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### Session 3: QD-LEDs I

Chair: Norman Bardsley, *Bardsley Consulting*

Co-Chair: Jonathan Steckel, *ST Microelectronics*

**3-2: Analyzing the Degradation Process of Quantum-Dot LEDs (QLEDs) by Mass Spectrometry** (Page 1)

Hin-Wai Mo, *Fukuoka i3-Center for Organic Photonics and Electronics Research (i3-opera)*

Daichi Shirakura, *Toray Research Center, Inc.*

Kentaro Harada, *OPERA Solutions Inc. & Kyushu University*

Kiyoshi Ishibashi, *Toray Research Center, Inc.*

Takahiro Shibamori, *Toray Research Center, Inc.*

Takashi Miyamoto, *Toray Research Center*

Chihaya Adachi, *Fukuoka i3-Center for Organic Photonics and Electronics Research (i3-opera) & Kyushu University*

**3-3: Distinguished Paper: All Inkjet-Printed RGB Cd-Free EL-QD Devices with Top-Emission Structure**

(Page 5)

Myoungjin Park, *Samsung Display Co., Ltd.*

Young Il Kim, *Samsung Display Co., Ltd.*

Jin-goo Kang, *Samsung Display Co., Ltd.*

Sehun Kim, *Samsung Display Co., Ltd.*

Jaekook Ha, *Samsung Display Co., Ltd.*

Yeo-geon Yoon, *Samsung Display Co., Ltd.*

Changhee Lee, *Samsung Display Co., Ltd.*

**3-4: Highly Efficient Green Top-Emission Light-Emitting Diodes Based on Indium-Phosphide Quantum Dots** (Page 9)

Di Zhang, *BOE Technology Group Co., Ltd.*

Dong Li, *BOE Technology Group Co., Ltd.*

Jingwen Feng, *BOE Technology Group Co., Ltd.*

Youqin Zhu, *BOE Technology Group Co., Ltd.*

Zhuo Chen, *BOE Technology Group Co., Ltd.*

Yanzhao Li, *BOE Technology Group Co., Ltd.*

Xingguo Li, *BOE Technology Group Co., Ltd.*

Xiaoguang Xu, *BOE Technology Group Co., Ltd.*

### Session 4: Oxide TFTs for OLED Displays

Chair: Mike Hack, *Universal Display Corporation*

Co-Chair: Yusin Lin, *Applied Materials, Inc.*

- 4-1: Development of Ultra-Large 95-in. 8K 120Hz OLED Display** (Page 12)  
 Zhongyuan Wu, *BOE Technology Group Co., Ltd.*  
 Yongqian Li, *BOE Technology Group Co., Ltd.*  
 Liangchen Yan, *BOE Technology Group Co., Ltd.*  
 Lankai Ye, *BOE Technology Group Co., Ltd.*  
 Yuqing Peng, *BOE Technology Group Co., Ltd.*  
 Huaiting Shih, *BOE Technology Group Co., Ltd.*  
 Jianwei Yu, *BOE Technology Group Co., Ltd.*  
 Xue Dong, *BOE Technology Group Co., Ltd.*
- 4-2: Student Paper: High-Performance, Coplanar Polycrystalline InGaO Thin-Film Transistor for Large-Area, High-Resolution AMOLED Display** (Page 16)  
 Md. Hasnat Rabbi, *Kyung Hee University*  
 Suhui Lee, *Kyung Hee University*  
 Daich Sasaki, *Idemitsu Kosan Co., Ltd.*  
 Emi Kawashima, *Idemitsu Kosan Co., Ltd.*  
 Yuki Tsuruma, *Idemitsu Kosan Co., Ltd.*  
 Jin Jang, *Kyung Hee University*
- 4-3: Invited Paper: High-Mobility Oxide Thin-Film Transistors for AMOLED Displays** (Page 20)  
 Joon Seok Park, *Samsung Display, Inc.*  
 Jun Hyung Lim, *Samsung Display, Inc.*

## Session 5: Advanced Compensation Techniques

Chair: Taesung Kim, *Google LLC*

Co-Chair: Soo-Yeon Lee, *Universal Display Corporation*

- 5-1: Student Paper: Implementation of Full-Panel Circuit Models for Interference Estimation Between Touch and Display Operation in On-Cell Touch AMOLED** (Page 24)  
 Seung-Hun Choi, *Korea University*  
 Jun-Yeol An, *Korea University*  
 Jae-Youl Lee, *Samsung Electronics*  
 Si-Woo Kim, *Samsung Electronics*  
 Hyung-Min Lee, *Korea University*  
 Yoon-Kyung Choi, *Korea University*
- 5-2: Tracing-Based Degradation Estimation Method for Stress-Profile Algorithm** (Page 28)  
 Seokha Hong, *Samsung Display*  
 Joonchul Goh, *Samsung Display*  
 Jaesung Bae, *Samsung Display*  
 Dongjoon Kwag, *Samsung Display*  
 Hyeongjin Kim, *Samsung Display*  
 Wonjun Choe, *Samsung Display*
- 5-3: Random-Access Gate Driver Using a-IGZO TFTs for External Compensation of High-Resolution, High-Frame-Rate AMOLEDs** (Page 32)  
 Yong-Duck Kim, *Hanyang University*  
 Ki-Lim Han, *Hanyang University*  
 Jin-Seong Park, *Hanyang University*  
 Byong-Deok Choi, *Hanyang University*

## Session 6: AR/MR - LC Optics and Displays

Chair: Lu Lu, *Facebook Reality Labs*

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

- 6-1: Invited Paper: Tutorial on Diffractive Liquid-Crystal Devices for AR/VR Displays** (Page 36)  
 Kun Yin, *University of Central Florida*  
 Junyu Zou, *University of Central Florida*  
 Yannanqi Li, *University of Central Florida*  
 Tiegang Lin, *University of Central Florida*  
 Shin-Tson Wu, *University of Central Florida*
- 6-2: Invited Paper: High-ppi Fast-Switch Display Development for Oculus Quest 2 VR Headsets** (Page 40)  
 Cheonhong Kim, *Meta*  
 Alex Klement, *Meta*  
 Eric Park, *Meta*  
 Jason Han, *Meta*  
 Linghui Rao, *Meta*  
 Jim Zhuang, *Meta*

## Session 7: Under Display Camera Systems

Chair: Jongseo Lee, *Google*

Co-Chair: Martin Grunthaner, *Apple*

- 7-1: *Invited Paper: UDC Technology for OLED Display*** (Page 44)  
 Jun-hui Lou, *Visionox*  
 Lu Zhang, *Visionox*  
 Lin Ge, *Visionox*
- 7-2: *High Transmittance Under-Display Camera Structure with COE*** (Page 48)  
 Chuan X. Xu, *BOE Technology Group Co., LTD.*  
 Qi Yao, *BOE Technology Group Co., LTD.*  
 Xiao H. Li, *BOE Technology Group Co., LTD.*  
 Shi Shu, *BOE Technology Group Co., LTD.*  
 Wei He, *BOE Technology Group Co., LTD.*  
 Zhi Q. Xu, *BOE Technology Group Co., LTD.*  
 Li W. Dong, *BOE Technology Group Co., LTD.*  
 Wei J. Wang, *BOE Technology Group Co., LTD.*  
 Zhi K. Gao, *BOE Technology Group Co., LTD.*  
 Guang C. Yuan, *BOE Technology Group Co., LTD.*
- 7-3: *OLED Camera-Under Panels with Improved Imaging Quality*** (Page 51)  
 Lei Wang, *Wuhan Tianma Microelectronics*  
 Yangzhao Ma, *Wuhan Tianma Microelectronics*  
 Hao Dai, *Wuhan Tianma Microelectronics*  
 Fengyun Wu, *Wuhan Tianma Microelectronics*  
 Minhong Kim, *Wuhan Tianma Microelectronics*  
 Feng Qin, *Wuhan Tianma Microelectronics*  
 DZ Peng, *Wuhan Tianma Microelectronics*
- 7-4: *Correction Algorithm for Under-Display Camera Area on AMOLED Display*** (Page 54)  
 Shang-Yu Su, *Novatek Microelectronics Corporation*  
 Chao-Ting Lee, *Novatek Microelectronics Corporation*  
 Jung-Hsuan Sung, *Novatek Microelectronics Corporation*  
 Feng-Ting Pai, *Novatek Microelectronics Corporation*  
 Ching-Chun Lin, *Novatek Microelectronics Corporation*
- 7-5: *Synthetic Dataset for Improving UDC Video Restoration Network Performance*** (Page 58)  
 Jewon Yoo, *Samsung Display*  
 Jaebum Cho, *Samsung Display*  
 Daewook Kim, *Samsung Display*  
 Sujin Choi, *Samsung Display*  
 Dhohun Lee, *Samsung Display*  
 Hyunjoo Hwang, *Samsung Display*  
 Hyunguk Cho, *Samsung Display*  
 Seungin Baek, *Samsung Display*  
 Yongjo Kim, *Samsung Display*

## Session 8: QD-LEDs II

Chair: Jean-Jacques Drolet, *Osram Opto Semiconductors*

Co-Chair: Jonathan Steckel, *ST Microelectronics*

- 8-1: *Invited Paper: Development of High-Efficiency QLED Technology for Display Applications*** (Page 61)  
 Yanzhao Li, *BOE Technology Group Co., Ltd.*  
 Zhuo Chen, *BOE Technology Group Co., Ltd.*  
 Dong Li, *BOE Technology Group Co., Ltd.*  
 Yuanming Zhang, *BOE Technology Group Co., Ltd.*  
 Tieshi Wang, *BOE Technology Group Co., Ltd.*  
 Jingwen Feng, *BOE Technology Group Co., Ltd.*  
 Shaoyong Lu, *BOE Technology Group Co., Ltd.*  
 Bing Fang, *BOE Technology Group Co., Ltd.*  
 Xinguo Li, *BOE Technology Group Co., Ltd.*  
 Xiaoguang Xu, *BOE Technology Group Co., Ltd.*
- 8-2: *Invited Paper: Development of Active-Matrix NanoLED Display Using Heavy-Metal-Free QDs Patterned by Photolithography Process*** (Page 65)  
 Yohei Nakanishi, *Sharp Display Technology Corporation*  
 Masayuki Kanehiro, *Sharp Display Technology Corporation*  
 Shota Okamoto, *Sharp Display Technology Corporation*  
 Kazuhiko Matsushita, *Sharp Display Technology Corporation*  
 Shinichi Horiue, *Sharp Display Technology Corporation*  
 Hisayuki Utsumi, *Sharp Display Technology Corporation*  
 Yang Qu, *Sharp Display Technology Corporation*  
 Xiaihuan Fu, *Sharp Display Technology Corporation*  
 Katsuhiko Konishi, *Sharp Display Technology Corporation*  
 Akihiro Oda, *Sharp Display Technology Corporation*  
 Makoto Kitagawa, *Sharp Display Technology Corporation*  
 Takeshi Ishida, *Sharp Display Technology Corporation*

Christian Ippen, *Nanosys, Inc.*  
Diego Barrera, *Nanosys, Inc.*  
Jeffrey DaRos, *Nanosys, Inc.*  
Ruiqing Ma, *Nanosys, Inc.*

**8-3: Development of Highly Efficient RGB Cadmium-Free Quantum-Dot Light-Emitting Diodes** (Page 69)

Tatsuya Ryowa, *Sharp Corporation*  
Yusuke Sakakibara, *Sharp Corporation*  
Satoru Yamamoto, *Sharp Corporation*  
Keisuke Kitano, *Sharp Corporation*  
Noboru Iwata, *Sharp Corporation*  
Makoto Izumi, *Sharp Corporation*  
Yuko Ogura, *NS Materials Inc.*  
Yoko Michiwaki, *NS Materials Inc.*  
Soichiro Nikata, *NS Materials Inc.*  
Akio Mishima, *NS Materials Inc.*  
Vit Kalousek, *NS Materials Inc.*  
Mikihiro Takasaki, *NS Materials Inc.*  
Akiharu Miyanaga, *NS Materials Inc.*

**8-4: Degradation Analysis of InP-Quantum-Dot Light-Emitting Diodes** (Page 72)

Raju Lampande, *Kyung Hee University*  
Jang Hyuk Kwon, *Kyung Hee University*

**8-5: Inkjet-Printed Quantum-Dot/Organic Semiconductor Nanohybrids for Efficient InP-Based Quantum-Dot Light-Emitting Diodes** (Page 74)

Yohan Kim, *Fraunhofer Institute for Applied Polymer Research (IAP)*  
Hyung Seok Choi, *Fraunhofer Institute for Applied Polymer Research (IAP)*  
Jiyong Kim, *Fraunhofer Institute for Applied Polymer Research (IAP)*  
Silvia Janietz, *Fraunhofer Institute for Applied Polymer Research (IAP)*  
Armin Wedel, *Fraunhofer Institute for Applied Polymer Research (IAP)*  
Kyoung Won Park, *Korea Electronics Technology Institute*  
Chul Jong Han, *Korea Electronics Technology Institute*  
Min Suk Oh, *Korea Electronics Technology Institute*  
Han Dong Lee, *LT Materials*  
Dong Uk Kim, *LT Materials*  
Yong Woo Kim, *LT Materials*  
Jiwan Kim, *Kyonggi University*

