li, Peking University, Shenzhen, China

Session 41: OLED Materials II *(OLEDs)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 403B
Chair: *Sven Zimmermann, Novaled GmbH*
Co-Chair: *Nicholas Thompson, Universal Display Corporation*

41.1: *Invited Paper:* **Highly Efficient and Stable Deep-Blue Organic Light-Emitting Diode Using Phosphor-Sensitized Thermally Activated Delayed Fluorescence**
Changwoong Chu, Samsung Display, Yongin, South Korea

41.2: *Invited Paper:* **Recent Progress in Boron-Based MR-TADF Materials**
Takuji Hatakeyama, Kyoto University, Kyoto, Japan

41.3: **Efficient Pure-Blue Hyperfluorescence OLEDs with Donor-Acceptor-Donor Type Thermally Activated Delayed Fluorescence Sensitizer**
Young Hun Jung, Kyung Hee University, Seoul, South Korea

41.4: **Multi-Resonance Thermally Activated Delayed Fluorescence Emitters for Pure-Blue OLEDs with Suppressed Efficiency Roll-Off**
Min Chul Suh, Kyung Hee University, Seoul, South Korea

Session 42: Automotive Image Quality *(Automotive/Vehicular Displays and HMI Technologies)*
Wednesday, May 24, 2023 / 10:40 AM - 12:00 PM / Room 411
Chair: *Rashmi Rao, Harman International*
Co-Chair: *Eric Margulies, Universal Display Corporation*

42.1: **Perceptual Judgements of Simulated Low Temperatures in LCD-Based Vehicle Displays**
Kjell Brunnström, RISE Research Institutes of Sweden AB, Kista, Sweden

42.2: **Automotive Image Enhancement**
Paul Weindorf, Visteon Corporation, Van Buren Twp., MI US

42.3: **Impact of Resolution of Image Condensation and Matrix BLU on Power Saving, Contrast Enhancement, and Local Dimming Processor Complexity for Automotive Applications**
Ramazan Ayasli, University of Saarland, Saarbrücken, Germany

42.4: **Automotive Liquid-Crystal Display Using MiniLED Backlight Managed by Flexible Local Dimming System**
Noriaki Yamaguchi, Sharp Display Technology Corporation, Nara, Japan

Session 43: Display Manufacturing: TFT Processing *(Display Manufacturing)*
Wednesday, May 24, 2023 / 3:30 PM - 4:50 PM / Room 402AB
Chair: *Tian Xiao, NEXT Biometrics Inc.*
Co-Chair: *Andriy Romanyuk, Glas Troesch AG*

43.1: *Invited Paper:* **The Application and Future Development Trend of Oxide Technology in the Meta-Universe**

Ce Ning, BOE Technology Group Co., Ltd., Beijing, China

43.2: ***Distinguished Paper:*** **High-Performance, Coplanar Amorphous IGZO TFTs by Spray Pyrolysis on PI Substrate for Low Cost Manufacturing of Foldable AMOLED Display**
Jin Jang, Kyunghee University, Seoul, South Korea

43.3: **AMOLED Display Sandy Mura Study and Improvement**
Haoyuan Fan, BOE Technology Group Co., Ltd., Mianyang, China

43.4: **Ultra-High On-Current Vertical Field-Effect Transistor with Submicron Channel Length of 0.5 μm Using CAAC-IGZO**
Masataka Nakada, Semiconductor Energy Laboratory Co., Ltd., Tochigi, Japan

Session 44: Light-Field and HDR for AR/VR/MR *(AR/VR/MR / Display Systems)*
Wednesday, May 24, 2023 / 3:30 PM - 4:50 PM / Room 408A
Chair: *Nikhil Balram, Mojo Vision*
Co-Chair: *Shinichi Uehara, AGC Inc.*

44.1: ***Invited Paper:*** **Review of Time-Multiplexed Methods for High-Performance Head-Mounted Light-Field Displays**
Hong Hua, The University of Arizona, Tucson, AZ US

44.2: **Viewing Window Extension in Integral-Imaging-Based Head-Mounted Light-Field Displays Using Time-Multiplexed Method**
Cheng-Ting Huang, The University of Arizona, Tucson, AZ US

44.3: ***Invited Paper:*** **Metalens Array for Integral-Imaging-Based Near-Eye Display**
Jian-Wen Dong, Sun Yat-Sen University, Guangzhou, China

44.4: **A Novel DPU Architecture for HDR Display for AR, VR, and MR**
Deoksoo Park, Samsung Electronics, Hwaseong, South Korea

Session 45: MicroLED Displays *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Wednesday, May 24, 2023 / 3:30 PM - 5:10 PM / Room 408B
Chair: *Qun Yan, Fuzhou University*
Co-Chair: *Michele Ricks, EMD Electronics*

45.1: ***Invited Paper:*** **Status of the MicroLED Display Industry**
Eric Virey, Yole Intelligence, Portland, OR US

45.2: **14.6-in. 202ppi Rollable MicroLED Display with Color-Conversion Technology**
Chan-Jui Liu, AUO Corporation, Hsinchu, Taiwan Roc

45.3: ***Invited Paper:*** **MicroLED Display Applications and Roadmap of Technology Development by PixeLED Solutions**
Ying-Tsang Liu, PlayNitride Display Co., Ltd., Zhunan Township, Miaoli County, Taiwan Roc

45.4: **MicroLED Display Life Cycle Assessment**
Antonin Holo, CEA-Leti, Grenoble, France

45.5: ***Invited Paper:*** **MicroLED Displays for Smartwatch and Smartphone Applications**
Reza Chaji, VueReal Inc, Waterloo, ON Canada

Session 46: Digital Signage *(Outdoor Displays / Flexible Displays and e-Paper / Display Systems)*
Wednesday, May 24, 2023 / 3:30 PM - 4:50 PM / Room 406
Chair: *Karlheinz Blankenbach, Pforzheim University*
Co-Chair: *Samantha Phenix, Phenix Consulting*

46.1: ***Invited Paper:*** **Large-Scale Outdoor Display Systems: Applications and Technology Trends**
Brett Wendler, Daktronics, Inc., Watertown, SD US

46.2: ***Invited Paper:*** **Outdoor Displays for Industrial and Digital Signage Applications**
Alexander Trica, Data Modul AG, Munich, Germany

46.3: ***Invited Paper:*** **Ultra-Low-Power Color e-Paper Signage Displays for Outdoor Use**
Ian French, E Ink Corporation, Billerica, MA US

46.4: ***Invited Paper:*** **Digital-out-of-Home Displays that Run Forever on Solar Energy**
Doeke Oostra, Etulipa, Eindhoven, Netherlands

Session 47: Emerging Optical Sensing *(Interactive Displays and Systems / Emerging Technologies and Applications)*
Wednesday, May 24, 2023 / 3:30 PM - 4:50 PM / Room 404
Chair: *Dr. John Zhong, Apple, Inc.*
Co-Chair: *Susan Jones, Nulumina Corp.*

47.1: **Ambipolar Gap-Type a-Si-TFT Circuit for a Color Ambient-Light Sensor**
Chen-Yu Lin, National Yang Ming Chiao Tung University, Hsinchu, Taiwan Roc

47.2: **A TFT-Based Photosensitive Device**
Meng Zhao Hui, BOE Technology Group Co.,Ltd, Beijing, China

47.3: **In-Cell Ambient Light Sensors (ALSs) LCD Integration Using a-Si TFT Photo-Transistor and Four-Mask Process Architecture Technology**
An-Thung Cho, ChuZhou HKC Optoelectronics Technology Co., Ltd., ChuZhou, China

47.4: **Highly Sensitive Lateral Poly-Si PIN Photodiode by Blue Laser Annealing of 400nm Amorphous Si for Near-Infrared Light Sensing**
Jiseob Lee, Kyunghee University, Seoul, South Korea

Session 48: Short Channel Oxide TFTs *(Active Matrix Devices)*
Wednesday, May 24, 2023 / 3:30 PM - 4:50 PM / Room 403A
Chair: *Prof. Man Wong, The Hong Kong University of Science & Technology*
Co-Chair: *Kwon-Shik Park, LG Display*

48.1: ***Invited Paper:*** **Oxide Semiconductor Thin-Film Transistors with Deep Submicron Channel Fabricated with Hyperlithography**
Sung Haeng Cho, Electronics and Telecommunications Research Institute, Daejeon, South Korea

48.2: **Vertical Oxide Semiconductor Transistor Suitable for High-Resolution OLED Display**
Motoharu Saito, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

48.3: **In-Ga-Zn-O Synaptic Transistor with 1μm Channel Length for Neuromorphic Computing**

Junhyeong Park, Seoul National University, Seoul, South Korea

48.4: *Late-News Paper:* **Evaluation of a-IGZO Channel Characteristics to Improve the Performance of Oxide TFT**
Bohwa Kim, Samsung Display, Yongin, South Korea

Session 49: OLED Materials III *(OLEDs)*
Wednesday, May 24, 2023 / 3:30 PM - 4:30 PM / Room 403B
Chair: *Jang Hyuk Kwon, Kyung Hee University*
Co-Chair: *Chihaya Adachi, Kyushu University*

49.1: *Invited Paper:* **Perovskite Nanocrystals for High-Efficiency, Stable, and Large-Area Light-Emitting Diodes**
Tae-Woo Lee, Seoul National University, Seoul, South Korea

49.2: **WITHDRAWN**
Zuo-Quan Jiang, Soochow University, Jiangsu, China

49.3: *Invited Paper:* **Blue-Emitting Tetradentate Pt Complexes for Displays and Lighting Applications**
Jian Li, Arizona State University, Tempe, AZ US

49.4: **Novel Composition of Black Bank for OLED**
JunKi Kim, Duksan Neolux, Cheonan, South Korea

Session 50: Automotive Panel Optics *(Automotive/Vehicular Displays and HMI Technologies)*
Wednesday, May 24, 2023 / 3:30 PM - 4:50 PM / Room 411
Chair: *Casey Kang, Corning Incorporated*
Co-Chair: *Taewoong Kim, Samsung Display Co.*

50.1: **Full-Area Local Dimming Switchable Privacy Solution with Color Compensation**
Pawel Murzyn, Visteon, Chelmsford, United Kingdom

50.2: **Optical Decoration Film**
Cyun-Tai Hong, BenQ Materials Corp., Taoyuan, Taiwan Roc