## Session 9: High Performance TFT Sensors

Chair: Yusin Lin, *Applied Materials, Inc.*

Co-Chair: Vincent Gu, *Apple, Inc.*

**9-1: Evaluation of X-ray Resistance of Submicron-Size c-Axis Aligned Crystalline-Oxide Semiconductor** (Page 78)

Kazuki Tsuda, *Semiconductor Energy Laboratory Co., Ltd.*  
Hironobu Takahashi, *Semiconductor Energy Laboratory Co., Ltd.*  
Toshiki Hamada, *Semiconductor Energy Laboratory Co., Ltd.*  
Satoru Saito, *Semiconductor Energy Laboratory Co., Ltd.*  
Haruyuki Baba, *Semiconductor Energy Laboratory Co., Ltd.*  
Masahiro Takahashi, *Semiconductor Energy Laboratory Co., Ltd.*  
Toshimitsu Obonai, *Semiconductor Energy Laboratory Co., Ltd.*  
Junichi Koezuka, *Semiconductor Energy Laboratory Co., Ltd.*  
Hitoshi Kunitake, *Semiconductor Energy Laboratory Co., Ltd.*  
Daisuke Kobayashi, *Japan Aerospace Exploration Agency*  
Michio Tajima, *Japan Aerospace Exploration Agency*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co., Ltd.*

**9-2: Oxide TFT Behavior Under X-Ray Irradiation in DXD Backplane** (Page 82)

YounGyoung Chang, *LG Display*  
Youngjin Yi, *LG Display*  
Hanseok Lee, *LG Display*  
JinPil Kim, *LG Display*  
JungJune Kim, *LG Display*  
Soyang Choi, *LG Display*  
Jihwan Jung, *LG Display*  
Yubeen Lim, *LG Display*  
Kwon-shik Park, *LG Display*  
JeomJae Kim, *LG Display*

**9-3: Student Paper: Widening the Wavelength Absorption Range of Indium-Gallium Zinc-Oxide Phototransistors Through the Capping Layer** (Page 86)

Kyungho Park, *Yonsei University*  
Hyukjoon Yoo, *Yonsei University*  
Dong Hyun Choi, *Yonsei University*  
Sujin Jung, *Yonsei University*

Kyungmoon Kwak, *Yonsei University*  
Byung Ha Kang, *Yonsei University*  
Hyun Jae Kim, *Yonsei University*

- 9-4: Fabrication of the Indirect X-Ray Detector Using Organic Photodiode** (Page 90)  
Chaewon Kim, *Korea Institute of Industrial Technology (KITECH)*  
Kunsik An, *Konkuk University*  
Kwan Hyun Cho, *Korea Institute of Industrial Technology (KITECH)*  
Kyung-Tae Kang, *Korea Institute of Industrial Technology (KITECH)*

## Session 10: High-PPI OLED and Micro-LED Displays

Chair: Carlin Vieri, *Google*

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

- 10-1: Layout of 1.50-in., 3,207ppi OLED Display with OSLSI/SiLSI Structure Capable of Division Driving Fabricated Through VLSI Process with Side-by-Side Patterning by Photolithography** (Page 94)  
Toshihiko Saito, *Semiconductor Energy Laboratory Co. Ltd.*  
Toshiki Mizuguchi, *Semiconductor Energy Laboratory Co. Ltd.*  
Yuki Okamoto, *Semiconductor Energy Laboratory Co. Ltd.*  
Minato Ito, *Semiconductor Energy Laboratory Co. Ltd.*  
Kouhei Toyotaka, *Semiconductor Energy Laboratory Co. Ltd.*  
Munehiro Kozuma, *Semiconductor Energy Laboratory Co. Ltd.*  
Takanori Matsuzaki, *Semiconductor Energy Laboratory Co. Ltd.*  
Hidetomo Kobayashi, *Semiconductor Energy Laboratory Co. Ltd.*  
Tatsuya Onuki, *Semiconductor Energy Laboratory Co. Ltd.*  
Yoshikazu Hiura, *Semiconductor Energy Laboratory Co. Ltd.*  
Ryota Hodo, *Semiconductor Energy Laboratory Co. Ltd.*  
Shinya Sasagawa, *Semiconductor Energy Laboratory Co. Ltd.*  
Hitoshi Kunitake, *Semiconductor Energy Laboratory Co. Ltd.*  
Daiki Nakamura, *Semiconductor Energy Laboratory Co. Ltd.*  
Hitomi Sato, *Semiconductor Energy Laboratory Co. Ltd.*  
Hajime Kimura, *Semiconductor Energy Laboratory Co. Ltd.*  
Chih-Chiang Wu, *Powerchip Semiconductor Manufacturing Corporation*  
Hiroshi Yoshida, *Powerchip Semiconductor Manufacturing Corporation*  
Min-Cheng Chen, *Powerchip Semiconductor Manufacturing Corporation*  
Ming-Han Liao, *National Taiwan University*  
Shou-Zen Chang, *Powerchip Semiconductor Manufacturing Corporation*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co. Ltd.*
- 10-2: Student Paper: Dual-Driver Pixel Circuit and Associated Drivers for Low-Power OLEDs Microdisplays** (Page 98)  
Sheida Gohardehi, *University of Waterloo*  
Manoj Sachdev, *University of Waterloo*
- 10-3: A Novel PAM-PWM Hybrid Driving Method for MicroLED Displays** (Page 102)  
Yingteng Zhai, *Tianma Microelectronics Co., Ltd.*  
Ji Xu, *Tianma Microelectronics Co., Ltd.*  
Lei Lu, *Tianma Microelectronics Co., Ltd.*  
Chengfeng Zhang, *Tianma Microelectronics Co., Ltd.*

## Session 11: AR/MR - High Speed LC

Chair: Takahiro Ishinabe, *Tohoku University*

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

- 11-1: 100-Microsecond Response In-Plane-Only Retardation Switching by Applied Voltage Polarity-Dependent Smectic Liquid Crystals** (Page 105)  
Akihiro Mochizuki, *i-CORE Technology, LLC*
- 11-2: Student Paper: High Brightness and Ultra-High ppi Field-Sequential-Color (FSC) Display Based on Deformed Helix Ferroelectric Liquid Crystal for VR/AR** (Page 109)  
Zhibo Sun, *Hong Kong University of Science and Technology*  
Sisi Wang, *Hong Kong University of Science and Technology*  
Zhengnan Yuan, *Hong Kong University of Science and Technology*  
Zhihe Xia, *Hong Kong University of Science and Technology*  
Lei Lu, *Peking University*  
Man Wong, *Hong Kong University of Science and Technology*  
Hoi-Sing Kwok, *Hong Kong University of Science and Technology*  
Abhishek Kumar Srivastava, *Hong Kong University of Science and Technology*
- 11-3: Invited Paper: New Materials for Film Optics and Game-Changing Head-Mount Devices** (Page 113)  
Kevin Adlem, *Merck Performance Materials Ltd.*  
Alex Davis, *Merck Performance Materials Ltd.*  
Sarabjot Kaur, *Merck Performance Materials Ltd.*  
Ingo Koehler, *Merck KGaA*  
Stephen Mulcahy, *Merck Performance Materials Ltd.*  
Owain Parri, *Merck Performance Materials Ltd.*



Ian Sage, *Abelian Services*  
Izumi Saito, *Merck KGaA*  
Benjamin Snow, *Merck Performance Materials Ltd.*

## Session 12: Integrated Optical Sensing Displays

Chair: Jeff Han, *Consultant*

Co-Chair: Steven Bathiche, *Microsoft*

- 12-1: *Invited Paper: Through-OLED Display Ambient Color Sensing*** (Page 117)  
Kenneth J. Vampola, *Apple*  
Guocheng Shao, *Apple*  
Warren S. A. Rieutort-Louis, *Apple*  
Ming Xu, *Apple*  
Mahesh Chappalli, *Apple*  
Abbas Jamshidi Roudbari, *Apple*
- 12-2: *High Accuracy In-Cell Integrated Ambient Light and Color Temperature Sensor LCD*** (Page 121)  
Can Huang, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Huanhuan Bu, *TCL China Star Optoelectronics Technology Co., LTD*  
Shuqi Liu, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Jiyue Song, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Xiaoyan Niu, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Chao Tian, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Lixin Zhang, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Rui He, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Guowei Zha, *TCL China Star Optoelectronics Technology Co., Ltd.*  
Guanghui Liu, *TCL China Star Optoelectronics Technology Co., Ltd.*
- 12-3: *Investigation of Fingerprint-on-Display Technology for FLI Display*** (Page 125)  
Chuan X. Xu, *BOE*  
Qi Yao, *BOE*  
Wen H. Tian, *BOE*  
Wei He, *BOE*  
Xiang Li, *BOE*  
Ming Yang, *BOE*  
Bing Y. Li, *BOE*  
Zhengri Lin, *BOE*  
Shi Shu, *BOE*  
Guang C. Yuan, *BOE*
- 12-4: *Tomography May Enable a Wavelength-Thin Camera*** (Page 128)  
Adrian R. L. Travis, *Travoptics*

## Session 13: QD-LEDs III

Chair: Seth Coe-Sullivan, *NS Nanotech*

Co-Chair: Mainak Biswas, *Google*

- 13-1: *Invited Paper: Optimizations for the Commercialization of Inkjet-Printed Quantum-Dot Light-Emitting Diode Displays*** (Page 132)  
Longjia Wu, *TCL Research*  
Xiongfeng Lin, *TCL Research*  
Wenjun Hou, *TCL Research*  
Xiaolin Yan, *TCL Research*
- 13-2: *Modification of ZnMgO NPs for Improving Device Performance of All-Inkjet-Printed Quantum-Dot Light-Emitting Diodes*** (Page 136)  
Juyon Lee, *Samsung Display Co., Ltd.*  
Sehun Kim, *Samsung Display Co., Ltd.*  
Jaekook Ha, *Samsung Display Co., Ltd.*  
Yoegeon Yoon, *Samsung Display Co., Ltd.*  
Changhee Lee, *Samsung Display Co., Ltd.*
- 13-5: *Quantum-Dot-in-Perovskite Near-Infrared Light-Emitting Diodes*** (Page 141)  
Marinos Tountas, *National Centre for Scientific Research DEMOKRITOS*  
Anastasia Soultati, *National Centre for Scientific Research DEMOKRITOS*  
Abd. Rashid Bin Mohd Yusoff, *Pohang University of Science and Technology (POSTECH)*  
Dimitris Davazoglou, *National Centre for Scientific Research DEMOKRITOS*  
Maria Vasilopoulou, *National Centre for Scientific Research DEMOKRITOS*

## Session 14: Advanced IGZO/LTPS Devices

Chair: Kenichi Takatori, *Huawei Technologies Japan K.K.*

Co-Chair: James Chang, *Apple, Inc.*

- 14-2: *Student Paper: Enhanced Electrical Characteristics of Low-Temperature-Processed In-Ga-Zn-O Thin-Film Transistors with Oxygen Scavenging Layer*** (Page 145)  
Min Seong Kim, *Yonsei University*  
Sujin Jung, *Yonsei University*



Jong Hyuk Ahn, *Yonsei University*  
Hyung Tae Kim, *Yonsei University*  
Hyun Jae Kim, *Yonsei University*

**14-3: Extremely Short-Channel LTPS-TFT Technologies for High-Performance Low-Power and Reliable AMOLED Displays** (Page 147)

Keunwoo Kim, *Samsung Display Co., LTD.*  
Jaehwan Chu, *Samsung Display Co., LTD.*  
Dokyeong Lee, *Samsung Display Co., LTD.*  
Doona Kim, *Samsung Display Co., LTD.*  
Hanbit Kim, *Samsung Display Co., LTD.*  
Bummo Sung, *Samsung Display Co., LTD.*  
Jiyoung Shin, *Samsung Display Co., LTD.*  
Yunjung Oh, *Samsung Display Co., LTD.*  
Hyena Kwak, *Samsung Display Co., LTD.*  
Sanggun Choi, *Samsung Display Co., LTD.*  
Junhyung Lim, *Samsung Display Co., LTD.*  
Taewook Kang, *Samsung Display Co., LTD.*  
Changhee Lee,

**14-4: Enhanced Low-Temperature Polycrystalline Silicon Thin-Film Transistor Device Structure by Doping at Channel Edge** (Page 151)

Seunghyun Jang, *Samsung Display*  
Byoungtaek Son, *Samsung Display*  
Myungbo Sim, *Samsung Display*  
Kihwan Kim, *Samsung Display*  
Yongsoo Lee, *Samsung Display*  
Tae Young Choi, *Samsung Display*  
Yongsu Lee, *Samsung Display*  
Byoung Kwon Choo, *Samsung Display*  
Seungin Baek, *Samsung Display*  
Yongjo Kim, *Samsung Display*

**Session 15: Ultra Low Power Driving , High-Speed I/F and IC Architecture**

Chair: Bong-Hyun You, *Samsung Display Co.*

Co-Chair: Juhn Yoo, *Apple, Inc.*

**15-1: Novel Multi-Frequency Driving of OLED for Low Power Consumption** (Page 155)

Sangan Kwon, *Samsung Display Co., Ltd.*  
Soondong Kim, *Samsung Display Co., Ltd.*  
Changnoh Yoon, *Samsung Display Co., Ltd.*  
Taehoon Kim, *Samsung Display Co., Ltd.*  
Jinwook Yang, *Samsung Display Co., Ltd.*  
Yongseok Choi, *Samsung Display Co., Ltd.*  
Wonjun Choe, *Samsung Display Co., Ltd.*

**15-2: A 6.0Gbps Clock Embedded Interface for Advanced Mobile Displays** (Page 159)

Dongwon Park, *Samsung Display*  
Jongman Bae, *Samsung Display*  
Hyunsu Kim, *Samsung Display*  
Amir Amirkhany, *Samsung Display America Laboratory*  
Anup Jose, *Samsung Display America Laboratory*  
Frank Seto, *Samsung Display America Laboratory*  
Dale Stoltzka, *Samsung Display America Laboratory*  
Kyungyool Min, *Samsung Display*  
Wonjun Choe, *Samsung Display*

**15-3: Cost-Effective Display Driver IC Architecture for First Frame-Drop Compensation with Shared Memory Interface** (Page 163)

Jin-Yong Park, *Samsung Eletronics Co.*  
Ho-Joon Chung, *Samsung Eletronics Co.*  
Tae-Woo Kim, *Samsung Eletronics Co.*  
Hong-Ki Kwon, *Samsung Eletronics Co.*  
Hyeon-Su Park, *Samsung Eletronics Co.*  
Hyun-Wook Lim, *Samsung Eletronics Co.*  
Jae-Youl Lee, *Samsung Eletronics Co.*

**Session 16: AR/MR - LC Lenses and Components**

Chair: Linghui Rao, *Meta (Facebook)*

Co-Chair: Michael Wittek, *Merck KGaA*

**16-1: Student Paper: Optical Performance Characterization of 5cm Aperture Continuous Focus Tunable Liquid-Crystal Lens for Resolving Accommodation-Convergence Mismatch Conflict in AR/VR/3D HMDs** (Page 166)

Amit Kumar Bhowmick, *Kent State University*  
Afsoon Jamali, *Meta Reality Labs*

Douglas Bryant, *Kent State University*  
Sandro Pintz, *Meta Reality Labs*  
Philip J. Bos, *Kent State University*

**16-2: *Distinguished Paper: Thin and Low-Reflection Metal Black Matrix for High ppi LCD*** (Page 170)

Keisuke Yoshida, *Sharp Display Technology Corporation*  
Satoshi Ueda, *Sharp Display Technology Corporation*  
Atsushi Hachiya, *Sharp Display Technology Corporation*  
Kuniaki Okada, *Sharp Display Technology Corporation*  
Akira Hirai, *Sharp Display Technology Corporation*  
Yuichi Kawahira, *Sharp Display Technology Corporation*  
Katsunori Misaki, *Sharp Display Technology Corporation*  
Hiroaki Furukawa, *Sharp Display Technology Corporation*  
Hiromi Kato, *Sharp Display Technology Corporation*

**16-3: *Compact Tunable Alvarez Lens Based on Pancharatnam-Berry Optical Elements*** (Page 174)

Junhao Lin, *Shanghai Jiao Tong University*  
Ziqian He, *University of Central Florida*  
Zhongsen Zhuang, *Shanghai Jiao Tong University*  
Yan Li, *Shanghai Jiao Tong University*  
Yikai Su, *Shanghai Jiao Tong University*  
Shin-Tson Wu, *University of Central Florida*

### Session 17: Capacitive Touch

Chair: John Zhong, *Apple Inc.*

Co-Chair: Patrick Worfolk, *Synaptics*

**17-1: *Self-Capacitive Touch Sensor Design for OLED On-Cell Touch*** (Page 178)

Yu-Ying Tang, *Novatek Microelectronics Corporation*  
Chich-Chung Lai, *Novatek Microelectronics Corporation*  
Ching-Chun Lin, *Novatek Microelectronics Corporation*

**17-2: *Integrated Self-Capacitance Touch Panel for Flexible OLED Display*** (Page 182)

Feng Lu, *Shanghai Tianma Micro-electronics Co., Ltd.*  
Zhe Li, *Shanghai Tianma Micro-electronics Co., Ltd.*  
Zihan Zhou, *Shanghai Tianma Micro-electronics Co., Ltd.*  
Jing Zhang, *Shanghai Tianma Micro-electronics Co., Ltd.*  
Qijun Yao, *Shanghai Tianma Micro-electronics Co., Ltd.*  
Yuan Ding, *Shanghai Tianma Micro-electronics Co., Ltd.*  
Yung-Sheng Lu, *Ilitek Technology Corp.*  
Jui-Chuan Chuang, *Ilitek Technology Corp.*  
Chien-Chuan Chen, *Ilitek Technology Corp.*

**17-4: *An Avionics Touchscreen Display for Safety-Critical Applications*** (Page 186)

Philippe Coni, *Thales AVS France SAS*  
Frederic Renaud, *Thales AVS France SAS*  
Hermann Alfred, *Thales AVS France SAS*

### Session 18: Human Vision and Evaluation Methods for AR/VR/MR

Chair: Jisoo Hong, *Korea Electronics Technology Institute*

Co-Chair: Soon-Gi Park, *LetinAR*

**18-1: *Invited Paper: Modeling and Optimizing Human-in-the-Loop Visual Perception Using Immersive Displays: A Review*** (Page 190)

Qi Sun, *New York University*  
Budmonde Duinkharjav, *New York University*  
Anjul Patney, *Nvidia Research*

**18-2: *Assessment of Image Quality in Augmented-Reality Displays Using a Computational Model of Target Detectability*** (Page 194)

Chumin Zhao, *U.S. Food and Drug Administration*  
Ryan Beams, *U.S. Food and Drug Administration*  
Matthew Johnson, *U.S. Food and Drug Administration & University of Maryland*  
Aldo Badano, *U.S. Food and Drug Administration*

**18-3: *3D Image-Quality Evaluation Method Based on Image Comparison Metrics*** (Page 198)

Young-sang Ha, *Samsung Display*  
Rang-kyun Mok, *Samsung Display*  
Beom-shik Kim, *Samsung Display*

### Session 19: QD Color Conversion I

Chair: John Van Derlofske, *3M*

Co-Chair: Ji Ho Baek, *LG Display*

**19-2: *Design Heuristics of Color-Conversion Films in MicroLED Displays*** (Page 202)

Khaled Ahmed, *Intel Corporation*

**19-3: Crucial Effect of Aspect Ratio of Quantum-Dot Color-Conversion Pixels on the Performance of High-Resolution Full-Color MicroLED Microdisplays** (Page 206)

Chih-Jung Chen, *Taiwan Nanocrystals Corp. Ltd.*  
Kuan-An Chen, *SynthEdge Advanced Material Corp. Ltd.*  
Wei-Hung Kuo, *Industrial Technology Research Institute*  
Chun-I Wu, *Industrial Technology Research Institute*  
Hao-Chung Kuo, *National Chiao Tung University & Hon Hai Research Institute*  
Ray-Kuang Chiang, *Taiwan Nanocrystals Corp. Ltd.*

**19-4: Triboelectric Discharging Problems in QD-OLED Manufacturing and Solutions Using Electromagnetic Analysis** (Page 210)

Hyun Sung Park, *Samsung Display*  
Hyeseok Na, *Samsung Display*  
Hyeondo Park, *Samsung Display*  
Sooyoung Park, *Samsung Display*  
Hyundo Shin, *Samsung Display*  
Yudeok Seo, *Samsung Display*  
Yongjo Kim, *Samsung Display*

**Session 20: Advanced Active Matrix Backplanes**

Chair: Hyun Jae Kim, *Yonsei University*

Co-Chair: Takashi Nakamura, *Japan Display Inc.*

**20-1: Distinguished Paper: Advanced Hybrid Process with Back-Contact IGZO-TFT** (Page 214)

Masatomo Honjo, *Sharp Display Technology Corporation*  
Yujiro Takeda, *Sharp Display Technology Corporation*  
Mehadi Aman, *Sharp Display Technology Corporation*  
Kazuatsu Ito, *Sharp Display Technology Corporation*  
Kohei Tanaka, *Sharp Display Technology Corporation*  
Hiroshi Matsukizono, *Sharp Display Technology Corporation*  
Wataru Nakamura, *Sharp Display Technology Corporation*

**20-2: Integration of Through-Glass Via Interconnects Within Thin-Film Transistor Active-Matrix Backplanes** (Page 218)

Sean M. Garner, *Corning Research & Development Corporation*  
Rajesh Vaddi, *Corning Research & Development Corporation*  
Mandakini Kanungo, *Corning Research & Development Corporation*  
Chukwudi Okoro, *Corning Research & Development Corporation*  
Daniel W. Levesque, *Corning Research & Development Corporation*  
Barry J. Paddock, *Corning Research & Development Corporation*  
Prantik Mazumder, *Corning Research & Development Corporation*

**20-3: Invited Paper: BEOL-Compatible Ferroelectric Field-Effect Transistors with Atomic Layer Deposition of Oxide Semiconductor Channel Toward Monolithic 3D Integration** (Page 221)

Zhiyu Lin, *Shanghai Jiao Tong University*  
Zehao Lin, *Purdue University*  
Ziheng Wang, *Shanghai Jiao Tong University*  
Mengwei Si, *Shanghai Jiao Tong University*  
Peide D. Ye, *Purdue University*

**20-4: Student Paper: High-Performance p-Channel Tellurium Thin-Film Transistor Applications Fabricated at a Low Temperature of 150°C** (Page 225)

Taikyu Kim, *Hanyang University*  
Cheol Hee Choi, *Hanyang University*  
Jae Kyeong Jeong, *Hanyang University*

**Session 21: OLED Optics**

Chair: CC Lee, *Anhui First Light Technology*

Co-Chair: Yifan Zhang, *Apple, Inc.*

**21-1: Invited Paper: Polarized Emission Thin-Film Light-Emitting Diodes** (Page 228)

Qi Dong, *North Carolina State University*  
Liping Zhu, *North Carolina State University*  
Shichen Yin, *North Carolina State University*  
Franky So, *North Carolina State University*

**21-2: Invited Paper: Improve OLED Light Outcoupling Efficiency by Eliminating Waveguide Mode Using Ultrathin Metal Electrode** (Page 231)

Changyeong Jeong, *University of Michigan*  
Yongbum Park, *University of Michigan*  
L. Jay Guo, *University of Michigan*

**21-3: Effect of Ag Adhesion Layer on Plasmon Outcoupling Efficiency** (Page 235)

Nicholas J. Thompson, *Universal Display Corporation*  
Michael A. Fusella, *Universal Display Corporation*  
Renata Saramak, *Universal Display Corporation*

Haridas Mundoor, *Universal Display Corporation*  
Vinod M. Menon, *Universal Display Corporation*  
Michael S. Weaver, *Universal Display Corporation*  
Julia J. Brown, *Universal Display Corporation*

- 21-4: Implications of Spatial Coherence on Minimizing Diffractive Reflection Artifacts in OLED Displays** (Page 239)  
S. Matthew Menke, *3M*  
David G Freier, *3M*  
Robert L Brott, *3M*

## Session 22: Emerging Liquid Crystal Technologies

Chair: Xiao-Yang Huang, *Ebulent Technologies Corp.*  
Co-Chair: CC Lee, *BOE Technology Group Co., Ltd.*