50.3: **Resolution Lossless Dual-View Displays Based on Direction Backlight and Time Multiplexing**
Yongle Qi, Beijing BOE Display Technology Co., Ltd., beijing, China

50.4: *Late-News Paper:* **Multi-Domain Retarders for Eliminating Off-Axis Reflection Color Differences in Automotive OLED Displays**
Tae-Hoon Choi, Korea Automotive Technology Institute, Cheonan, South Korea

Session 51: Advances in Display Manufacturing Equipment *(Display Manufacturing)*
Thursday, May 25, 2023 / 9:00 AM - 10:20 AM / Room 402AB
Chair: *Toshiaki Arai, JOLED Inc*
Co-Chair: *Greg Gibson, nTact*

51.1: *Distinguished Paper:* **High Precision and High Stability Inkjet Printing Technology for QD Color-Conversion Filter Formation**
Yoshida Hidehiro, Panasonic Production Engineering, Osaka, Japan

51.2: *Invited Paper:* **Developing a Platform for Creating Waveguide Combiners for AR Headsets and Metasurface-Based Optics**
Robert Visser, Applied Materials Inc., Santa Clara, CA US

51.3: **Gen. 2 Copper Thin-Film Dry-Etching Equipment via ECR Plasma Source**
Chiwoo Kim, APS Holdings Corporation, Hwasung, South Korea

51.4: **Collimated Organic Molecular Beam Made by Triple-Nozzle Evaporator**
Sungmoon Kim, DepoLab, Gwangmyeong, South Korea

Session 52: Emerging Optics for AR/VR/MR *(AR/VR/MR / Emerging Technologies and Applications)*
Thursday, May 25, 2023 / 9:00 AM - 10:30 AM / Room 408A
Chair: *Abhishek Srivastava, Hong Kong University of Science & Technology*
Co-Chair: *Vincent Gu, Apple, Inc.*

52.1: **Ultracompact Virtual-Reality System**
Junyu Zou, University of Central Florida, Orlando, FL US

52.2: *Invited Paper:* **ChromaCorrect: Prescription Correction in Virtual-Reality Headsets Through Perceptual Guidance**
Jeanne Beyazian, University College London, London, United Kingdom

52.3: **Field-Sequential Color LCD for Enabling 60ppd and 100°-FoV VR Displays**
Zhiyong Yang, University of Central Florida, Orlando, FL US

52.4: *Distinguished Paper:* **Switchable Polarization Volume Gratings for Augmented-Reality Waveguide Displays**
Yannanqi Li, University of Central Florida, Orlando, FL US

52.5: *Late-News Paper:* **Thin and Lightweight Head-Mounted Displays with Holographic Optics and Polarized Laser Backlights Using an Inverted Wedge-Shaped Light-Guide Plate**
Jin Hirosawa, Japan Display Inc., Mobara, Japan

Session 53: MicroLED Processing *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Thursday, May 25, 2023 / 9:00 AM - 10:30 AM / Room 408B
Chair: *Francois Templier, CEA-LETI*
Co-Chair: *Yajie Dong, University of Central Florida*

53.1: *Invited Paper:* **Enhanced Performance of III-Nitride-Based Light-Emitting Diodes Through Novel Band Engineering and Fabrication Technology**
Xiaohang Li, King Abdullah University of Science and Technology (KAUST), Jeddah, Saudi Arabia

53.2: **Mini LED Emissive Display Product with Pitch 0.5mm Based on MIP Chips**
Qi Fan, BOE MLED Technology Co., Ltd., Beijing, China

53.3: **High-Efficiency MicroLED Displays Enabled Through PulseForge Assisted Die Transfer**
Pranav Gavirneni, University of Waterloo, Waterloo, ON Canada

53.4: **The Path of 300 mm GaN-on-Si Epiwafers into Silicon Semiconductor Fabs**
Atsushi Nishikawa, ALLOS Semiconductors GmbH, Dresden, Germany

53.5: *Late-News Paper:* **High-Resolution Optical Inspection of NR LEDs-Based Assembly and Their Evaluation for Display Applications**

Jaekyun Kim, Hanyang University, Ansan, South Korea

Session 54: Optical Sensing Displays *(Sensors Integration and Multi-Functional Displays / Interactive Displays and Systems)*
Thursday, May 25, 2023 / 9:00 AM - 10:00 AM / Room 406
Chair: *Jeff Han, Consultant*
Co-Chair: *Ion Bita, Google LLC*

54.1: *Invited Paper:* **Through OLED Display Proximity Sensing**
Mark Winkler, Apple Inc, Cupertino, CA US
54.2: *Invited Paper:* **Novel Display Applications Beyond OLED: All-in-One Sensor Display**
Sunghan Kim, Samsung Display Co. Ltd., Yongin, South Korea
54.3: **Patterned Liquid-Crystal Polymer on Polarized Ambient Light Sensor**
Yi Hung, Liqxtal Technology Inc., Tainan, Taiwan Roc

Session 55: High Performance Displays *(Display Systems)*
Thursday, May 25, 2023 / 9:00 AM - 10:20 AM / Room 404
Chair: *Brian Berkeley, Highlight Display, LLC*
Co-Chair: *Hidekazu Hatanaka, Ushio Inc.*

55.1: *Invited Paper:* **Apple Liquid Retina XDR Displays with MiniLEDs**
Jun Qi, Apple Inc, Cupertino, CA US
55.2: *Invited Paper:* **Quantum-Dot Color Conversion for Displays**
Ilan Jen-La Plante, Nanosys, Inc., Milpitas, CA US
55.3: *Invited Paper:* **From Smallest AR Glasses to Mainstream Display Projection: Latest Advances of Visible LED and Laser Solutions**
Stephan Haneder, ams-OSRAM International GmbH, Regensburg, Germany
55.4: *Invited Paper:* **Monolithic MicroLED Display for AR Applications**
Peng Chen, Jade Bird Display Limited, Shanghai, China

Session 56: Extreme LCDs *(Liquid Crystal Technology)*
Thursday, May 25, 2023 / 9:00 AM - 10:40 AM / Room 403A
Chair: *Dr Akihiro Mochizuki, I-CORE Technology, LLC*
Co-Chair: *Jenn Jia Su, AU Optronics Corporation*

56.1: *Invited Paper:* **Ultra-High Frame-Rate ADS LCDs**
Zhonghao Huang, BOE Technology Group Co., Ltd., Beijing, China
56.2: *Invited Paper:* **World's First 1Hz Driving Fringe-Field Switching (FFS) LCD for Power Saving**
Seung-Hwa Baek, LG Display, Paju-si, Gyeonggi-do, South Korea
56.3: *Invited Paper:* **Immersive Gaming Display: 49-in. Ultra-Wide (32:9) Curve (R=1,000mm) and High Frame Rate (360Hz)**
Chien-Huang Liao, AUO Corporation, Hsinchu, Taiwan Roc
56.4: **Exploration of Ultra-Large 16K High-Resolution Technology**
Chunyu Li, BOE Technology Group Co., Ltd., Fuzhou, China
56.5: **HTR-ADS: A Novel Ultra-High-Transmittance Display Mode**
Xin Zhou, Hefei BOE Display Technology Co., Ltd., Hefei, China

Session 57: OLED Physics I *(OLEDs)*
Thursday, May 25, 2023 / 9:00 AM - 10:00 AM / Room 403B
Chair: *Denis Kondakov, DuPont*
Co-Chair: *Yuan-Chun Wu, China Star Optoelectronics*

57.1: **Accelerating Next-Generation Display Materials Development with a Smart Digital Chemistry Platform**
Christopher Brown, Schrödinger, Inc., New York, NY US
57.2: **Polarization-Induced Exciton-Polaron Quenching and Efficiency Loss in OLEDs: Role of Stack Architecture and Processing Conditions**
Russell Holmes, University of Minnesota, Minneapolis, MN US
57.3: *Invited Paper:* **Using Digital Twins of OLEDs to Quantify the Impact of Molecular Properties on Device Performance for Rational Design**
Tobias Neumann, Nanomatch GmbH, Karlsruhe, Germany

Session 58: Flexible Displays *(Flexible Displays and e-Paper)*
Thursday, May 25, 2023 / 9:00 AM - 10:00 AM / Room 411
Chair: *Jeong-Ik Lee, ETRI*
Co-Chair: *Joon Young Yang, LG Display Co. Ltd.*

58.1: **Research on 360-Degree Folding AMOLED Display and Optimization Design of Terminal Product by FEA**
Baofeng Sun, BOE, Beijing, China
58.2: **Structurally Anisotropic Backing Sheets for Rollable-Foldable Display Modules**
William Hamburgen, Palo Alto, CA US
58.3: *Late-News Paper:* **Transparent Organic Thin-Film Transistors for Wearable Bioelectronics**
Chen Jiang, Tsinghua University, Beijing, China

Session 59: Improved Light Management *(Display Manufacturing)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 402AB
Chair: *Dr. Andriy Romanyuk, Glas Troesch AG*
Co-Chair: *Joerg Winkler, PLANSEE SE*

59.1: **Low-Reflection Material Design and Application in LCD Panel**
Chang Eun Kim, LG Display, Seoul, South Korea
59.2: **Diffuse Reflected Light Control for Reflective Tablet Display by Combining Use of Anisotropic and Isotropic Light-Diffusing Films**

Hiroki Fukushima, LINTEC Corporation, Warabi, Japan

59.3: **Application of 3D Printing in the Reflector of Glass-Based MiniLED Backlight**
Xing Liu, BOE MLED Technology Co., Ltd., Hefei, China

Session 60: Subsytems for AR/VR/MR *(AR/VR/MR / Emerging Technologies and Applications / Liquid Crystal Technology)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 408A
Chair: *Ian Underwood, University of Edinburgh*
Co-Chair: *Linghui Rao, Meta*

60.1: *Invited Paper:* **Emerging Microdisplay Technologies for AR/VR Applications**
Shin-Tson Wu, University of Central Florida, Orlando, FL US

60.2: *Distinguished Paper:* **High-Efficiency Folded Optics for Near-Eye Displays**
Zhenyi Luo, University of Central Florida, Orlando, FL US

60.3: *Invited Paper:* **Liquid-Crystal Optics for AR/VR/MR Near-Eye Displays**
Yuge Huang, Reality Labs, Meta Platforms, Inc., Redmond, WA US

60.4: *Distinguished Paper:* **Novel Pancake-Based HMD Optics to Improve Light Efficiency**
Naru Usukura, Sharp Display Technology Corporation, Nara, Japan

Session 61: Quantum Dot Displays I *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 408B
Chair: *Yong Seog Kim, Hongik University*
Co-Chair: *Keunchan Oh, Samsung Display*

61.1: *Invited Paper:* **Development of Active-Matrix NanoLED Display with Cadmium-Free QDs Patterned by Photolithography Process in the Atmosphere**
Shota Okamoto, Sharp Display Technology Corporation, Tenri, Japan

61.2: *Distinguished Paper:* **Development of Inkjet Printing Technology for 55-in. 8K AMQLED Display**
Zhuo Chen, BOE Technology Group Co., Ltd., Beijing, China

61.3: **Method for Controlling Surface Energy of Bank Surfaces to Fabricate High-Thickness Inkjet-Printed QD Color Conversion Layer**
Sang youn Lee, Korea Institute of Industrial Technology, Ansan, South Korea

61.4: **All-Inkjet-Printed EL-QD Display with Improved Efficiency and Lifetime**
Jaekook Ha, Samsung Display Company, Yongin, South Korea

Session 62: Non-Visible Spectrum Optical Sensing *(Sensors Integration and Multi-Functional Displays / Interactive Displays and Systems / Active Matrix Devices / Emissive, Micro-LED, and Quantum-Dot Displays)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 406
Chair: *Ying Zheng, Microsoft*

62.1: *Distinguished Paper:* **Ultraviolet Photodetectors and Readout Based on a-IGZO Semiconductor Technology**
Yannick Schellander, University of Stuttgart, Stuttgart, Germany

62.2: **Novel TFT Short-Wave Infrared Sensor Based on Colloidal Quantum-Dot Technology**
Dexi Kong, Beijing BOE Optoelectronics Technology Co., Ltd., Beijing, China

62.3: **Infrared Sensitive Thin-Film Phototransistor Made on Glass Substrate for Active-Matrix Sensing Application**
Yi-Cheng Yuan, National Yang Ming Chiao Tung University, Hsinchu, Taiwan Roc

62.4: *Invited Paper:* **Visible-Blind Infrared Upconversion Devices for Image Sensing**
Shun-Wei Liu, Ming Chi University of Technology, New Taipei City, Taiwan Roc

Session 63: Backlighting Technologies *(Display Systems)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 404
Chair: *Dr Daming Xu, Apple Inc*
Co-Chair: *K Käläntär, Global Optical Solutions*

63.1: **Integrated Ultra-Thin Direct-Lit LCD Backlight Using Glass Components**
Seung-yong Park, Corning Technology Center Korea, Asan, South Korea

63.2: **Nanowire Grid Polarizer and Meta-Surface Textures Integrated with Highly Efficient, Single Polarized Light-Emitting Diode**
Xianqin Meng, BOE Technology Group Co., Ltd., Beijing, China

63.3: **A Small-Aspect-Ratio High-Voltage MiniLED Solution for Glass-Based MLED Backlighting**
Shan Wei Yang, BOE MLED Technology Co., Ltd., Beijing, China

63.4: **A New Single X-Wire Active-Matrix MiniLED Backlight with Motion Blur Reduction for LCD TVs**
Hansai Ji, Xianxin Technology, Beijing, China

Session 64: LC Materials *(Liquid Crystal Technology)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 403A
Chair: *Michael Wittek, Merck KGaA*
Co-Chair: *Koichi Miyachi, JSR Corporation*

64.1: *Invited Paper:* **XtraFast: New LC Mixture Developments for Gaming Applications**
Ki-Sun Kwon, Merck performance Materials Ltd., Pyeongtaek-si, Gyeonggi-do, South Korea

64.2: *Distinguished Paper:* **Novel Cholesteric Liquid-Crystal Films Create Angle-Insensitive Reflective Colors**
Haruka Sano, FUJIFILM Corporation, Kanagawa, Japan

64.3: *Invited Paper:* **Latest Developments in Liquid Crystals for RF Applications**
Matthias Jost, Merck KGaA, Darmstadt, Germany

64.4: *Invited Paper:* **High-Contrast-Ratio ADS LCD Using Negative Liquid-Crystal Material**
Lei Guo, BOE Technology Group Co., Ltd., Beijing, China

Session 65: OLED Physics II *(OLEDs)*
Thursday, May 25, 2023 / 10:40 AM - 11:40 AM / Room 403B

Chair: *Nicholas Thompson, Universal Display Corporation*
Co-Chair: *Jang Hyuk Kwon, Kyung Hee University*

65.1: *Invited Paper:* **Diverse Effects of Defects on the Performance of Organic Light-Emitting Diodes**
Jaesang Lee, Seoul National University, Seoul, South Korea

65.2: *Invited Paper:* **OLEDs with Doublet Emission Using Radicals**
Emrys Evans, Swansea University, Swansea, United Kingdom

65.3: **Kinetic Pathways of Excitons and Polarons Governing Device Degradation in Exciplex-Forming Co-Host-Based Organic Light-Emitting Diodes**
Kyung Hyung Lee, Sungkyunkwan University, Suwon, South Korea

Session 66: Mechanical Strength and Reliability *(Flexible Displays and e-Paper)*
Thursday, May 25, 2023 / 10:40 AM - 12:00 PM / Room 411
Chair: *Arokia Nathan, Darwin College, University of Cambridge*
Co-Chair: *Jennifer Lin, AU Optronics*

66.1: *Invited Paper:* **Flexible Yet Robust Cover Window with Enhanced Bending Stiffness**
Yong-Cheol Jeong, KITECH, Ansan, South Korea

66.2: **Highly Transparent, Colorless Optical Film with Outstanding Mechanical Strength and Folding Reliability Using Mismatched Charge-Transfer Complex Intensification**
Sung Woo Hong, Korea Institute of Industrial Technology, Cheonan, South Korea

66.3: **Effective Foldable AMOLED Structure with Bendability and Impact Resistance**
Mayuko Sakamoto, Sharp Display Technology Corporation, Nara, Japan

66.4: *Late-News Paper:* **Z-Type Multi-Foldable AMOLED for High Durability and Superior Foldability**
Suk Choi, LG Display, Seoul, South Korea

Session 67: Laser Processing *(Display Manufacturing)*
Thursday, May 25, 2023 / 1:30 PM - 2:50 PM / Room 402AB
Chair: *Dr. Chiwoo Kim, APS Holdings*
Co-Chair: *Dr. Sangyeol Kim, Samsung Display*

67.1: **Laser Process for Full-Screen OLED Displays**
Eonseok Oh, Samsung Display, Yongin, South Korea

67.2: **Activation of Doped Silicon Film Using Semiconductor Blue-Light Diode Laser Annealing**
Yang Yingbao, V-Technology Co., Ltd.,, Yokohama, AL Japan

67.3: **Numerical Simulation for GaN-based MicroLED Laser-Induced Forward Transfer**
Oliver Haupt, Coherent LaserSystems GmbH & Co. KG, Göttingen, Germany

67.4: **Uniform Polycrystalline Si Films Obtained via the Fiber-Laser-Based Spot-Beam-Annealing Method**
Jayoung Park, Columbia University, New York, NY US

Session 68: Waveguide Technologies for AR *(AR/VR/MR / Display Systems)*
Thursday, May 25, 2023 / 1:30 PM - 2:30 PM / Room 408A
Chair: *Brian Schowengerdt, Meta*
Co-Chair: *Nikhil Balram, Mojo Vision*

68.1: *Invited Paper:* **A Waveguide-Type Retinal Scan AR Display with Pupil Expansion System**
Akira Yoshikaie, Sony Group Corporation, Kanagawa, Japan

68.2: *Distinguished Paper:* **Design Optimization of Polarization Volume Gratings for Full-Color Waveguide-Based AR Displays**
Yuqiang Ding, University of Central Florida, Orlando, FL US

68.3: **A Multi-Focal Waveguide Near-Eye Display Based on a Tunable Pancharatnam-Berry Phase Lens**
Bo Wang, Shanghai Jiao Tong University, Shanghai, China

Session 69: Quantum Dot Displays II *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Thursday, May 25, 2023 / 1:30 PM - 2:50 PM / Room 408B
Chair: *Ruiqing Ma, Nanosys*
Co-Chair: *Xiao Wei Sun, Southern University of Science and Technology*

69.1: *Invited Paper:* **Improving Efficiency and Brightness in Colloidal Quantum-Dot Light-Emitting Diodes**
Jeonghun Kwak, Seoul National University, Seoul, South Korea

69.2: **Narrow-Band Quantum Rods for Healthy Solid-State Lighting**
Chengbin Kang, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

69.3: *Late-News Paper:* **Enhanced Performance of Quantum Dot Light Emitting Diode via Optimizing PVK and Poly-TPD Mixture Ratio for Hole Transport Layer**
Hyobin Kim, Sungkyunkwan University, Suwon, South Korea

69.4: *Late-News Paper:* **Quantum Dot/Organic Nanohybrids for InP-based QD-LEDs and Their Patterning via Electrohydrodynamic Jet Printing**
Yohan Kim, Fraunhofer Institute for Applied Polymer Research IAP, Potsdam, Germany

Session 70: RF and Antenna on Display Applications *(Sensors Integration and Multi-Functional Displays / Emerging Technologies and Applications)*
Thursday, May 25, 2023 / 1:30 PM - 2:30 PM / Room 406
Chair: *Fang-Cheng Lin, Apple, Inc.*
Co-Chair: *Ian Underwood, University of Edinburgh*

70.1: **Antenna-on-Display (AoD) for Smartphones: Role, Main Requirements, and Promising Evolution**
Huan-Chu Huang, Visionox Technology Inc., Langfang, China

70.2: **Modification of Pixel Design for NFC Antenna Integrated in LCD Panel**
Dawei Feng, Beijing BOE Optoelectronics Technology Co. ,Ltd., Beijing, China

70.3: **Tunability of Reconfigurable Intelligent Surface (RIS) using Liquid Crystal According to Various Bias Voltage Levels**

Byounggwan Kang, Corning Technology Center Korea, Asan, South Korea

Session 71: Display Visual Comfort *(Applied Vision)*
Thursday, May 25, 2023 / 1:30 PM - 2:50 PM / Room 404
Chair: *Takashi Shibata, Tokai University*
Co-Chair: *Chien-Yu Chen, National Taiwan University of Science & Technology*