- 22-1: Invited Paper: Electrically Switchable Privacy Technology Suitable for Laptop PC** (Page 243)  
Dong-Jin Lee, *LG Display*  
Jaeyoung Kwak, *LG Display*  
Kyung Su Ha, *LG Display*  
Jongwook Jung, *LG Display*  
Chan Heon Lee, *LG Display*  
Gwang Tae Kim, *LG Display*  
Won Gyun Youn, *LG Display*  
Jeong-Ki Park, *LG Display*
- 22-2: Field-Sequential Color See-Through Panel Development** (Page 247)  
Shinichi Terashita, *Sharp Display Technology Corporation*  
Kouichi Watanabe, *Sharp Display Technology Corporation*  
Tsuyoshi Okazaki, *Sharp Display Technology Corporation*  
Masamitsu Kobayashi, *Sharp Display Technology Corporation*  
Akihiro Hada, *Sharp Display Technology Corporation*  
Fumikazu Shimoshikiryoh, *Sharp Display Technology Corporation*
- 22-3: A New Near-Infrared Polarizer with High Visible Transparency and Its Sensor Applications** (Page 251)  
Mayumi Nojiri, *FUJIFILM Corporation*  
Yuki Hirai, *FUJIFILM Corporation*  
Shin-ichi Morishima, *FUJIFILM Corporation*  
Ayako Muramatsu, *FUJIFILM Corporation*  
Yoji Ito, *FUJIFILM Corporation*
- 22-4: Invited Paper: Display on Demand** (Page 1524)  
Ya-Ling Hsu, *AU Optronics Corporation*  
Shang-Chiang Lin, *AU Optronics Corporation*  
Hao-Shiun Yang, *AU Optronics Corporation*  
Chien-Chi Chen, *AU Optronics Corporation*  
Cheng-Hsien Liao, *AU Optronics Corporation*  
Jenn-Jia Su, *AU Optronics Corporation*

## Session 23: Advanced Display Characterization Methods

Chair: Stephen Atwood, *Consultant*  
Co-Chair: Thomas Fiske, *Microsoft*

- 23-1: Invited Paper: Visualization of Color-Gamut Coverage—Gamut Ring Intersection** (Page 255)  
Kenichiro Masaoka, *NHK Science & Technology Research Laboratories*
- 23-2: Characterization of Directional Chromaticity of Cylindrically Curved OLED** (Page 259)  
K. Kälantär, *Global Optical Solutions*  
Yasuki Yamauchi, *Yamagata University*
- 23-3: Distinguished Paper: Utilizing Advanced Spatio-Temporal Backgrounds with Dynamic Test Signals for HDR Display Metrology** (Page 263)  
Timo Kunkel, *Dolby Laboratories, Inc.*  
Florian Friedrich, *FF Pictures*
- 23-4: Quick Detection and Evaluation of Irregular Response-Time Behavior for High-Frame-Rate Displays Through Noticeable Artifacts** (Page 267)  
Isao Kawahara, *FairSpec & Co. LLC*

## Session 24: Emerging Applications of Display Technology

Chair: Adi Abileah, *Adi - Displays Consulting LLC*  
Co-Chair: Susan Jones, *Nulumina Corp.*

- 24-1: Can Light Microscopes Really Be Chip-Sized?** (Page 271)  
Anna Vilà, *University of Barcelona*  
Sergio Moreno, *University of Barcelona*  
Angel Dieguez, *University of Barcelona*

- 24-2:** **Development of Methods to Reduce Blue Light Hazard from Displays** (Page 275)  
 Derek Brent Harris, *Eyesafe*  
 Arkady Garber, *Eyesafe*  
 Paul James BroylesIII, *Eyesafe*  
 Kelly Anne Mitzel, *Eyesafe*  
 Benjamin Joseph Binger, *Eyesafe*  
 Elishaa Batdorf, *Eyesafe*
- 24-3:** **Distinguished Student Paper: Toward a Solid-State LIDAR Using Holographic Illumination and a SPAD-Based Time-of-Flight Image Sensor** (Page 279)  
 Konstantinos Bantounos, *University of Edinburgh*  
 Tim M. Smeeton, *Envisics Ltd*  
 Ian Underwood, *University of Edinburgh*
- 24-4:** **Student Paper: High-Precision Beam Angle Expander Based on Polymeric Liquid-Crystal Polarization Lenses for LiDAR Applications** (Page 283)  
 Yannanqi Li, *University of Central Florida*  
 Zhenyi Luo, *University of Central Florida*  
 ShinTson Wu, *University of Central Florida*

## Session 25: Innovations in Microdisplays for AR/VR/MR

Chair: Ion Bitu, *Google LLC*

Co-Chair: Yunhee Kim, *Samsung Electronics*

- 25-1:** **Invited Paper: OLED Microdisplays for AR/VR Applications: Technical Approaches Toward Realization of over 10,000 Nits Full-Color Panels** (Page 287)  
 Jang Jo, *LG Display Co., Ltd.*  
 Pureum Kim, *LG Display Co., Ltd.*  
 Ho-Jin Kim, *LG Display Co., Ltd.*  
 Hyeongjun Lim, *LG Display Co., Ltd.*  
 Seung-Ryong Joung, *LG Display Co., Ltd.*  
 Choong-Keun Yoo, *LG Display Co., Ltd.*  
 Dong-Wook Choi, *LG Display Co., Ltd.*  
 Joon-Young Yang, *LG Display Co., Ltd.*  
 Yong-Min Ha, *LG Display Co., Ltd.*  
 Sooyoung Yoon, *LG Display Co., Ltd.*
- 25-2:** **Invited Paper: Ultra-High-Resolution NanoLED Panel for AR/VR by UV Patterning Technology** (Page 291)  
 Kazuya Tsujino, *Sharp Display Technology Corporation*  
 Tomohiro Kosaka, *Sharp Display Technology Corporation*  
 Manabu Daio, *Sharp Display Technology Corporation*  
 Yuuki Ootsuka, *Sharp Display Technology Corporation*  
 Kunihiko Orita, *Sharp Display Technology Corporation*  
 Tomoko Teranishi, *Sharp Display Technology Corporation*  
 Takeshi Ishida, *Sharp Display Technology Corporation*  
 Kiyoshi Minoura, *Sharp Display Technology Corporation*
- 25-4:** **Contact Lens Embedded MicroLED displays** (Page 1521)  
 Paul S. Martin, *Mojo Vision*

## Session 26: QD Color Conversion II

Chair: Juanita Kurtin, *OSRAM Opto Semiconductors*

Co-Chair: John Van Derlofske, *3M*

- 26-1:** **Invited Paper: Challenges in QD-OLED Display Technology** (Page 295)  
 Julian Burschka, *Merck KGaA*  
 Chang-Suk Choi, *Merck KGaA*  
 Nils Greinert, *Merck KGaA*  
 Elizaveta Kossoy, *Merck KGaA*  
 Teruaki Suzuki, *Merck KGaA*  
 Atsuko Yamamoto, *Merck KGaA*  
 Ingo Koehler, *Merck KGaA*
- 26-2:** **How Perovskite Quantum Dots are Supporting the Rise of MiniLED-Based LCDs** (Page 299)  
 Norman Luechinger, *Avantama AG*
- 26-3:** **Optical Modeling of Quantum-Dot-OLED (QD-OLED) Color Conversion** (Page 303)  
 Peter Palomaki, *Palomaki Consulting, LLC*  
 Karen Twietmeyer, *Palomaki Consulting, LLC*
- 26-4:** **Perovskite Inks and Photoresists for In-Pixel Color Conversion** (Page 307)  
 Nobuya Sakai, *Helio Display Materials*  
 Hywel Hopkin, *Helio Display Materials*  
 Ger deKeyzer, *Helio Display Materials*  
 Bernard Wenger, *Helio Display Materials*



## Session 27: High Resolution Display Technology I

Chair: Kalluri Sarma, *Display Technology Consulting*

Co-Chair: Chen Xi, *BOE Technology Group Co., Ltd.*

- 27-1: Fabrication Method for Miniaturized CAAC-OS FET for High-Definition AR/VR Displays** (Page 310)  
Ryota Hodo, *Semiconductor Energy Laboratory Co., Ltd.*  
Satoru Saito, *Semiconductor Energy Laboratory Co., Ltd.*  
Kentaro Sugaya, *Semiconductor Energy Laboratory Co., Ltd.*  
Yoshikazu Hiura, *Semiconductor Energy Laboratory Co., Ltd.*  
Takahiro Fujie, *Semiconductor Energy Laboratory Co., Ltd.*  
Shinya Sasagawa, *Semiconductor Energy Laboratory Co., Ltd.*  
Tsutomu Murakawa, *Semiconductor Energy Laboratory Co., Ltd.*  
Hitoshi Kunitake, *Semiconductor Energy Laboratory Co., Ltd.*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co., Ltd.*
- 27-2: Novel LTPS-TFT Backplane Structure on Glass for 1,443ppi 4.3-in. AMOLED VR Display** (Page 314)  
Kummi Oh, *LG Display*  
Sun-Wook Ko, *LG Display*  
Deuk-Ho Yeon, *LG Display*  
Tae-Hyoung Moon, *LG Display*  
Kwon-Shik Park, *LG Display*  
Jeom-Jae Kim, *LG Display*  
Soo-Young Yoon, *LG Display*
- 27-3: Invited Paper: High-Performance Sub-50nm Channel Length 3D Monolithically Stackable Vertical IGZO TFTs for Active-Matrix Application** (Page 318)  
Xinlv Duan, *Chinese Academy of Sciences*  
Kailiang Huang, *Huawei Technologies Co., Ltd.*  
Junxiao Feng, *Huawei Technologies Co., Ltd.*  
Shihui Yin, *Huawei Technologies Co., Ltd.*  
Zhaogui Wang, *Huawei Technologies Co., Ltd.*  
Guangfan Jiao, *Huawei Technologies Co., Ltd.*  
Yin Wu, *Huawei Technologies Co., Ltd.*  
Weiliang Jing, *Huawei Technologies Co., Ltd.*  
Zhengbo Wang, *Huawei Technologies Co., Ltd.*  
Jingyu Li, *Huawei Technologies Co., Ltd.*  
Jeffrey Xu, *Huawei Technologies Co., Ltd.*  
Chuanke Chen, *Chinese Academy of Sciences*  
Qian Chen, *Chinese Academy of Sciences*  
Xichen Chuai, *Chinese Academy of Sciences*  
Congyan Lu, *Chinese Academy of Sciences*  
Guanhua Yang, *Chinese Academy of Sciences*  
Di Geng, *Chinese Academy of Sciences*  
Ling Li, *Chinese Academy of Sciences*  
Ming Liu, *Chinese Academy of Sciences*

## Session 28: OLED Physics and Simulations

Chair: Denis Kondakov, *DuPont*

Co-Chair: JNicholas Thompson, *Universal Display Corporation*

- 28-1: Invited Paper: Bottom-Up OLED Development by Virtual Design: Systematic Elimination of Performance Bottlenecks Using a Microscopic Simulation Approach** (Page 322)  
Tobias Neumann, *Nanomatch GmbH*  
Franz Symalla, *Nanomatch GmbH*  
Timo Strunk, *Nanomatch GmbH*  
Artem Feidai, *Nanomatch GmbH & Karlsruhe Institute of Technology*  
Simon Kaiser, *Karlsruhe Institute of Technology*  
Pascal Friederich, *Karlsruhe Institute of Technology*  
Wolfgang Wenzel, *Karlsruhe Institute of Technology*
- 28-2: Invited Paper: Accelerating OLED R&D with Digital Twins** (Page 326)  
Arthur Vauzelle, *Simbeyond B.V.*  
Christoph Hauenstein, *Simbeyond B.V.*  
Engin Torun, *Simbeyond B.V.*  
Ruud Gijssen, *Simbeyond B.V.*  
Siebe VanMensfoort, *Simbeyond B.V.*  
Harm VanEersel, *Simbeyond B.V.*  
Stefano Gottardi, *Simbeyond B.V.*
- 28-3: Invited Paper: Enhanced Current Efficiency and Accumulation Charge in Model OLEDs by Light Irradiation During Deposition of Polar Molecule** (Page 330)  
Yuya Tanaka, *Chiba University*  
Yuki Tazo, *Chiba University*  
Hisao Ishii, *Chiba University*

- 28-4: *Invited Paper: Effects of Guest Clustering Morphology in Phosphorescent OLEDs*** (Page 334)  
Jeremy D. Zimmerman, *Colorado School of Mines*  
Roland A. Bennett, *Colorado School of Mines*  
Paul Niyonkuru, *Colorado School of Mines*  
Matthew B. Jaskot, *Colorado School of Mines*  
Andrew P. Proudian, *Colorado School of Mines*