71.1: **Data-Driven and Optics-Inspired Decomposition of Global Pupil Swim in VR/AR for an Improved Perception Model of Motion Discomfort**
Jerry Jia, Meta Reality Labs, Menlo Park, CA US

71.2: **Effect of Compensation Method on Visually Induced Motion Sickness for Transparent Window Display**
Chia-Hsun Tu, Electronic and Optoelectronic System Research Laboratories, Industrial Technology Research Institute, Hsinchu, Taiwan Roc

71.3: **Effects of Circadian Rhythm, Ambient Illuminance, and Display Content on Comfortable Display Luminance**
Yan Tu, Southeast University, Nanjing, China

71.4: *Late-News Paper:* **Real-Time Visual Fatigue Measurements During Video Watching**
Uijong Ju, Kyung Hee University, Seoul, South Korea

Session 72: Liquid Crystal In-Cell Polarizers *(Liquid Crystal Technology)*
Thursday, May 25, 2023 / 1:30 PM - 2:50 PM / Room 403A
Chair: *Lu Lu, Meta Reality Labs*
Co-Chair: *Matthew Sousa, 3M*

72.1: *Invited Paper:* **Improving the Thermal Stability of Coatable Polarizers Through Materials Optimization**
Youyou Li, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China

72.2: *Invited Paper:* **Color-Conversion Liquid-Crystal Display with an In-Cell Polarizer**
Yiyang Gao, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

72.3: **High-Performance In-Cell Polarizer with Multi-Layer Structure for Liquid-Crystal Displays**
Yuechu Cheng, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

72.4: **High-Light-Efficiency and High-Contrast LCD Using Polarizer Louver**
Ryosuke Saigusa, Sharp Display Technology Corporation, Nara, Japan

Session 73: OLED Optics and Simulations *(OLEDs)*
Thursday, May 25, 2023 / 1:30 PM - 2:50 PM / Room 403B
Chair: *Yasunori Kijima, Huawei Technologies Japan K.K.*
Co-Chair: *Yifan Zhang, Apple, Inc.*

73.1: **Study of MicroOLED Optical Simulation**
wang yingtao, BOE Technology Group Co., Ltd., Beijing, China

73.2: **Optimized WRGB OLED Reflection Properties to Enhance Visual Quality in Gaming Displays**
JungHyun Ham, LG Display, Seoul, South Korea

73.3: **Study on WAD Improvement of a Large AMOLED Panel**
In Young Chung, Samsung Display Co., Ltd., Yongin, South Korea

73.4: **Value and Benefit of Multiscale Material Simulation for OLED R&D: Prediction and Validation of Triplet Emitter Orientation Yielding > 90% In-Plane Transition Dipole Orientation for Ir(ppy)3 Derivatives**
Falk May, Merck Electronics KGaA, Darmstadt, Germany

Session 74: Stretchable/Flexible AMOLEDs *(Flexible Displays and e-Paper)*
Thursday, May 25, 2023 / 1:30 PM - 2:50 PM / Room 411
Chair: *Simon Kang, Apple*
Co-Chair: *Meng-Ting Lee, Huawei Technologies Co.*

74.1: *Invited Paper:* **Highly Stretchable and Shrinkable AMOLED for Free Deformation**
Jong-Ho Hong, Samsung Display, Yongin, South Korea

74.2: *Late-News Paper:* **Top-Emitting Fiber-Based OLEDs with Water Resistance Based on Vacuum Environment for Truly Wearable Displays**
Kyung Cheol Choi, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

74.3: **Inkjet-Printed High-Performance Organic Thin-Film Transistors**
Shinya Oku, Tosoh Corporation, Yokkaichi, Japan

74.4: **Spherical Forming: A Test Method for Stretchability of Flexible OLED from 2D Plane to 3D Surface**
Haoran Wang, BOE Technology Group Co., Ltd., Beijing, China

Session 75: Yield Improvement and Failure Analysis *(Display Manufacturing)*
Thursday, May 25, 2023 / 3:10 PM - 4:30 PM / Room 402AB
Chair: *Neetu Chopra, Apple Inc*
Co-Chair: *Bradley Bowden, Corning Research and Development Corporation*

75.1: **Real-Time Doping Management of High-Performance Organic Electroluminescence Displays**
Yong-Woon Lim, Samsung Display, Asan-city, South Korea

75.2: **Failure Mechanisms and Optimum Methods for Through-Glass Via**
Qichang An, Beijing BOE Sensor Technology Company, Ltd., Hong Kong, China

75.3: **Investigation of Influence and Improvement of Dry Etch on Glass Strength**
Zheng Wei Zhu, HeFei BOE Photoelectric Technology Co., Ltd., Hefei, China

75.4: **Research on Surface Protective Layer of Cu Pad to Improve Welding Capability for MLED**
Haifeng Hu, HeFei Ruisheng Optoelectronics Technology Co., Hefei, China

Session 76: Holography *(AR/VR/MR / Display Systems)*
Thursday, May 25, 2023 / 3:10 PM - 4:30 PM / Room 408A
Chair: *Yifan (Evan) Peng, HKU/Stanford*

Co-Chair: *David Eccles*

76.1: *Invited Paper:* **A Magneto-Optical Spatial Light Modulator with Narrow Pixel Pitch for Holography Application**
Ken-ichi Aoshima, Japan Broadcasting Corp., Tokyo, Japan

76.2: **Scalable Real-Time Holography Processor Architecture**
Wonok Kwon, Electronics and Telecommunications Research Institute, Daejeon, South Korea

76.3: **A Modified, Unsupervised Vision Transformer Network for High-Fidelity Computer-Generated Holography**
Yan Li, Shanghai Jiao Tong University, Shanghai, China

76.4: **Analytical Computer-Generated Holography for Quadrilateral Meshes**
Zong Qin, Sun Yat-sen University, Guangzhou, China

Session 77: Quantum Dot Color Conversion *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Thursday, May 25, 2023 / 3:10 PM - 4:10 PM / Room 408B
Chair: *John Van Derlofske, 3M*
Co-Chair: *Seth Coe-Sullivan, NS Nanotech*

77.1: *Invited Paper:* **Colloidal Quantum-Dot-Based Color-Conversion Layer for MicroLED Arrays**
Chien-Chung Lin, National Taiwan University, Taipei, Taiwan Roc

77.2: **Quantum-Dot Color Conversion Achieved by A Novel Structure of Hollow Cylindrical Blue MicroLED**
Wenjun Huang, Southern University of Science and Technology, Shenzhen, China

77.3: *Invited Paper:* **Quantum-Dot Color Conversion In Display Applications: In Pursuit of the Holy Grail**
Igor Nakonechnyi, QustomDot BV, Zwijnaarde, Belgium

Session 78: Piezo Transducers and Applications *(Sensors Integration and Multi-Functional Displays / Interactive Displays and Systems)*
Thursday, May 25, 2023 / 3:10 PM - 4:10 PM / Room 406
Chair: *Jongseo Lee, Google*
Co-Chair: *Ying Zheng, Microsoft*

78.1: *Invited Paper:* **Tactile Scanner as Neuromorphic Skin for Computer Haptics**
Kai Wang, Sun Yat-sen University, Guangzhou, China

78.2: **A Flat-Panel-Display-Compatible Ultrasound Platform**
Epimitheas Georgitzikis, imec, Leuven, Belgium

78.3: **Piezoresistive Area Sensor with Polymer and Laser-Annealed CNT Mixture on Oxide-TFT Backplane**
Jin Jang, Kyunghee University, Seoul, South Korea

Session 79: HDR + Color *(Applied Vision)*
Thursday, May 25, 2023 / 3:10 PM - 4:10 PM / Room 404
Chair: *Youngshin Kwak, Ulsan National Institute of Science and Technology*
Co-Chair: *Jang Jin Yoo, LG Display*

79.1: **Display White According to Surround Ratio**
Seonyoung Yoon, Ulsan National Institute of Science and Technology, Ulsan, South Korea

79.2: **Comparison of HDR MicroLED Display and High-Resolution (8K) Impact on Image Quality**
YungKyung Park, Ewha Womans University, Seoul, South Korea

79.3: **Image-Quality Change by White-Boost Function of WRGB OLED Display**
Woojae Jung, Ulsan National Institute of Science, Ulsan, South Korea

Session 80: Liquid Crystal Lenses and Beamforming *(Liquid Crystal Technology)*
Thursday, May 25, 2023 / 3:10 PM - 4:30 PM / Room 403A
Chair: *Xiao-Yang Huang, Ebulent Technologies Corp*
Co-Chair: *Philip Bos, Kent State University*

80.1: *Invited Paper:* **Tunable Liquid-Crystal Lens for Dynamic Rx Correction and Accommodation-Convergence Conflict Correction in AR/VR/3D HMDs**
Amit Bhowmick, Kent State University, Kent, OH US

80.2: **Liquid-Crystal Surface-Relief Diffractive Lens for Presbyopia**
Guo Lin Hu, Liqxtal Technology Inc., Tainan, Taiwan Roc

80.3: **Novel Switchable Half-Wave Retarder with In-Cell Pancharatnam Berry Lens**
Daisuke Minami, Sharp Display Technology Corporation, Nara, Japan

80.4: *Invited Paper:* **Optical Metasurface Beam Steering for Solid-State Lidar 2.0**
Gleb Akselrod, Lumotive, Redmond, WA US

Session 88: e-Paper Displays *(Flexible Displays and e-Paper)*
Thursday, May 25, 2023 / 3:10 PM - 4:30 PM / Room 403B
Chair: *Norihisa Kobayashi, Chiba University*
Co-Chair: *Chan-Il Park, LG Display Co. Ltd.*

88.1: **E-Book with Animation-Playing Capability Based on Liquid-Crystal Display Technology**
Pengcheng Liu, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

88.2: **Highly Saturated Color Electrophoretic Display**
HongMei Zang, E Ink California, LLC., Fremont, CA US

88.3: *Late-News Paper:* **IGZO Backplane for Full-Color Electrophoretic Display**
Fumiki Nakano, Sharp Display Technology Corporation, Nara, Japan

88.4: *Late-News Paper:* **Electrochromic Devices with Metallo-Supramolecular Polymers**
Masayoshi Higuchi, National Institute for Materials Science, Tsukuba, Japan