### Session 29: Green, Low Power/Stretchable/LCDs

Chair: Philip Chen, *National Chiao Tung University*

Co-Chair: Matthew Sousa, *3M*

- 29-2: *Invited Paper: An Ultra-Low-Power FFS LCD Using Zero-Anchoring Interface*** (Page 337)  
Hiroaki Asagi, *Sharp Display Technology Corporation*  
Koji Murata, *Sharp Display Technology Corporation*  
Kazuhito Matsumoto, *Sharp Display Technology Corporation*  
Yusuke Nishihara, *Sharp Display Technology Corporation*  
Yoshito Hashimoto, *Sharp Display Technology Corporation*  
Kiyoshi Minoura, *Sharp Display Technology Corporation*
- 29-3: *Invited Paper: Ultra-Thin Stretchable LCD Using Deformable Polarizer*** (Page 341)  
Ryo Kawamura, *Nitto Denko Corporation*  
Toru Umemoto, *Nitto Denko Corporation*  
Kosuke Takae, *Nitto Denko Corporation*  
Kazuki Kawamidori, *Nitto Denko Corporation*  
Takashi Kamijo, *Nitto Denko Corporation*  
Kazuya Miwa, *Nitto Denko Corporation*  
Junichi Nagase, *Nitto Denko Corporation*  
Fumihiko Kono, *Nitto Denko Corporation*  
Takahiro Ishinabe, *Tohoku University*  
Yosei Shibata, *Tohoku University*  
Hideo Fujikake, *Tohoku University*
- 29-4: *Novel High Impedance Driving of Zenithal Bistable LCDs*** (Page 345)  
Stephen M. Beldon, *New Vision Display, Inc.*  
Quanshui Shi, *New Vision Display*  
Matthias Pfeiffer, *New Vision Display, Inc.*  
Guy Bryan-Brown, *New Vision Display, Inc.*

### Session 30: Spatial and Temporal Display Metrology

Chair: Stephen Atwood, *Consultant*

Co-Chair: Frank Rochow, *Adviser*

- 30-1: *High-Precision High-Resolution Measurements Within Moiré*** (Page 349)  
Ingo Rotscholl, *TechnoTeam Bildverarbeitung GmbH*  
Udo Krüger, *TechnoTeam Bildverarbeitung GmbH*  
Franz Schmidt, *TechnoTeam Bildverarbeitung GmbH*
- 30-2: *Visualization and Rating of Motion Artifacts by Analyzing Asymmetric Response-Time Behavior***  
(Page 353)  
Isao Kawahara, *FairSpec & Co. LLC*
- 30-3: *A Moving Camera and Synthetic Calibration Target Solution for Non-Planar Scene Estimation and Projector Calibration*** (Page 357)  
Katherine Arnold, *University of Waterloo*  
Paul Fieguth, *University of Waterloo*  
Mark Lamm, *Christie Digital Systems Inc*
- 30-4: *Requirements for Reliable Display Sparkle Contrast Measurement: Analysis in Spatial Frequency Domain*** (Page 361)  
Masanobu Isshiki, *AGC Inc.*  
Yukio Endo, *AGC Inc.*

### Session 31: Novel Display Technology Approaches

Chair: Timothy Large, *Microsoft Corp. Southwater*

Co-Chair: Abhishek Srivastava, *Hong Kong University of Science & Technology*

- 31-1: *Numerical Approach for Sound-Quality Prediction of a Large OLED Panel Speaker*** (Page 365)  
Hyundo Shin, *Samsung Display Co., Ltd.*  
Hyun Sung Park, *Samsung Display Co., Ltd.*  
Yudeok Seo, *Samsung Display Co., Ltd.*  
Yongjo Kim, *Samsung Display Co., Ltd.*
- 31-2: *Student Paper: Fermi Level Prediction of Solution-Processed Ultra-Wide Bandgap a-Ga<sub>2</sub>O<sub>x</sub> via Supervised Machine-Learning Models*** (Page 369)  
Diki Purnawati, *Nara Institute of Science and Technology*  
Paul Rossener Regonia, *Nara Institute of Science and Technology & University of the Philippines Diliman*  
Juan Paolo Bermundo, *Nara Institute of Science and Technology*



Kazushi Ikeda, *Nara Institute of Science and Technology*  
Yukiharu Uraoka, *Nara Institute of Science and Technology*

**31-3: Multi-Primary Wide-Gamut Color Systems** (Page 373)

Corey Carbonara, *Baylor University*  
Michael Korpi, *Baylor University*  
James DeFilippis, *6P Color, Inc.*  
Mitchell Bogdanowicz, *6P Color, Inc.*  
Gary Feather, *6P Color, Inc.*  
Gary Mandle, *Baylor University*

**Session 32: High Resolution Display Technology II**

Chair: Norbert Fruehauf, *University of Stuttgart*

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

**32-1: Oxide Semiconductor Field-Effect Transistor for High-Resolution Displays Capable of Deep Black Display** (Page 377)

Yutaka Okazaki, *Semiconductor Energy Laboratory Co., Ltd.*  
Hiromi Sawai, *Semiconductor Energy Laboratory Co., Ltd.*  
Masami Endo, *Semiconductor Energy Laboratory Co., Ltd.*  
Ryousuke Motoyoshi, *Semiconductor Energy Laboratory Co., Ltd.*  
Daigo Shimada, *Semiconductor Energy Laboratory Co., Ltd.*  
Hitoshi Kunitake, *Semiconductor Energy Laboratory Co., Ltd.*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co., Ltd.*  
Kou Chang Huang, *Powerchip Semiconductor Manufacturing Corporation*  
Hiroshi Yoshida, *Powerchip Semiconductor Manufacturing Corporation*  
Min Cheng Chen, *Powerchip Semiconductor Manufacturing Corporation*  
Ming Han Liao, *National Taiwan University*  
Shou Zen Chang, *Powerchip Semiconductor Manufacturing Corporation*

**32-2: An Optical Compensation Scheme for High ppi AMOLED Display** (Page 381)

Ying Han, *Hefei BOE Joint Technology Co., Ltd.*  
Mingyi Zhun, *Hefei BOE Joint Technology Co., Ltd.*  
Yicheng Lin, *BOE Technology Group Co., Ltd.*  
Zhengliang Li, *BOE Technology Group Co., Ltd.*  
Pan Xu, *Hefei BOE Joint Technology Co., Ltd.*  
Jiayu He, *BOE Technology Group Co., Ltd.*  
Rui Huang, *BOE Technology Group Co., Ltd.*  
Lirong Wang, *Hefei BOE Joint Technology Co., Ltd.*  
Zhiqiang Dong, *Hefei BOE Joint Technology Co., Ltd.*  
Yu Wang, *Hefei BOE Joint Technology Co., Ltd.*  
Xing Zhang, *Hefei BOE Joint Technology Co., Ltd.*  
Wei Quan, *Hefei BOE Joint Technology Co., Ltd.*  
Chengyuan Luo, *Hefei BOE Joint Technology Co., Ltd.*  
Tianji Li, *Hefei BOE Joint Technology Co., Ltd.*  
Donghui Zhao, *Hefei BOE Joint Technology Co., Ltd.*  
Yi Chen, *BOE Technology Group Co., Ltd.*  
Fei Yang, *BOE Technology Group Co., Ltd.*  
Guang Yan, *BOE Technology Group Co., Ltd.*  
Yongqian Li, *Hefei BOE Joint Technology Co., Ltd.*  
Zhongyuan Wu, *BOE Technology Group Co., Ltd.*  
Jianwei Yu, *Hefei BOE Joint Technology Co., Ltd.*  
Xue Dong, *BOE Technology Group Co., Ltd.*  
Tangxiang Wang, *BOE Technology Group Co., Ltd.*

**32-3: 1.5-in., 3,207ppi Side-by-Side OLED Display Capable of 32-Division Driving with OSLSI/SILSI Structure Fabricated by Photolithography** (Page 384)

Munehiro Kozuma, *Semiconductor Energy Laboratory Co. Ltd.*  
Yuki Okamoto, *Semiconductor Energy Laboratory Co. Ltd.*  
Minato Ito, *Semiconductor Energy Laboratory Co. Ltd.*  
Hiroki Inoue, *Semiconductor Energy Laboratory Co. Ltd.*  
Toshihiko Saito, *Semiconductor Energy Laboratory Co. Ltd.*  
Yusuke Komura, *Semiconductor Energy Laboratory Co. Ltd.*  
Shoki Miyata, *Semiconductor Energy Laboratory Co. Ltd.*  
Kouhei Toyotaka, *Semiconductor Energy Laboratory Co. Ltd.*  
Takanori Matsuzaki, *Semiconductor Energy Laboratory Co. Ltd.*  
Tatsuya Onuki, *Semiconductor Energy Laboratory Co. Ltd.*  
Hidetomo Kobayashi, *Semiconductor Energy Laboratory Co. Ltd.*  
Kentaro Sugaya, *Semiconductor Energy Laboratory Co. Ltd.*  
Takahiro Fujie, *Semiconductor Energy Laboratory Co. Ltd.*  
Yutaka Okazaki, *Semiconductor Energy Laboratory Co. Ltd.*  
Ryota Hodo, *Semiconductor Energy Laboratory Co. Ltd.*  
Yuichi Yanagisawa, *Semiconductor Energy Laboratory Co. Ltd.*  
Masahiro Wakuda, *Semiconductor Energy Laboratory Co. Ltd.*  
Tsutomu Murakawa, *Semiconductor Energy Laboratory Co. Ltd.*

Shinya Sasagawa, *Semiconductor Energy Laboratory Co. Ltd.*  
Hitoshi Kunitake, *Semiconductor Energy Laboratory Co. Ltd.*  
Daiki Nakamura, *Semiconductor Energy Laboratory Co. Ltd.*  
Takaaki Nagata, *Semiconductor Energy Laboratory Co. Ltd.*  
Shinya Fukuzaki, *Semiconductor Energy Laboratory Co. Ltd.*  
Tomoya Aoyama, *Semiconductor Energy Laboratory Co. Ltd.*  
Hajime Kimura, *Semiconductor Energy Laboratory Co. Ltd.*  
Shih-Ci Yen, *Powerchip Semiconductor Manufacturing Corporation*  
Chuan-Hua Chang, *Powerchip Semiconductor Manufacturing Corporation*  
Wen-Hsiang Hsieh, *Powerchip Semiconductor Manufacturing Corporation*  
Hiroshi Yoshida, *Powerchip Semiconductor Manufacturing Corporation*  
Min-Cheng Chen, *Powerchip Semiconductor Manufacturing Corporation*  
Ming-Han Liao, *National Taiwan University*  
Shou-Zen Chang, *Powerchip Semiconductor Manufacturing Corporation*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co. Ltd.*

**32-4: Metal-Oxide Thin-Film Transistors with 0.1um Channel Length Formed by Self-Aligned Nanogap Patterning** (Page 388)

Chihun Sung, *Electronics and Telecommunications Research Institute*  
Sooji Nam, *Electronics and Telecommunications Research Institute*  
Sung Haeng Cho, *Electronics and Telecommunications Research Institute*

**Session 33: Printed OLED**

Chair: Sven Zimmermann, *Novald GmbH*

Co-Chair: Denis Kondakov, *DuPont*

**33-1: All-Inkjet-Printed AMOLED Display with Improved Efficiency and Lifetime** (Page 391)

Sehun Kim, *Samsung Display Co., Ltd.*  
Taeheon Kang, *Samsung Display Co., Ltd.*  
Heunggyu Kim, *Samsung Display Co., Ltd.*  
Hyeran Mun, *Samsung Display Co., Ltd.*  
Youngmo Koo, *Samsung Display Co., Ltd.*  
Jaekook Ha, *Samsung Display Co., Ltd.*  
Changhee Lee, *Samsung Display Co., Ltd.*

**33-2: Invited Paper: Flexible OLED Displays with Inkjet Printing Technology** (Page 395)

Weiran Cao, *Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd.*  
Jinchuan Li, *Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd.*  
Xiang-Long Li, *Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd.*  
Yunxi Li, *Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd.*

**33-3: Invited Paper: Research and Applications of Inkjet Printing for OLED Mass Production** (Page 398)

Valerie Gassend, *Kateeva, Inc.*  
Christopher R. Hauf, *Kateeva, Inc.*  
Jianglong Chen, *Kateeva, Inc.*

**Session 34: High Dynamic Range LCDs**

Chair: Jenn Jia Su, *Adviser*

Co-Chair: Thomas Fiske, *Microsoft*

**34-1: Novel Liquid-Crystal Display Mode SUVA4 and SUVA5 with Double Photoalignment Technology for High-Definition Display** (Page 402)

Fan Li, *BOE Technology Group Co., Ltd.*  
Zhi-gang Wang, *BOE Technology Group Co., Ltd.*  
Lin Peng, *BOE Technology Group Co., Ltd.*  
Yong Zhang, *BOE Technology Group Co., Ltd.*  
Hai-bin Han, *BOE Technology Group Co., Ltd.*  
Peng Zhou, *BOE Technology Group Co., Ltd.*  
Makoto Kambe, *BOE Technology Group Co., Ltd.*

**34-2: Invited Paper: Analysis of Temperature Effect of RGB Mini/MicroLED Chips** (Page 406)

Yuanhao Sun, *BOE MLED Technology Co., Ltd.*  
Jiawei Zhao, *BOE MLED Technology Co., Ltd.*  
Junjie Ma, *BOE MLED Technology Co., Ltd.*  
Yicheng Lin, *BOE MLED Technology Co., Ltd.*  
Chao Tian, *BOE MLED Technology Co., Ltd.*  
Lingyun Shi, *BOE MLED Technology Co., Ltd.*  
Haiwei Sun, *BOE MLED Technology Co., Ltd.*