Session 81: Stretchable/Flexible Micro LEDs and AMOLEDs *(Flexible Displays and e-Paper / Active Matrix Devices / OLEDs)*
Thursday, May 25, 2023 / 3:10 PM - 4:30 PM / Room 411
Chair: *Dr. Joon Young Yang, LG Display Co. Ltd*
Co-Chair: *Yong Taek Hong, Seoul National University*

- **81.1:** *Invited Paper:* **Highly Stretchable Backplane Technologies for Deformable Display Applications**
  Masashi Miyakawa, NHK Science & Technology Research Laboratories, Tokyo, Japan
- **81.2:** *Invited Paper:* **Highly Stretchable Color MicroLED Meta-Display Without Image Distortion**
  Jae-Hyun Kim, Korea Institute of Machinery and Materials (KIMM), Daejeon, South Korea
- **81.3:** **Design of Narrow-Border Flexible OLED Display Based on Simulation Analysis and Optimization**
  Xiaofei Luo, BOE Technology Group Co., Ltd., Beijing, China
- **81.4:** **High-Performance Coplanar Polycrystalline InGaO TFTs on Polyimide Substrate for Foldable AMOLED Display**
  Jin Jang, Kyunghee University, Seoul, South Korea

Session 82: Display Measurement For AR/VR/MR *(AR/VR/MR / Display Measurement)*
Friday, May 26, 2023 / 9:00 AM - 10:20 AM / Room 408A
Chair: *Thomas Fiske, Consultant*
Co-Chair: *Ingo Rotscholl, TechnoTeam Bildverarbeitung GmbH*

- **82.1:** *Distinguished Paper:* **Radially Variant Contrast in Virtual-Reality Headsets**
  Chumin Zhao, Food and Drug Administration, Silver Spring, MD US
- **82.2:** **Binocular Vergence and Virtual Focus: A Simple Method for Evaluating the Vergence-Accommodation Conflict in Near-Eye Displays**
  Bruce Pixton, U.S. Army C5ISR Center Research & Technology Integration Directorate, Fort Belvoir, VA US
- **82.3:** **Rapid AR/VR Device Eye-Box Measurement Using a Wide-FOV Lens**
  Thomas Kerst, OptoFidelity, Tampere, Finland
- **82.4:** **Color Characterization of Virtual-Reality Devices Using Professional- and Consumer-Grade Instruments**
  Wei-Chung Cheng, US Food and Drug Administration, Silver Spring, MD US

Session 83: Quantum Dot LED Efficiency *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Friday, May 26, 2023 / 9:00 AM - 10:20 AM / Room 408B
Chair: *Xiao Wei Sun, Southern University of Science and Technology*
Co-Chair: *Jonathan Steckel, ST Microelectronics*

- **83.1:** **Improved Performance of EL-QD Display Through Surface-Modified QDs and Inorganic Materials Nano Ink**
  Yun Ku Jung, Samsung Display Company, Yongin, South Korea
- **83.2:** **Inorganic Ion Treatment of Cd-Free Quantum Dots and Applications to QD-LED with Improved Characteristics**
  Keisuke Kitano, Sharp Corporation, Nara, Japan
- **83.3:** **High External Quantum Efficiency of 16.8% Achieved in Quantum-Rod Light-Emitting Diodes**
  Kumar Mallem, The Hong Kong University of Science and Technology, Hong Kong, China
- **83.4:** **High-Performance Inverted Green and Red InP Quantum-Dot Light-Emitting Diodes with Robust ZnS Electron Transport Interlayer**
  Truong Thi Thuy, Kyung Hee University, Dongdaemun, South Korea

Session 84: Liquid Crystal Smart Windows *(Liquid Crystal Technology)*
Friday, May 26, 2023 / 9:00 AM - 10:20 AM / Room 403A
Chair: *Mr Gang Xu, Jingce Electronics, USA*
Co-Chair: *Michael Wittek, Merck KGaA*

- **84.1:** **Optical Performance and Driving Method of HTN-Mode Dye-Doped Liquid-Crystal Smart Windows**
  Sikai Zhang, Beijing BOE Sensor Technology Co. LTD., Beijing, China
- **84.2:** **Flexible Dye Liquid-Crystal Dimming Film for Smart Window**
  Chen Juan, Beijing BOE Sensor Technology Co. Ltd., Beijing, China
- **84.3:** **A Novel 2D Diffractive Liquid-Crystal Smart Window Using Single-Sided Engineered Electrode Structure**
  Jaewon Huh, Corning Technology Center Korea, Asan, South Korea
- **84.4:** **Switchable Privacy LCD Suitable for the Automotive Super Long-Size Screen**
  Kiyoshi Minoura, Sharp Display Technology Corporation, Tenri, Japan

Session 89: Enabling Technologies for AR/VR/MR *(AR/VR/MR / Emerging Technologies and Applications / Emissive, Micro-LED, and Quantum-Dot Displays)*
Friday, May 26, 2023 / 9:00 AM - 10:00 AM / Room 403B
Chair: *Adi Abileah, Adi - Displays Consulting LLC*
Co-Chair: *John-Ho Hong, Samsung*

- **89.1:** *Late-News Paper:* **Usability of Glove-Based Handling Devices in Virtual Training: Use Case in Automotive Sector**
  Sara Buonocore, University of Naples Federico II, Napoli, Italy
- **89.2:** *Late-News Paper:* **Strength-Optimized Laser Cutting of High Refractive Index Wafers for Augmented Reality**
  René Liebers, 3D-Micromac AG, Chemnitz, Germany
- **89.3:** *Late-News Paper:* **High-Efficiency and Single-Polarized Light-Emitting Diode with Nano-Wire Grid Polarizer and Meta-Surface Textures**
  Xianqin Meng, BOE Technology Group Co., Ltd., Beijing, China

Session 85: Display Manufacturing for AR/VR/MR *(AR/VR/MR / Display Manufacturing)*
Friday, May 26, 2023 / 10:40 AM - 12:00 PM / Room 408A
Chair: *Yung-Yu Hsu, Meta*
Co-Chair: *Jinsoo Jeong, KETI*

- **85.1:** **Ultra-High-Resolution Corrugated Silicon-Nitride Masks for Direct Patterning of OLED Microdisplays**
  Shou-Cheng Dong, Hong Kong University of Science and Technology, Kowloon, Hong Kong

85.2: **2,117ppi VR LCD with Ultra-High Aperture Opening Ratio**
Tianmin Zhou, BOE Technology Group Co., Ltd., Beijing, China

85.3: **High-Transmittance, High-Resolution Color Filters with Tailored Structures for Microdisplays**
Byung Gwan Hyun, LG Display Co., Ltd., Seoul, South Korea

85.4: *Invited Paper:* **Plasma-Polymerized HMDSO for Thin Film Encapsulation of Micro-OLED**
Ethan Wu, AKT Display, Applied Materials Inc., Santa Clara, CA US

Session 86: Quantum Dot Perovskite *(Emissive, Micro-LED, and Quantum-Dot Displays)*
Friday, May 26, 2023 / 10:40 AM - 12:10 PM / Room 408B
Chair: *Dr. Zhuo Chen, BOE Technology Group Co., Ltd.*
Co-Chair: *Seth Coe-Sullivan, NS Nanotech*

86.1: **Control of Emission Wavelength on Perovskite Quantum Dot Based on Band Engineering**
Ryota Sato, Yamagata University, Yamagata, Japan

86.2: **Quantum-Confined CsPbBr3 Perovskite Quantum Dots with Pure-Blue Emission via Ligand-Assisted Reprecipitation**
Naoaki Oshita, Yamagata University, Yamagata, Japan

86.3: **Why Perovskite Quantum Dots Will Be Key for LCD-, OLED- and microLED-Based Displays**
Norman Luechinger, Avantama Ltd., Stafa, Switzerland

86.4: **High-Performance Perovskite Nanocrystals and Photoresists for In-Pixel Color Conversion**
Bernard Wenger, Helio Display Materials, Headington, United Kingdom

86.5: *Late-News Paper:* **Green- and Red-Emitting Perovskite Nanocrystal Inks for Color Conversion Display Technologies**
Yoshihiro Ohashi, Canon Inc., Tokyo, Japan

Session 87: Sunlight Readable LCDs *(Liquid Crystal Technology)*
Friday, May 26, 2023 / 10:40 AM - 12:20 PM / Room 403A
Chair: *Shin Tson Wu, University Of Central Florida*
Co-Chair: *Takahiro Ishinabe, Tohoku University*

87.1: *Invited Paper:* **A Novel Reflective 90-in. TFT LCD with UV2A Technology**
Hiroyuki Hakoi, Sharp Display Technology Corporation, Nara, Japan

87.2: **New Reflective Liquid-Crystal Display with an Advanced Polarizer Film**
Jiaxing Wang, Beijing BOE Optoelectronics Technology Co. LTD., Beijing, China

87.3: *Invited Paper:* **High-Ambient-Contrast LCDs with Advanced Reflectionless Technology**
Jenn Jia Su, AUO Corporation, Hsinchu, Taiwan Roc

87.4: *Invited Paper:* **Specular-Free Surface for Excellent Image Quality in a Bright Environment**
Young Wook Kim, LG Display, Paju, South Korea

87.5: **AM MiniLED Based on LTPS-TFT Backplane with over 5,000 Dimming Zones and High Driving Bits**
Yong Yang, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China

Poster Session
Thursday, May 25, 2023 / 5:00 PM - 8:00 PM / Hall G

Active-Matrix Devices

P.1: **Study on the Mechanism of Fluorination-Enhanced Thermal Stability of IGZO Thin-Film Transistors Based on a Kinetic Model of Donor Defects**
Yuqi Wang, The Hong Kong University of Science and Technology, Kowloon, Hong Kong

P.2: **Narrow-Bezel Gate Driver Generating Positive Pulse for AMOLED Display Using LTPO-TFT Technology**
Jin Jang, Kyunghee University, Seoul, South Korea

P.3: **Conductive Indium-Tin-Zinc Oxide Formed Using an Oxygen Plasma Treatment Through a Silicon-Oxide Cover Layer**
Man Wong, The Hong Kong University of Science and Technology, Kowloon, Hong Kong