**34-3: High-Contrast Research of 4K ADS TV Technology** (Page 410)

Hongling Hu, *Hefei BOE Display Technology Co., Ltd.*  
Kai Wang, *Hefei BOE Display Technology Co., Ltd.*  
Liangliang Jiang, *Hefei BOE Display Technology Co., Ltd.*  
Heng Zhang, *Hefei BOE Display Technology Co., Ltd.*  
Yajun Li, *Hefei BOE Display Technology Co., Ltd.*  
Xiaobin Li, *Hefei BOE Display Technology Co., Ltd.*

Yinhu Huang, *Hefei BOE Display Technology Co., Ltd.*  
Byung-cheon Lim, *Hefei BOE Display Technology Co., Ltd.*  
Zhangtao Wang, *Hefei BOE Display Technology Co., Ltd.*  
Xibin Shao, *Hefei BOE Display Technology Co., Ltd.*

**34-4: *Invited Student Paper: UBplus/UB-FFS – Premium Performance for Liquid-Crystal TV and IT Displays*** (Page 414)

Lawrence Huang, *Merck Display Materials Co., Ltd., Shanghai, China, an affiliate of Merck KGaA, Darmstadt, Germany*  
Sven Christian Laut, *Merck KGaA Darmstadt, Germany*  
Grace Wang, *Merck Display Materials Co., Ltd., Shanghai, China, an affiliate of Merck KGaA, Darmstadt, Germany*  
Ji-Hun Jung, *Merck Display Materials Co., Ltd., Shanghai, China, an affiliate of Merck KGaA, Darmstadt, Germany*  
Peter Zhao, *Merck Display Materials Co., Ltd., Shanghai, China, an affiliate of Merck KGaA, Darmstadt, Germany*

**34-5: *Invited Paper: C-PS-VA – Innovative LC Materials Enabling Super-High Transmittance for High-Resolution Displays*** (Page 417)

Susan Chuang, *Merck Performance Materials Ltd., Taoyuan, Taiwan, an affiliate of Merck KGaA, Darmstadt, Germany*  
Fred Chen, *Merck Performance Materials Ltd., Taoyuan, Taiwan, an affiliate of Merck KGaA, Darmstadt, Germany*  
Ray Chou, *Merck Performance Materials Ltd., Taoyuan, Taiwan, an affiliate of Merck KGaA, Darmstadt, Germany*  
Joseph Hsieh, *Merck Performance Materials Ltd., Taoyuan, Taiwan, an affiliate of Merck KGaA, Darmstadt, Germany*  
Randy Lin, *Merck Performance Materials Ltd., Taoyuan, Taiwan, an affiliate of Merck KGaA, Darmstadt, Germany*  
Zoe Chen, *Merck Performance Materials Ltd., Taoyuan, Taiwan, an affiliate of Merck KGaA, Darmstadt, Germany*

**34-6: *Invited Paper: High Image Quality in 8K TV LCDs with Negative LC*** (Page 420)

Dongchuan Chen, *BOE Technology Group Co.*  
Jianhua Huang, *BOE Technology Group Co.*  
Xibin Shao, *BOE Technology Group Co.*  
Yanping Liao, *BOE Technology Group Co.*  
Zhangtao Wang, *BOE Technology Group Co.*  
Seungmin Lee, *BOE Technology Group Co.*  
Hongming Zhan, *BOE Technology Group Co.*  
Yuanhui Guo, *BOE Technology Group Co.*  
Lei Guo, *BOE Technology Group Co.*  
Liangliang Jiang, *BOE Technology Group Co.*  
Lifeng Lin, *BOE Technology Group Co.*  
Yingying Qu, *BOE Technology Group Co.*  
Dan Wang, *BOE Technology Group Co.*  
Yinhu Huang, *BOE Technology Group Co.*  
Yujie Gao, *BOE Technology Group Co.*  
Baoqiang Wang, *BOE Technology Group Co.*

## **Session 35: Halo Measurements**

Chair: Frank Rochow, *Tianma Japan, Ltd.*

Co-Chair: Kalluri Sarma, *Display Technology Consulting*

**35-1: *Halo Mura of OLED and FALD LCD: Measurements and Perception for Automotive Displays*** (Page 424)

Karlheinz Blankenbach, *Pforzheim University*  
Faraz Bhatti, *Pforzheim University*

**35-2: *Proposal for Improved Calculation Method for the Halo Effect in Digital Displays Based on Human Brightness Perception*** (Page 428)

Han Byul Lim, *Samsung Display Co., Ltd.*  
Hyunah Suh, *Samsung Display Co., Ltd.*  
Hyeyoung Ha, *Samsung Display Co., Ltd.*  
Hyosun Kim, *Samsung Display Co., Ltd.*  
Young-Jun Seo, *Samsung Display Co., Ltd.*  
Jaejoong Kwon, *Samsung Display Co., Ltd.*  
Changhee Lee, *Samsung Display Co., Ltd.*

**35-3: *Measurement Method of Halo: Halo Length, Angular Halo*** (Page 432)

Hyunah Suh, *Samsung Display*  
Han Byul Lim, *Samsung Display*  
Hyosun Kim, *Samsung Display*

Hyeyoung Ha, *Samsung Display*  
Young-Jun Seo, *Samsung Display*  
Jaejoong Kwon, *Samsung Display*  
Changhee Lee, *Samsung Display*

**35-4: *Student Paper: Systematic Comparisons of Display Performances Including Halo Effect*** (Page 436)

Zhiyong Yang, *University of Central Florida*  
En-Lin Hsiang, *University of Central Florida*  
Yizhou Qian, *University of Central Florida*  
Shin-Tson Wu, *University of Central Florida*

**Session 36: Novel Processes & MicroOptics**

Chair: Fang-Cheng Lin, *Apple, Inc.*

Co-Chair: Jim Zhuang, *Meta*

**36-1: *Invited Paper: Liquid-Crystal Lasers: Recent Advances and Future Opportunities*** (Page 440)

Philip J. W. Hands, *University of Edinburgh*  
Calum M. Brown, *University of Edinburgh*  
Daisy K. E. Dickinson, *University of Edinburgh*  
Stephen M. Morris, *University of Oxford*  
Jia-De Lin, *University of Oxford*

**36-2: *Optimizing Brightness with Microlens Array Gain-Enhancing Films for Edge-Lit Backlight Units***  
(Page 444)

Bing Shen, *BrightView Technologies*  
Kenneth L. Walker, *BrightView Technologies*  
Matthew Pope, *BrightView Technologies*

**36-3: *Novel Silicone Hotmelt Adhesive for Display Assembly Applications*** (Page 447)

Ryosuke Yamazaki, *Dow Toray Co., Ltd.*  
Kouichi Ozaki, *Dow Toray Co., Ltd.*  
Toru Imaizumi, *Dow Toray Co., Ltd.*  
Shinichi Yamamoto, *Dow Toray Co., Ltd.*  
Yoshito Ushio, *Dow Toray Co., Ltd.*

**36-4: *Precision Micro-Optics on Display Technical Glass for Innovative Display Designs*** (Page 450)

Antoine Lesuffleur, *Corning Incorporated*  
Casey Kang, *Corning Incorporated*  
Alejandro Aguilar, *Corning Incorporated*  
Sang-Mook Lee, *Corning Incorporated*  
Chao Yu, *Corning Incorporated*  
Chengshuai Li, *Corning Incorporated*  
Robert Sharps, *Corning Incorporated*  
Markus Rawert, *Temicon GmbH*  
Oliver Humbach, *Temicon GmbH*  
Janine Brommert, *Temicon GmbH*  
Han Zhang, *Temicon GmbH*  
Martin Klasen, *Temicon GmbH*

**Session 37: Holographic and Autostereoscopic 3D Displays**

Chair: Yifan (Evan) Peng, *Stanford University*

Co-Chair: Zong Qin, *Sun Yat-Sen University*

**37-1: *Invited Paper: Advances in Neural Holographic Displays for Virtual and Augmented Reality*** (Page 454)

Manu Gopakumar, *Stanford University*  
Yifan Peng, *Stanford University*  
Suyeon Choi, *Stanford University*  
Jonghyun Kim, *Stanford University & NVIDIA, Santa Clara, CA*  
Gordon Wetzstein, *Stanford University*

**37-2: *Invited Paper: Enabling Augmented-Reality Near-Eye and Head-Up Displays with Neural Holography*** (Page 458)

Suyeon Choi, *Stanford University*  
Yifan (Evan) Peng, *Stanford University*  
Manu Gopakumar, *Stanford University*  
Jonghyun Kim, *Stanford University & NVIDIA*  
Gordon Wetzstein, *Stanford University*

**37-3: *Student Paper: Method of Color Amplitude-Only Hologram Generation for Speckle Noise Suppression*** (Page 462)

Zhao-Song Li, *Beihang University*  
Yi-Wei Zheng, *Beihang University*  
Yi-Long Li, *Beihang University*  
Di Wang, *Beihang University*  
Qiong-Hua Wang, *Beihang University*

- 37-4: [Student Paper: Depth-Enhanced 2D/3D Switchable Display Based on Integral Imaging](#)** (Page 466)  
Qiang Li, *Sichuan University*  
Huan Deng, *Sichuan University*  
Fei-Yan Zhong, *Sichuan University*  
Wei He, *Sichuan University*  
Feng-Bin Rao, *Sichuan University*

- 37-5: [Invited Paper: Flat-Panel Holographic Display](#)** (Page 470)  
Yunhee Kim, *Samsung Electronics Co., Ltd.*  
Hoon Song, *Samsung Electronics Co., Ltd.*  
Jungkwuen An, *Samsung Electronics Co., Ltd.*  
Chilsung Choi, *Samsung Electronics Co., Ltd.*  
Kanghee Won, *Samsung Electronics Co., Ltd.*  
Young Kim, *Samsung Electronics Co., Ltd.*  
Jong-Young Hong, *Samsung Electronics Co., Ltd.*  
Yongkyu Kim, *Samsung Electronics Co., Ltd.*  
Geeyoung Sung, *Samsung Electronics Co., Ltd.*  
Younghun Sung, *Samsung Electronics Co., Ltd.*  
Kichul Kim, *Samsung Electronics Co., Ltd.*  
Hong-Seok Lee, *Samsung Electronics Co., Ltd.*

## Session 38: Micro-LEDs I

Chair: Chris Bower, *X Display Company*

Co-Chair: Jonathan Steckel, *ST Microelectronics*

- 38-2: [Latest Breakthroughs in 200 and 300mm EPI Technology to Unlock the MicroLED Revolution for the Metaverse and Beyond](#)** (Page 474)  
Atsushi Nishikawa, *ALLOS Semiconductors GmbH*  
Alexander Loesing, *ALLOS Semiconductors GmbH*  
Burkhard Slischka, *ALLOS Semiconductors GmbH*

- 38-3: [Invited Paper: MicroLED Device Technology for Low-Power Wearable Displays](#)** (Page 478)  
Joseph Flemish, *Lumileds, LLC*  
Robert Armitage, *Lumileds, LLC*  
Zhongmin Ren, *Lumileds, LLC*  
Wouter Soer, *Lumileds, LLC*  
Hossein Lotfi, *Lumileds, LLC*  
Theodore Chung, *Lumileds, LLC*  
Rajiv Pathak, *Lumileds, LLC*  
Hee Jin Kim, *Lumileds, LLC*  
Brendan Moran, *Lumileds, LLC*  
Willem Sillevs Smitt, *Lumileds, LLC*  
Jia Cheng Tan, *Lumileds Singapore Pte Ltd*  
Yongxiang Melvin Tio, *Lumileds Singapore Pte Ltd*  
Reich Distor, *Lumileds Singapore Pte Ltd*  
Shimin Lim, *Lumileds Singapore Pte Ltd*  
Kheng Boo Lim, *Lumileds Singapore Pte Ltd*  
Anant Vaidyanathan, *Lumileds, LLC*  
Oleg Shchekin, *Lumileds*

- 38-4: [Invited Paper: Inline Screening Known Good Die \(KGD\) Mapping for MicroLEDs](#)** (Page 481)  
John C. Robinson, *KLA Corporation*

## Session 39: E-Paper and Transparent Display Measurements

Chair: Stephen Atwood, *Consultant*

Co-Chair: Karlheinz Blankenbach, *Pforzheim University*

- 39-1: [Distinguished Paper: Gamut Rings of Reflective ePaper Displays with Combined Frontlight and Ambient Illumination](#)** (Page 485)  
Dirk Hertel, *E Ink Corporation*  
Alain Bouchard, *E Ink Corporation*  
Ryan Kruse, *E Ink Corporation*  
John Penczek, *University of Colorado*
- 39-2: [Evaluating the Components of Reflected Glare in Displays](#)** (Page 489)  
John Penczek, *NIST and University of Colorado, Boulder*  
Edward F. Kelley, *KELTEK Research*  
Euan Smith, *42 Technology Ltd.*
- 39-3: [Fluorescence-Enhanced Optical Resonator Constituted of Quantum Dots and Thin-Film Resonant Cavity for High-Efficiency Reflective Color Filter](#)** (Page 493)  
Xiaochuan Chen, *BOE Technology Group Co., Ltd.*  
Pengxia Liang, *BOE Technology Group Co., Ltd.*  
Qian Wu, *BOE Technology Group Co., Ltd.*  
Xue Dong, *BOE Technology Group Co., Ltd.*