P.4: **PAM and PWM Combined Oxide-TFT MiniLED Pixel Circuit Working at Low Voltage**
Zhibo Shao, Peking University, Shenzhen, China

P.5: **Improved Split C–V Technique for Effective Mobility Extraction in Self-Aligned Top-Gate Amorphous InGaZnO TFTs with Short Channel**
Yuqing Zhang, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.6: **Study of Source-Gated Transistor (SGT) for Output Current Enhancement Through TCAD Simulation**
Pongsakorn Sihapitak, Nara Institute of Science and Technology, Ikoma, Japan

P.7: **Enhanced Visible Light Response of Amorphous InZnO Thin-Film Transistors by Hydrogen Doping via Al2O3/SiO2 Gate Dielectric**
Meng Zhang, Shenzhen University, Shenzhen, China

P.8: **Synthesis of Superior-Performance InGaZnO Based on Ideal Reaction of Plasma-Enhanced Atomic Layer Deposition**
Jin-Seong Park, Hanyang University, Seoul, South Korea

P.9: **LTPO-TFT-Based PWM Pixel Circuit for AM MicroLED Display with Falling-Time <10us**
Yunfei Liu, Peking University, Shenzhen, China

P.10: **Novel OLED Compensation TFT Circuit for Enhanced Outside Visibility**
Jaegang Jo, LG Display Co., Seoul, South Korea

P.11: **Novel AMOLED Pixel Circuit Using Double-Gate LTPO TFTs for Variable Refresh Rate with Low Power Consumption**
Wonjun Lee, Samsung Display, Yongin, South Korea

P.12: **Transient Drain Current Characteristics of Poly-Silicon TFTs on Plastic Substrates**
Dong Li, BOE Technology Group Co., Ltd., Beijing, China

P.153: *Late-News Poster:* **Temporal Photo-Response Analysis of Inkjet-Printed Transparent Single-Walled Carbon Nanotube Thin-Film Transistors**
Yongtaek Hong, Seoul National University, Seoul, South Korea

P.154: *Late-News Poster:* **High-Performance Indium-Gallium-Oxide Thin-Film-Transistors via Plasma-Enhanced Atomic-Layer Deposition**
Jae Kyeong Jeong, Hanyang University, Seoul, South Korea

P.155: *Late-News Poster:* **Low-Voltage Operation a-IGZO Oxide Gate Insulator Thin-Film Transistor Using Thermal Metal**
Eun Seong Yu, Hoseo University, Asan, South Korea

Applied Vision

P.13: **Picture Quality of In-Plane Switching Liquid-Crystal Displays with Deep Black**

Hyeok-Jun Kwon, LG Display, Seoul, South Korea

P.14: **Image Quality Study of Super-Retina-Resolution AMOLED Display Device**
Jianpeng Wu, Chengdu BOE Optoelectronic Technology Co., Ltd., Chengdu, China

P.141: ***Late-News Poster:*** **Chroma Remapping Power-Saving Technique for OLEDs**
Jieun Jang, Samsung Display, Yongin, South Korea

P.142: ***Late-News Poster:*** **Research on a Gamut-Mapping Color Enhancement Algorithm Based on User Experience**
Dong Zhai, Beijing Xiaomi Mobile Software Co., Ltd., Beijing, China

P.168: **Threshold Estimation Experiment of Color Difference Between On-Axis and Off-Axis Using Various Complex Images**
Hyeyoung Ha, Samsung Display, Yongin, South Korea

Automotive/Vehicular Displays and HMI Technologies

P.15: **Vehicle High-Response Intelligent Heating Control Electronic Side Mirror**
Pengtao Li, Beijing BOE Display Technology Co., Ltd., Beijing, China

P.16: **WITHDRAWN**

P.17: **All-Weather Robust Image-Quality Enhancement Based on Image Feature Fusion and Multiscale Degradation Profile**
Seungchul Ryu, Faurecia Irystec Inc., Montreal, PQ Canada

Display Electronics

P.18: **Development of Oxide UHD LCD Panel with High Mobility for Notebook PC**
Jiayu He, BOE Technology Group Co., Ltd., Beijing, China

P.19: **Design and Application of MIP Special Driving System for Low-Power Glass-Based Products**
Jing Zhao, Beijing BOE Optoelectronics Technology Co., Ltd., Beijing, China

P.20: **Hardware Super-Resolution LCD Driving Technology**
Yinlong Zhang, Beijing BOE Display Technology Co., Ltd., Beijing, China

P.21: **Novel Circuit-Driving Solutions for Eliminating TFT-LCD Image-Sticking Flicker Issue**
Xiuqin Zhang, Chengdu BOE Display Sci-Tech Co., Ltd., Chengdu, China

P.22: **Scan Driver Circuit with Multiple Outputs Employing Low-Temperature Polysilicon and Oxide TFTs for Mobile Displays**
Ye-Rim Jeong, Sungkyunkwan University, Suwon, South Korea

P.23: **MicroLED Pixel Circuit Based on IGZO TFTs Using a Stepwise Control Signal**
Hwarim Im, Sungkyunkwan University, Suwon, South Korea

P.24: **OLED Full Display with Camera Technology with High Image Quality**
Ben Lian Wang, Chengdu BOE Optoelectronics Technology Co., Ltd., Chengdu, China

P.25: **An AMOLED Pixel Circuit Compensating for Sub-Threshold Swing and Threshold Voltage Variation Based on Double-Gate a-IGZO TFTs**
Hyunwoo Kim, Soongsil University, Seoul, South Korea

P.26: **IGZO TFT-Based PWM MicroLED Pixel Circuit with Progressive Emission**
Eun Kyo Jung, Sungkyunkwan University, Suwon, South Korea

Display Manufacturing

P.27: **UV-Induced Adhesion Increasable PSAs for Display Assembly**
Juyoung Yook, Dow Chemical Silicones Korea Co. Ltd., Jincheon, South Korea

P.28: **Photocurable and Inkjet-Printable Optically Clear Silicone-Acrylic Hybrid Resin**
Minkyu Kyeong, Dow Chemical Silicones Korea Co. Ltd., Jincheon, South Korea

P.29: **Noise Reduction and Defect Detection Algorithm in White-Light Scanning Interferometry for Display Panel Inspection**
Sanghoon Cho, Samsung Display, Suwon, South Korea

P.30: **Analysis of Deterioration Mechanism of Sealing Force in LTPS-LCD 7-Mask Technology**
Chao Deng, Xiamen Tianma Microelectronics Co., Ltd., Xiamen, China

P.31: **Improvement of White High-Reflectivity Ink Process**
Bing Zhang, BOE MLED Co., Ltd, Hefei, China

P.32: **Stress Analysis of LED Welding Pin on Glass-Based MLED Curved Light Board**
Jiwei Sun, BOE MLED Technology Co., Ltd., Beijing, China

P.33: **Research on the Application Direction of MiniLED Glass-Based Laser Technology**
JingPing Zhao, BOE Technology Group Co., Ltd., Beijing, China

P.34: **Investigation of Cutting Schemes for Glass with a SiNxSiOx Film Based on Hybrid OLED**
Fuwei Yuan, Mianyang BOE Optoelectronics Technology Co., Ltd., Mianyang, China

P.35: **Photo-Radically Curable Negative-Tone Patternable Silicone**
Takuya Ogawa, Dow Toray Co. Ltd, Ichihara, Japan

P.36: **Impact of Packaging Film on the Uniformity of MiniLED Displays**
Liang-Liang Jin, BOE MLED Technology Co., Ltd., Beijing, China

P.37: **Design and Research of Thermal Soaking Scheme for COG Display Module**
Shaofei Guo, BOE MLED Technology Co., Ltd., Beijing, China

P.38: **Display Industry Industrial Robot Failure Warning System**
Wankun Yang, Hefei BOE Display Technology Co., Ltd., Hefei, China

P.39: **New Method to Solve Low-Gray Mura by Optimizing Oven Structure**
Zhong Lu, Chengdu BOE Display Technology Co., Ltd., Chengdu, China

P.40: **TFT-LCD a-Si Wet-Etch Technology**
Zhao-jian Wu, Wuhan BOE Optoelectronics Technology Co., Ltd., Wuhan, China

P.41: **Experimental Study of Intrinsic Melting Mechanism and Behavior During Laser Annealing of Si Films**
Nikita Lisenko, Columbia University, New York, NY US

P.148: **Inspection of Excimer-Laser Annealed Thin Silicon Films Across the Length Scale of Interest**
Paul van der Wilt, Coherent LaserSystems GmbH & Co. KG, Goettingen, Germany

P.149: ***Late-News Poster:*** **Effective Approach to Failure Analysis of IC-Embedded OLED Display Device**
Hoseok Song, Samsung Display Co., Yongin, South Korea

Display Measurement

P.42: **A Polynomial Regression-Based Method for Color Characterization of Mobile AMOLED Displays**
Yung-Cheng Tsai, Novatek Microelectronics Corporation, Hsinchu, Taiwan Roc

P.43: **Development of 3D Crosstalk Classification Model Using Deep Learning**
Young-Sang Ha, Samsung Display, Yongin, South Korea

P.44: **Real Content-Based Method for HDR Tone Curve Characterization**
Thibault Cabana, DXOMARK, Boulogne-Billancourt, France

P.45: **Evaluation Method of Moving Picture Response Time for Organic Light-Emitting Diode Motion Blur**
Ruidan Kang, Xiaomi Inc., Beijing, China

P.46: **RGB Pixel Aging in OLED Displays**
Kevin Kam, Columbia University, New York, NY US

P.47: **A Measurement Method for the Effect of Lateral Current Leakage on OLED Panels**
Gang Xu, Jince Electronics, USA, San Jose, CA US

P.48: **Selection of Contrast Ratio Based on Human Eye's Perception in Actual Use Case**
Bowen Li, Beijing BOE Display Technology Co., Beijing, China

P.49: **Picture Quality Evaluation Method for an LCD with Local Dimming Technology**
Chaoping Li, TCL China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

P.150: **A New Multitasking Demura Algorithm for Display Defect Compensation**
Ling Xu, TCL China Star Optoelectronics Technology Corporation, Shenzhen, China

P.158: *Late-News Poster:* **Dynamic Crosstalk Evaluation Method for Eye-Tracking-Based Autostereoscopic Display Using a Virtual Image**
Satoshi Mitani, Sony Corporation, Atsugi, Japan

P.169: *Late-News Poster:* **How Display Size and Response Time Affect Flicker Perception Compared to Flicker Indices**
Hyungsuk Hwang, Samsung Display, Yongin, South Korea

Display Systems

P.50: **Virtual-Reality System Based on Field-Sequence Display**
Jianwen Zhu, BOE Technology Group Co., LTD., Beijing, China

P.51: **A Novel Backlight Unit for LCD Used in Virtual Reality**
Wang Qiu Li, BOE, Beijing, China

P.52: **Higher Brightness MiniLED Displays: Optimizing Collimation and Uniformity in a Thinner Form Factor**
Kenneth Walker, BrightView Technologies, Durham, NC US

P.53: **Real-Time Method for Preventing AM MiniLED COG Image Sticking Based on Display Content History and Heat Diffusion**
Yanhong Wu, BOE Technology Group Co., Ltd., Beijing, China

P.54: **Research On DGS Character of Glass-Based MiniLED BLU**
Jiawei Xu, BOE Technology Group Co., Ltd., Hefei, China

P.55: **Patterned Glass Diffuser (PGD) for Luminance Increase and with Glass Circuit Board in a MiniLED Backlight**
Xiang-Dong Mi, Corning Incorporated, Corning, NY US

P.56: **Advanced High-Dynamic-Range Display Technology with Power Saving Algorithm of Adaptive Real-Time Controllable Backlight**
Lin Cheng, DBU, Suzhou ESWIN Computing Technology Co., Ltd., Suzhou, China

P.57: **Spatial Display System Based on Cylindrical Lens Technology**
Xitong Ma, BOE Technology Group Co., Ltd., Beijing, China

P.58: **Development of 2D-3D Switchable Autostereoscopic OLED Display with High Resolution and Low Crosstalk**
Yanliu Sun, BOE Technology Center, Beijing, China

P.59: **A Pupil Distance-Based Monocular Camera Eye-Tracking Algorithm for Naked-Eye 3D Display**
Xiaojun Tang, BOE Technology Group Co., Ltd., Beijing, China

P.145: *Late-News Poster:* **Integral Imaging 3D Display Based on Top-Hat Diffusing Screen**
Qiong-Hua Wang, Beihang University, Beijing, China

P.146: *Late-News Poster:* **Real-Time Facial Communication Systems Using Light-Field Displays with Point-Cloud Representation**
Koichiro Fukano, Tokyo University of Agriculture and Technology, Koganei, Japan

P.151: *Late-News Poster:* **1.5-in. 3,207ppi Foveated Display with OLED/OS/Si Structure Capable of 32-Division Control of Resolution and Frame Rate**
Yuki Tamatsukuri, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

P.174: **The Causes and Improvement of Waterfall Mura in Mini/MicroLED Displays**
Ying Xiao Guo, TCL China Star Optoelectronics, Shenzhen, China

Emerging Technologies and Applications

P.60: **Dual Ferroelectric Liquid-Crystal Polarization Converter for Fast (100 kHz) and Bi-Stable Beam Steering Based on Pancharatnam-Berry Devices**
Zhi-Bo Sun, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.61: *Distinguished Poster:* **Research on Parameter Extraction of Thin-Film Transistors Based on Swarm Intelligence**
Peng Liu, BOE Technology Group Co., Ltd., Beijing, China

P.62: **Broadband In-Cell Polarizer Using Solution-Processed Broadband Quarter-Wave Plate and Photoaligned Polarizer**
Zheng-Nan Yuan, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.138: **Broadband Light Shutter Using Electrophoresis of Carbon Black Particles**
Seung Hee Lee, Jeonbuk National University, Jeonju, South Korea

Emissive, Micro-LED, and Quantum-Dot Displays

P.63: **Simple Pixel Circuit with External Compensation for High-ppi Active-Matrix MicroLED Displays Using PWM Method**
Chia-Che Hung, National Taiwan University, Taipei, Taiwan Roc

P.64: **Investigation of Fabrication Technologies of GaN-Based MicroLED Devices**
Xiangyu Miao, Southern University of Science and Technology, Shenzhen, China

P.65: **Strategic Realization of the Highest Possible Pixel Density for Quantum-Dot Color Converter with Optimized Performance**
Ray-Kuang Chiang, Taiwan Nanocrystals Corp. Ltd., Tainan, Taiwan Roc

P.66: **Simulation and Optimization of In-Situ Integration Ultraviolet HEMT-LED Enabled by P-GaN Selective Epitaxy Growth**
Zhaojun Liu, Southern University of Science and Technology, Shenzhen, China

P.67: **Photoelectric Performance in GaN-Based Green MicroLEDs**
Mengyuan Zhanghu, Southern University of Science and Technology, Shenzhen, China

P.68: **High-Luminance Blue MicroLEDs in 4 × 4 and 8 × 8 Arrays**
Hang Yang, Southern University of Science and Technology, Shenzhen, China

P.69: **Ligand Treatment on Quantum Dots to Obtain High Stable Infrared Light-Emitting Diode**
Minh-Son Hoang, National Tsing Hua University, Hsinchu, Taiwan Roc

P.70: **Red-and-Green Perovskite Quantum-Dot Paper for Full-Color Microdisplay**

Yujia Sheng, Southern University of Science and Technology, Shenzhen, China

P.71: **Inkjet-Printed Quantum-Dot Photoresist Light-Converting Layer and Photolithography Pixel Patterning for Microdisplays**
Tyng-Woei Jang, National Tsing Hua University, Hsinchu, Taiwan Roc

P.72: **Study on Issues in Glass-Based ENIG Products of MiniLED**
Qiqi Zhou, BOE MLED Technology Co., Ltd., Beijing, China

P.73: **Breakthrough for Production Test Cost Reduction on MicroLED Device with High Parallel Single Insertion of Electric-Luminescence and Electrical Tests**
Hiroshi Kaga, Advantest Corporation, Tokyo, Japan

P.74: **A Novel Color-Converted Full-Color MiniLED Display**
Wenjia Sun, BOE MLED Technology Co., Ltd., Beijing, China

P.160: *Late-News Poster:* **One-Pot Synthesis Method for Monodisperse and Stable In(Zn)P Quantum Dots**
Kangtaek Lee, Yonsei University, Seoul, South Korea

P.161: *Late-News Poster:* **Non-Toxic PEIE Dual Interfacial Layers for Efficiency Improvement in Quantum-Dot Light-Emitting Diodes**
Gun Kim, Sungkyunkwan University, Suwon, South Korea

P.162: *Late-News Poster:* **Analysis of Various Solvents for Hole-Transport Layer in Tandem Structure Quantum-Dot Light-Emitting Diode**
Jae-In Yoo, Sungkyunkwan University, Suwon, South Korea

P.163: *Late-News Poster:* **Demonstration of Color Tunable µLED Passive Matrix**
Matthew Hartensveld, Innovation Semiconductor Inc., Rochester, NY US

P.164: **WITHDRAWN**

P.165: **Implementation of Three-Color White Electroluminescence Emission Using Perovskite Nanocrystals and Organic Emitters**
Hyukmin Kwon, Kyung Hee University, Yongin, South Korea

Flexible Displays and e-Paper

P.75: **Development of Medium and Large Active-Bistable-State Dual- and Four-Color Cholesteric LCDs**
Hui Wang, Hefei BOE Optoelectronics Technology Co., Ltd., Hefei, China

P.76: **Improvement of Low-Temperature Folding Performance of AMOLED Modules**
Zhao Li, BOE Technology Group Co., Ltd., Beijing, China

P.77: **Island-Bridge Stretchable Green Organic Light-Emitting Diodes with Empty Space Pixels**
Kyung Cheol Choi, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

P.78: **An Adhesion-Reinforced Structure for TFE of Flexible OLED Display**
Tao Wang, BOE Technology Group Co., Ltd., Beijing, China

P.136: **Simulation Study on the Lifetime of Rollable AMOLED Modules**
Chunxiao Gu, Visionox, Kunshan, China

P.139: **WITHDRAWN**

P.143: **Development of High-Strength Flexible Panel Capable of High Resolution**
Youn Joon Kim, Samsung Display, Youngin, South Korea

P.144: *Late-News Poster:* **Evaluation for Flexible Substrates According to the Number of Rollings**
Seung Gyun Kim, Hoseo University, Asan, South Korea

P.172: *Late-News Poster:* **Highly Stretchable OLED Panel with Sensors Embedded for Wearable Healthcare Applications**
Jun-Kyul Song, Samsung Display, Yongin, South Korea

Interactive Displays and Systems

P.79: **Prediction Model for Active Pen Coordinate Based on Machine Learning Algorithm**
Kyounghun Been, Samsung Display, Yongin, South Korea

P.80: **Process Optimization of High-Hardness Polarizer for Touch Display**
Ma Kun, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China

P.81: **LCD In-Cell Self-Capacitive Sensor Using 3D Detection Driving Method for Proximity 50 mm**
Yi-Ying Lin, Novatek Microelectronics Corporation, Hsinchu, Taiwan Roc

P.82: **Optimizing Angular Response and Color Estimation for LCD In-Cell Ambient Light Sensor**
Pei-Li Sun, National Taiwan University of Science and Technology, Taipei, Taiwan Roc

P.83: **Optimizing Water-Proofing Algorithm with Machine Learning for Wearable OLED In-Cell Touch Panel**
Jun-Jie Huang, Novatek Microelectronics Corporation, Zhubei, Taiwan Roc

P.84: **Ultrasonic Haptic Display System for Rendering Virtual Surface Textures**
Saewon Kang, LG Display, Seoul, South Korea

P.140: **High-Bandwidth Glass-Based Capacitive Micromachined Ultrasound Transducers (G-CMUTs) for Medical Imaging Applications**
Pin-Hsiang Chiu, AUO Corporation, Hsinchu, Taiwan Roc

Liquid Crystal Technology

P.85: *Distinguished Poster:* **Overcoming the Low-Temperature Operation of LCDs**
Hao Li, BOE Technology Group Co., Ltd., Chengdu, China

P.86: **Ultra-Thin High Dichroic Ratio Azo Dye Thin-Film Polarizer by Photoalignment and Photostability Enhancement**
Yiyang Gao, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.87: **New Liquid-Crystal Materials for Outdoor Displays**
Xiao Liu, TCL China Star Optoelectronics Technology Co., Ltd, Shenzhen, China