**39-4: High-Performance MicroLED Transparent Display** (Page 497)

Liqun Chen, *Tianma Microelectronics Co., Ltd.*  
Haijing Chen, *Tianma Microelectronics Co., Ltd.*  
Tianyi Wu, *Tianma Microelectronics Co., Ltd.*  
Qian Zhou, *Tianma Microelectronics Co., Ltd.*

**Session 40: OLED Devices I**

Chair: Yasunori Kijima, *Huawei Technologies Japan K.K.*

Co-Chair: Larry Liao, *Soochow University*

**40-1: Invited Paper: Marching Toward Theoretical Limits of Blue Fluorescent OLEDs with BI > 300** (Page 501)

Xiao Liang, *Jiangsu Sunera Technology*  
Xudong Cao, *Jiangsu Sunera Technology*  
Chong Li, *Jiangsu Sunera Technology*  
Dongdong Zhang, *Tsinghua University*  
Lian Duan, *Tsinghua University*

**40-2: Invited Paper: Prolonging Device Lifetime of Blue Organic Light-Emitting Diodes** (Page 505)

Sunghan Kim, *Samsung Display Co.*

**40-3: Distinguished Paper: Realization of Ultra-High Efficient Fluorescent Blue OLED** (Page 506)

Satomi Tasaki, *Idemitsu Kosan Co., Ltd.*  
Kazuki Nishimura, *Idemitsu Kosan Co., Ltd.*  
Hiroaki Toyoshima, *Idemitsu Kosan Co., Ltd.*  
Tetsuya Masuda, *Idemitsu Kosan Co., Ltd.*  
Masato Nakamura, *Idemitsu Kosan Co., Ltd.*  
Yuki Nakano, *Idemitsu Kosan Co., Ltd.*  
Hiroaki Itoi, *Idemitsu Kosan Co., Ltd.*  
Emiko Kambe, *Idemitsu Kosan Co., Ltd.*  
Yuichiro Kawamura, *Idemitsu Kosan Co., Ltd.*  
Hitoshi Kuma, *Idemitsu Kosan Co., Ltd.*

**40-4: Double EML Structure for High-Efficiency Organic Light-Emitting Diode** (Page 510)

Eun-Hyung Lee, *LG Display Co., Ltd.*  
Yong-Cheol Kim, *LG Display Co., Ltd.*  
Moon-Sung Kil, *LG Display Co., Ltd.*  
Han-Byeol Seok, *LG Display Co., Ltd.*  
Kil-Yong Shin, *LG Display Co., Ltd.*  
Hyun-Sook Jeon, *LG Display Co., Ltd.*  
Mi-Na Kim, *LG Display Co., Ltd.*  
Heui-Dong Lee, *LG Display Co., Ltd.*  
Ji-Ho Baek, *LG Display Co., Ltd.*  
Jeom-Jae Kim, *LG Display Co., Ltd.*  
Soo-Young Yoon, *LG Display Co., Ltd.*

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## Session 41: Stretchable High-Resolution Displays

Chair: David Hermann, *Seoul National University*

Co-Chair: Jeong-Ik Lee, *ETRI*

**41-1: *Invited Paper: Technical Advances in Stretchable Displays for High Pixel Density and High Stretchability*** (Page 514)

Jangyeol Yoon, *Samsung Display Co., Ltd.*  
Sangwoo Kim, *Samsung Display Co., Ltd.*  
Jun Hyeong Park, *Samsung Display Co., Ltd.*  
Gyujeong Lee, *Samsung Display Co., Ltd.*  
Hosik Shin, *Samsung Display Co., Ltd.*  
Jiwon Lee, *Samsung Display Co., Ltd.*  
Dong Chul Shin, *Samsung Display Co., Ltd.*  
Jong-Ho Hong, *Samsung Display Co., Ltd.*  
Sung-Chan Jo, *Samsung Display Co., Ltd.*  
Changhee Lee, *Samsung Display Co., Ltd.*

**41-2: *Invited Paper: Active-Matrix MicroLED Stretchable Displays and Technical Challenges*** (Page 517)

Haeyoon Jung, *LG Display Co., Ltd*  
Chan Il Park, *LG Display Co., Ltd*  
Moon Bae Gee, *LG Display Co., Ltd*  
Myungsung Kim, *LG Display Co., Ltd*  
Weonsoo Park, *LG Display Co., Ltd*  
Byungjoon Rhee, *LG Electronics Co., Ltd*  
Yoonho Choi, *LG Electronics Co., Ltd*  
Joon-Young Yang, *LG Display Co., Ltd*  
Chang-Dong Kim, *LG Display Co., Ltd*  
Sang Hoon Jung, *LG Display Co., Ltd*  
Yong-Min Ha, *LG Display Co., Ltd*  
Sooyoung Yoon, *LG Display Co., Ltd*

**41-3: *Invited Paper: High Resolution Stretchable Micro-LED Displays*** (Page 521)

Cheng-Liang Wang, *AU Optronics Corporation*  
Shu-Te Ho, *AU Optronics Corporation*  
Wen-Ting Wang, *AU Optronics Corporation*  
Chia-Kai Chen, *AU Optronics Corporation*  
Ching-Fei Yang, *AU Optronics Corporation*  
Cheng-Wei Jiang, *AU Optronics Corporation*  
Chih-Hung Wu, *AU Optronics Corporation*



Wei-Jen Su, *AU Optronics Corporation*  
Hong-Sian Chi, *AU Optronics Corporation*  
Shin-Ru Lin, *AU Optronics Corporation*  
Wei-Lun Hung, *AU Optronics Corporation*  
Yi-Wei Tsai, *AU Optronics Corporation*  
Chang-Chan Wu, *AU Optronics Corporation*  
Ching-Yao Shih, *AU Optronics Corporation*  
Yung-Hsiang Lan, *AU Optronics Corporation*  
Shih-Liang Lin, *AU Optronics Corporation*  
Yi-Da Ho, *AU Optronics Corporation*  
Yi-Fu Ou, *AU Optronics Corporation*  
Chih-Yu Yu, *AU Optronics Corporation*  
Wen-Hui Lee, *AU Optronics Corporation*  
Yen-Huei Lai, *AU Optronics Corporation*  
Hong-Shen Lin, *AU Optronics Corporation*  
Wan-Tsang Wang, *AU Optronics Corporation*  
Yu-Chieh Lin, *AU Optronics Corporation*

**41-4: [Invited Paper: A 200ppi Oval Shape Stretchable AMOLED Display](#)** (Page 524)

Pinfan Wang, *BOE Technology Group Co., Ltd.*  
Zunqing Song, *BOE Technology Group Co., Ltd.*  
Bingwei Wang, *BOE Technology Group Co., Ltd.*  
Haoran Wang, *BOE Technology Group Co., Ltd.*  
Hejin Wang, *BOE Technology Group Co., Ltd.*  
Zheng Liu, *BOE Technology Group Co., Ltd.*  
Shiming Shi, *BOE Technology Group Co., Ltd.*  
Dawei Wang, *BOE Technology Group Co., Ltd.*

## Session 42: Light Field Displays

Chair: Brian Schowengerdt, *University of Washington*

Co-Chair: Shinichi Uehara, *AGC, Inc.*

**42-1: [Invited Paper: High-Resolution Light-Field AR at Comparable Computing Cost to Stereo 3D](#)** (Page 526)

Tomas Sluka, *CREAL*

**42-2: [Spatial Resolution-Tripled Integral Imaging Light-Field Displays with No Loss of Angular Resolution by Recombining Subpixels with Zero Sampling Error](#)** (Page 528)

Wenchao Yang, *Sun Yat-Sen University*  
Yunfan Cheng, *Sun Yat-Sen University*  
Guowei Zou, *Sun Yat-Sen University*  
Bo-Ru Yang, *Sun Yat-Sen University*  
Zong Qin, *Sun Yat-Sen University*

**42-3: [Real-Time Rendering for Integral-Imaging Light-Field Displays Based on a Voxel-Pixel Lookup Table](#)** (Page 533)

Quanzhen Wan, *Sun Yat-Sen University*  
Yuqing Qiu, *Sun Yat-Sen University*  
Ruijia Dai, *Sun Yat-Sen University*  
Wenchao Yang, *Sun Yat-Sen University*  
Bo-Ru Yang, *Sun Yat-Sen University*  
Zong Qin, *Sun Yat-Sen University*

**42-4: [Near-Eye Light-Field Displays with Computational Vision Correction by Manipulating Vector Sampling Rays](#)** (Page 537)

Yuqing Qiu, *Sun Yat-Sen University*  
Quanzhen Wan, *Sun Yat-Sen University*  
Ziyi Wu, *Sun Yat-Sen University*  
Wenchao Yang, *Sun Yat-Sen University*  
Bo-Ru Yang, *Sun Yat-Sen University*  
Zong Qin, *Sun Yat-Sen University*

## Session 43: Micro-LEDs II

Chair: Francois Templier, *CEA-LETI*

Co-Chair: Larry Weber, *Consultant*

**43-2: [Low Efficiency Attenuation and Stable Monochromaticity for Non-Polar m-Plane Micro Light-Emitting Diodes \(MicroLEDs\)](#)** (Page 541)

Yibo Liu, *Hong Kong University of Science and Technology*  
Feng Feng, *Hong Kong University of Science and Technology*  
Ke Zhang, *Hong Kong University of Science and Technology*  
Ka-Wah Chan, *Shenzhen Sitan Technology Co., Ltd.*  
Zhaojun Liu, *Southern University of Science and Technology*  
Hoi Sing Kwok, *Hong Kong University of Science and Technology*

**43-3: *Student Paper: Enhanced External Quantum Efficiency in the Low-Current Region Using Three Terminal GaN-Based Blue Micro-Light-Emitting Diodes*** (Page 545)

Woo Jin BAEK, *Korea Advanced Institute of Science and Technology*  
Dae-Myeong Geum, *Korea Advanced Institute of Science and Technology*  
Juhuk Park, *Korea Advanced Institute of Science and Technology*  
Sang Hyeon Kim, *Korea Advanced Institute of Science and Technology*

**Session 44: E-Paper Display Technologies and Applications**

Chair: Norihisa Kobayashi, *Chiba University*

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

**44-1: *Distinguished Paper: Electrophoretic Display Comprising Black, White, Red, and Yellow Particles*** (Page 549)

HongMei Zang, *E Ink California, LLC*  
Craig Lin, *E Ink California, LLC*  
Hui Du, *E Ink Corporation*  
Haiyan Gu, *E Ink California, LLC*  
Mary Parent, *E Ink California, LLC*  
Yajuan Chen, *E Ink California, LLC*  
Lei Liu, *E Ink California, LLC*

**44-2: *Electronic Tile for Decoration of Outdoor/Indoor Walls*** (Page 553)

Makoto Omodani, *Tokyo Denki University*  
Hiroyuki Yaguchi, *Tokyo Denki University*  
Fusako Kusunoki, *Tama Art University*

**44-3: *High-Performance Color MIP LCD with New Electrode Structure*** (Page 557)

Takashi Sato, *Sharp Display Technology Corporation*  
Takahiro Sasaki, *Sharp Display Technology Corporation*  
Hiroyuki Hakoi, *Sharp Display Technology Corporation*  
Atsuko Kanashima, *Sharp Display Technology Corporation*  
Seiji Maeda, *Sharp Display Technology Corporation*  
Shinji Shimada, *Sharp Display Technology Corporation*  
Kiyoshi Minoura, *Sharp Display Technology Corporation*  
Kiyoshi Minoura, *Sharp Display Technology Corporation*

**Session 45: OLED Devices II**

Chair: Nicholas Thompson., *Universal Display Corporation*

Co-Chair: Ji Ho Baek, *LG Display*

**45-1: *Invited Paper: Charge Balance in OLEDs: Optimization of Hole-Injection Layer*** (Page 561)

Menglan Xie, *Beijing Summer Sprout Technology Co., Ltd.*  
Huiqing Pang, *Beijing Summer Sprout Technology Co., Ltd.*  
Jing Wang, *Beijing Summer Sprout Technology Co., Ltd.*  
Zhihao Cui, *Beijing Summer Sprout Technology Co., Ltd.*  
Ray Kwong, *Beijing Summer Sprout Technology Co., Ltd.*  
Sean Xia, *Beijing Summer Sprout Technology Co., Ltd.*