P.88: **Study on the Correlation of Flicker Shift and PI in FFS-Mode Display**
Guanhuo Li, XiaMen Tianma Microelectronics Co., Ltd., Xiamen, China

P.89: **Digital Holographic Microscope with a Liquid-Crystal Phase Modulator**
Kyung-Il Joo, Korea Photonics Technology Institute, Gwangju, South Korea

P.90: **Evaluating Maxwellian View Design with a Non-Equal Weighting Matrix**
Fenglin Xi, Kent State University, Kent, OH US

P.91: **Novel Dual-Gate Pixel Design with High Image Quality and Low Power Consumption for LCDs**
Liqing Liao, Hefei BOE Optoelectronics Technology Co., Ltd., Hefei, China

P.92: **Fast-Response FFS LCD with a Novel Electrode Design**
Hongwei Zhao, XiaMen Tianma Microelectronics Co., Ltd., XiaMen, China

P.93: **Skin Color in Side-View Improvement via a Novel ITO Slit Design**
Chin-An Lin, AUO Corporation, Hsinchu, Taiwan Roc

P.94: **Enhancement of the Reliability of TFT LCDs by Focusing on Residual DC Voltage**

Shixin Zhou, TCL China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

P.170: *Late-News Poster:* **Programmable and Pixelated Liquid Crystal Lens**
Ming Syuan Chen, Liqxtal Technology Inc., Tainan, Taiwan Roc

P.171: *Late-News Poster:* **Ultra-Light Liquid Crystal Lenses for AR and VR**
James Harding, FlexEnable Technology Ltd., Cambridge, United Kingdom

Machine Learning for Displays

P.96: **Data Structure Change by Applying Domain Knowledge in Industrial Tabular Data**
Jin-Ha Hwang, Samsung Display Co., Ltd., Yongin, South Korea

P.97: **Applying a Generative Model to Improve TFT Measurement Capacity Performance**
Kyongtae Park, Samsung Display Co., Ltd., Yongin, South Korea

P.98: **Novel Solution for High-Speed Detection of Very Small Defects in Displays**
Junghoon Kim, Samsung Display, Yongin, South Korea

P.99: **Development of Deep Learning Models for FMM Welding Point Qualification**
Sukbin Jung, Samsung Display, Yongin, South Korea

P.100: **Consistent Low-Light Image Restoration for Under-Display Camera**
Shao-Chun Wu, Innolux Corporation, Miaoli, Taiwan Roc

P.101: **Convolutional Neural Network to Optimize Dual-Panel Displays**
Qibin Feng, Hefei University of Technology, Hefei, China

P.102: **Explainable AI Approach for MOD Outliers in FAB to MOD Process**
Sujin Park, Samsung Display, Yongin, South Korea

P.103: **Multi-Path Control System for AGV Based on Digital Twin in Display Module Process**
Yonggu Kim, Samsung Display Co., Ltd., Yongin, South Korea

P.104: **Graph-Based AI Workflow for OLED Materials Discovery**
Wei Xu, TCL AI Lab, Hong Kong, Hong Kong

P.105: **Understanding Recombination Dynamics in Electroluminescence of OLEDs Using Artificial Intelligence**
Jae Min Kim, Sungkyunkwan University, Suwon, South Korea

P.135: **AI-Based Auto-Masking Technique for Detection of Small-Stage Vacuum Holes**
Sang-Hoon Lim, Samsung Display Co., Ltd., Yongin, South Korea

P.159: **Display Gamma Tuning Point Reduction Using Deep Learning Algorithm**
Sangmi Kim, Samsung Display, Yongin, South Korea

P.167: **Autoencoder with Variables-Added Model for Manufacturing Process Anomaly Detection Using Multivariate Time-Series Data that Minimizes Data Information Loss**
Yunyoung Kyeong, Sungkyunkwan University, Seoul, South Korea

P.175: **AI-Based Multimodal Architecture for Video Anomaly Detection in Large OLED Panel Manufacturing**
Euiyoung Jeong, Samsung Display, Yongin, South Korea

OLEDs

P.106: **Charge Transfer Optimized Thermally Activated Delayed Fluorescence for Highly Efficient Deep-Red Hyperfluorescence Device**
Dong Jin Shin, Sungkyunkwan University, Suwon, South Korea

P.108: **Highly Efficient and Narrow-Band Blue Multi-Resonance Thermally Activated Delayed Fluorescence Emitters with Silane Moieties**
Junyoung Moon, Sungkyunkwan University, Suwon, South Korea

P.109: **C/N Fusion Controlled Emission Strategy for Narrow-Emitting High-Efficiency OLEDs**
Vilas Patil, Sungkyunkwan University, Suwon, South Korea

P.110: **Donor-Acceptor Type Bifunctional Molecules with Hybridized Local and Charge-Transfer Excited State as Efficient Non-Doped Deep-Blue Emitters for Highly Efficient Fluorescent OLEDs**
Khushbu Patel, Sungkyunkwan University, Suwon, UNK South Korea

P.111: **Tetradentate Ligand-Based Novel Platinum (II) Complex and Its Outstanding Performance in Blue Phosphorescent OLEDs**
Chan Hee Ryu, Kangwon National University, Chuncheon, South Korea

P.112: **Improvement of White OLED Performance by Optical Enhancement Structure**
Wei Quan, Hefei BOE Joint Technology Co., Ltd., Beijing, China

P.113: **AI Model Proposal to Predict Thickness and Flatness of Organic Layer in Display Process**
Sunghwan Hong, Samsung Display, Youngin, South Korea

P.114: **Novel Optical Simulation System for Pixel Design Optimization**
Bo Shi, Chengdu BOE Optoelectronics Technology Co., Ltd., Chengdu, China

P.115: **Verification of Improvement in Fast-Switching Characteristics of OLEDs by Using Frequency Related Analysis**
Inyeob Na, LG Display, Seoul, South Korea

P.116: **Elucidation of OLED Degradation Mechanism Using Mass Spectrometry and Theoretical Analysis**
Keisuke Sawada, Toray Research Center, Inc., Otsu, Japan

P.117: **WITHDRAWN**

P.118: **Flexible and Shape-Controllable Micro-Convex Structure to Improve Light Extraction of OLEDs**
Eun Jeong Bae, Sun Moon University, Asan, South Korea

P.119: **Structural Research on Low-Temperature Mask-Free Process-Based Random Nanopillar Scattering Layer for Improving OLED Optical Properties**
Young Wook Park, Korea University, Asan, South Korea

P.120: **Accelerated Lifetime Testing and Degradation Mechanisms of a Blue TADF OLED**
Sandra Jenatsch, Fluxim AG, Winterthur, Switzerland

P.121: **Evidence for the Formation of Localized Charge Traps During OLED Degradation**
Stefano Sem, Fluxim AG, Winterthur, Switzerland

P.122: **Low Cross-Linking Temperature Hole-Transport Copolymer with Exemplary Hole-Transport Ability for Efficient Solution-Processed OLED**
Min Chul Suh, Kyung Hee University, Seoul, South Korea

P.123: **Double-Emitting Layer Structure for High Efficiency and Ultra-Stable Blue Triplet-Triplet Annihilation OLED**
Jiun-Haw Lee, National Taiwan University, Taipei, Taiwan Roc

P.124: **Efficiency Enhanced Top-Emitting OLED-on-Silicon Microdisplay with Aluminum Anode**
Chanyoung Park, Samsung Display, Yongin, South Korea

P.125: **A Novel Method to Increase Transmittance of Full Display with Camera**
Chuanxiang Xu, BOE, BeiJing, China

P.126: **An Introduction to GGRB Virtual Pixel Technology**

Lu-jiang Huangfu, BOE Technology Group Co., Ltd., Beijing, China

P.127: **Improving the Driving Voltage Stability of Tandem Red OLED**
Jia Pengcheng, Xiaomi Communications Co., Ltd., Beijing, China

P.128: **Characteristic Optimization Method of Organic Photodetector Based on OLED Integrated Backplane**
Jing Wang, BOE Technology Center, Beijing, China

P.129: **Effective Gamma LUT Conversion Method to Achieve Consistent Optical Quality Across a Variety of IR-Drop Compensation Scenarios**
Jun-Yu Yang, Novatek Microelectronics Corporation, Hsinchu, Taiwan Roc

P.130: **3207ppi, 1.50-in. OLED Microdisplay with All Pixels Formed Through RGB Side-by-Side Patterning by Photolithography**
Yasumasa Yamane, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

P.137: **Enhancement of Light-Extraction Efficiency and Roll-Off Characteristics of Thermally Activated Delayed Fluorescence Organic Light-Emitting Diodes by Inserting Nanoscale Pixel-Defining Layer**
Seungwon Lee, Korea University, Seoul, South Korea

P.156: *Late-News Poster:* **Effect of Light Emission Delay on AMOLED Panel**
Seungyeon Lee, Samsung Display Co., Ltd., Yongin, South Korea

P.157: *Late-News Poster:* **Understanding of Degradation Process by Voltage-Sweep Loop Method in Exciplex Host-Based Phosphorescent Organic Light-Emitting Diodes**
Hakjun Lee, Hongik University, Seoul, South Korea

P.173: *Late-News Poster:* **Composite Cavity Design for Long Lifetime and Low-Cost OLED Displays**
Yu Gu, Wuhan China Star Optoelectronics Semiconductor Display Technology Corporation, Wuhan, China

Outdoor Displays

P.131: **Thermally Stable Quantum-Rod On-Chip Light-Emitting Diodes and Decay Mechanism of Quantum Rods Under High-Power Illumination**
jianxin Song, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.132: **Carrier Transport Dynamics in Quantum-Dot Light-Emitting Diode by Transient Electroluminescence Analysis**
Zebing Liao, The Hong Kong University of Science and Technology, Hong Kong, China

P.152: *Invited Poster:* **Outdoor LED Video Screen Considerations.**
Jorge Perez Bravo, NanoLumens, Inc., Norcross, GA US

Outdoor Displays: Manufacturing

P.133: **Research of Novel Splicing Technique on Glass-Based MicroLED Display**
Xin-Hong Lu, BOE Technology Group Co., Ltd., Beijing, China

P.134: **Influencing Factors of Polarization Characteristics of Backlight Unit in Liquid-Crystal Display**
Chengyi Xu, Hefei BOE Optoelectronics Technology Co., Ltd., Hefei, China