**45-2: *Invited Paper: Toward High-Performance Organic Transistors for Displays and Other Applications*** (Page 565)

Erjuan Guo, *Technische Universität & University of Cambridge*  
Zhongbin Wu, *Technische Universität & Northwestern Polytechnical University*  
Yuan Liu, *Technische Universität & Beijing Information Science & Technology University*  
Hans Kleemann, *Technische Universität*  
Karl Leo, *Technische Universität*

**45-3: *Effects of Near-UV Irradiation on Organic Light-Emitting Diodes and Their Solutions Using UV Blocking Layer*** (Page 569)

Jungjin Yang, *Samsung Display*  
Hyein Jeong, *Samsung Display*  
Jinwoo Park, *Samsung Display*

**45-4: *A High-Performance Full-Fluorescent Electroluminescence Solution with a 96.5% Coverage of B.T. 2020 Color Gamut*** (Page 573)

Xiaojin Zhang, *BOE Technology Group. Co., Ltd.*  
Xinhua Liu, *BOE Technology Group. Co., Ltd.*  
Haiyan Sun, *BOE Technology Group. Co., Ltd.*  
Yong Wu, *BOE Technology Group. Co., Ltd.*  
Siqi Wang, *BOE Technology Group. Co., Ltd.*  
Xuan Li, *BOE Technology Group. Co., Ltd.*  
Tongzhi Liu, *BOE Technology Group. Co., Ltd.*  
Dan Wang, *BOE Technology Group. Co., Ltd.*

**Session 46: Wearable and Skin-Like Displays**

Chair: Xiaojun Guo, *Shanghai Jiao Tong University*

Co-Chair: Yong Taek Hong, *Seoul National University*

- 46-1: Student Paper: High-Performance Fiber-Based Red OLEDs and TFTs for Truly Wearable Textile Displays** (Page 577)  
 Yong Ha Hwang, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Chan Young Kim, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Seong Uk Kong, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Kyung Cheol Choi, *Korea Advanced Institute of Science and Technology (KAIST)*
- 46-2: Invited Paper: Strip-Helix-Fiber Architecture for Stretchable TFTs and Circuits** (Page 581)  
 Arokia Nathan, *University of Cambridge*  
 Jun Yu, *Shandong University*  
 Chen Jiang, *Tsinghua University*  
 Hanbin Ma, *Tsinghua University*
- 46-3: Invited Paper: Skin-Like Organic Optoelectronic System for Real-Time Heart-Rate Monitoring** (Page 585)  
 Youngjun Yun, *Samsung Electronics*  
 Yeongjun Lee, *Stanford University*  
 Jong Won Chung, *Samsung Electronics*  
 Gae Hwnag Lee, *Samsung Electronics*  
 Hyunbum Kang, *Samsung Electronics*  
 Joo-Young Kim, *Samsung Electronics*  
 Sung-Gyu Kang, *Samsung Electronics*  
 Ji Young Jung, *Samsung Electronics*  
 Yasutaka Kuzumoto, *Samsung Electronics*  
 Sangah Gam, *Samsung Electronics*  
 Suk Gyu Hahm, *Samsung Electronics*  
 Yongtaek Hong, *Seoul National University*  
 Byoungki Choi, *Samsung Electronics*
- 46-4: Student Paper: Reconfigurable and Reusable Soft Modular LED Blocks Assembly** (Page 589)  
 Jaeyoung Yoon, *Seoul National University*  
 Hayun Kim, *Seoul National University*  
 Yongtaek Hong, *Seoul National University*

## Session 47: Automotive Display Optimizations

Chair: David Hermann, *Volvo Car Corporation AB*

Co-Chair: Eric Margulies, *Universal Display Corporation*

- 47-1: Display Outdoor Visibility Enhancement Using Adaptive Tone Mapping** (Page 592)  
 Seungwan Kim, *Samsung Electronics Co., Ltd.*  
 Deoksoo Park, *Samsung Electronics Co., Ltd.*  
 Byoungju Song, *Samsung Electronics Co., Ltd.*  
 Sanghoon Lee, *Samsung Electronics Co., Ltd.*
- 47-2: Monocular Depth Perception Enhancement Based on Joint Shading/Contrast Model and Motion Parallax (JSM)** (Page 596)  
 Seungchul Ryu, *Faurecia Irystec Inc.*  
 Hyunjin Yoo, *Faurecia Irystec Inc.*  
 Tara Akhavan, *Faurecia Irystec Inc.*
- 47-3: Electromagnetic Compatibility Problem Analysis of Flexible Vehicle Organic-light Emitting Display** (Page 600)  
 Hang Dong, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 Xing Huang, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 Qiang Li, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 Cheng-Jie Zhao, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 Yu-Dan Shui, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 Hui Zhao, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 Zheng-De Lai, *Chengdu BOE Optoelectronics Technology Co., Ltd.*  
 You-Xiong Feng, *Chengdu BOE Optoelectronics Technology Co., Ltd.*
- 47-4: Color Acceptability Threshold for Mixed Display Technology Automotive Cockpit** (Page 604)  
 Pooshpanjan Roy Biswas, *Technocentre Renault & ENTPE*  
 Dominique Dumortier, *ENTPE*  
 Herve Drezet, *Technocentre Renault*  
 Marie-Laure Avenel, *Technocentre Renault*

## Session 48: LTPO Technology

Chair: Chiwoo Kim, *APS Holdings*

Co-Chair: Jae-Hoon Lee, *Samsung Display Co*

- 48-1: Solid-State Laser Crystallization for Poly-Si TFTs and Their Applications** (Page 608)  
 Hiroshi Tanabe, *Tianma Japan, Ltd.*  
 Hideki Obata, *Tianma Japan, Ltd.*  
 Ken-ichi Hayashi, *Tianma Japan, Ltd.*  
 Keita Hamada, *Tianma Japan, Ltd.*  
 Isao Shoji, *Tianma Japan, Ltd.*

Shigeru Mori, *Tianma Japan, Ltd.*

**48-2: *Invited Paper: Advanced LTPO Technology for CMOS Driving*** (Page 612)

Kook Chul Moon, *Gachon University*  
Hwarim Im, *Sungkyunkwan University*  
Sara Hong, *Sungkyunkwan University*  
Yong-Sang Kim, *Sungkyunkwan University*

**48-3: *Invited Paper: Fiber-Laser Processing of Si and IGZO Films for Advanced AMOLED Displays on Gen 8 Substrates*** (Page 616)

James S. Im, *Columbia University*  
Ruobing Song, *Columbia University*  
Jayoung Park, *Columbia University*  
Nikita Lisenko, *Columbia University*  
Bonan Shen, *Columbia University*  
Alexander Killips, *Columbia University*  
Adithya P. Nair, *Columbia University*

**48-4: *LTPO Technology Development for Enhanced Display Performance: Image Sticking Phenomena, Circuit Operation, and Backplane Process Integration*** (Page 620)

Daeyoun Cho, *Samsung Display Co., Ltd*  
Jiho Moon, *Samsung Display Co., Ltd*  
T.-Y. Khim, *Samsung Display Co., Ltd*  
Y.-T. Choi, *Samsung Display Co., Ltd*  
Jongwoo Park, *Samsung Display Co., Ltd*

## **Session 49: Light Manipulation for VR/AR Optics**

Chair: Nikhil Balram, *Mojo Vision Inc.*

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

**49-1: *Distinguished Student Paper: Gaze-Matched Pupil Steering Maxwellian-View Augmented-Reality Display*** (Page 624)

Junyu Zou, *University of Central Florida*  
Lingshan Li, *GoerTek Electronics*  
Shin-Tson Wu, *University of Central Florida*

**49-2: *Student Paper: Holographic Near-Eye Display with Expanded Eyebow Based on Exit Pupil Scanning*** (Page 628)

Xinxing Xia, *Shanghai University*  
Weisen Wang, *Shanghai University*  
Yunqing Guan, *Singapore Institute of Technology*  
Furong Yang, *Shanghai University*  
Xinghua Shui, *Shanghai University*  
Huadong Zheng, *Shanghai University*  
Banghua Yang, *Shanghai University*  
Yingjie Yu, *Shanghai University*

**49-3: *Building a Predictive Model for Contrast Ratio of Folded Optic Lens Systems for Virtual Reality*** (Page 632)

Bing Hao, *3M Company*  
Timothy Wong, *3M Company*  
John Le, *3M Company*  
David Aastuen, *3M Company*  
Art Kotz, *3M Company*  
David Rosen, *3M Company*  
Kayla McGrath, *3M Company*  
Susan Kent, *3M Company*

**49-4: *Thin and Lightweight Head-Mounted Displays with Polarized Laser Backlights and Holographic Optics*** (Page 636)

Shinichi Komura, *Japan Display Inc.*  
Koichi Okuda, *Japan Display Inc.*  
Hiroaki Kijima, *Japan Display Inc.*

**49-5: *Fast-Response Pancharatnam-Berry Phase LC Lens for AR Display*** (Page 640)

Shuxin Liu, *Shanghai Jiao Tong university*  
Yan Li, *Shanghai Jiao Tong university*  
Yikai Su, *Shanghai Jiao Tong university*

## **Session 50: Micro-LED Displays I**

Chair: Khaled Ahmed, *Intel Corporation*

Co-Chair: Ioannis Kymissis, *Columbia University*

**50-1: *Invited Paper: Designs and Manufacturing Processes for MicroLED Displays in Handsets, Smartwatches, and Personal Computers.*** (Page 644)

Matthew A. Meitl, *X Display Company (XDC) Inc.*  
Murat Ozbas, *X Display Company (XDC) Inc.*

Imre Knausz, *X Display Company (XDC) Inc.*  
Sophia Fox, *X Display Company (XDC) Inc.*  
Andrew Pearson, *X Display Company (XDC) Inc.*  
Nikhil Jain, *X Display Company (XDC) Inc.*  
Erich Radauscher, *X Display Company (XDC) Inc.*  
Sal Bonafede, *X Display Company (XDC) Inc.*  
Clint Meyer, *X Display Company (XDC) Inc.*  
Chris Verreen, *X Display Company (XDC) Inc.*  
John Lynch, *X Display Company (XDC) Inc.*  
Ben Keller, *X Display Company (XDC) Inc.*  
Carl Prevatte, *X Display Company (XDC) Inc.*  
Christopher A. Bower, *X Display Company (XDC) Inc.*

**50-2: [Invited Paper: Why Does the Road to High-Volume Production of MicroLED Displays Pass Through the Semiconductor Industry?](#)** (Page 648)

Makarem A Hussein, *LuxNour Technologies*  
Nabil Elsayed, *LuxNour Technologies*

**50-3: [Status of MicroLED Mass-Transfer Processes and Equipment](#)** (Page 650)

Eric H. Virey, *Yole Developpement*  
Zine Bouhamri, *Yole Developpement*

**50-4: [Invited Paper: Development of MicroLED Display Technology and Applications](#)** (Page 654)

Ying-Tsang (Falcon) Liu, *PlayNitride Display Co., Ltd.*  
Yun-Li Li, *PlayNitride Display Co., Ltd.*

## **Session 51: Large and Tiled Display Technologies**

Chair: K. Käländtär, *Global Optical Solutions*

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

**51-1: [Method to Suppress Tiled Display Seam Visibility](#)** (Page 658)

Shenping Li, *Corning Research & Development Corporation*  
Alexander L Cuno, *Corning Research & Development Corporation*  
Sean M Garner, *Corning Research & Development Corporation*  
Dongkeun Shin, *Corning Technology Center Korea*  
Hong Yoon, *Corning Technology Center Korea*  
Seungyong Park, *Corning Technology Center Korea*  
Kyungjin Lee, *Corning Technology Center Korea*  
Daeyoun Kim, *Corning Technology Center Korea*  
Goo-Soo Lee, *Corning Technology Center Korea*

**51-2: [Glass Solution for Zero Border Design \(ZBD\) TVs: Advantages and Prevention of Border Light Leakage](#)** (Page 662)

Tzu-ling Niu, *Corning Incorporated*  
Chi-Hsiang Yang, *Corning Incorporated*  
Wei-Shin Chen, *Corning Incorporated*  
Bor-Kai Wang, *Corning Incorporated*  
Xiang-Dong Mi, *Corning Incorporated*  
Hsuan-Yu Teng, *Corning Incorporated*  
Andy Sullivan, *Corning Incorporated*  
Tomohiro Ishikawa, *Corning Incorporated*

**51-3: [65-in. Splicing Screen Adapted to a Wide Temperature Range and High Brightness](#)** (Page 666)

Xipeng Wang, *Hefei BOE Display Technology Co., Ltd.*  
Wei Zhang, *Hefei BOE Display Technology Co., Ltd.*  
Yinhu Huang, *Hefei BOE Display Technology Co., Ltd.*  
Byung Cheon Lim, *Hefei BOE Display Technology Co., Ltd.*  
Zhangtao Wang, *Hefei BOE Display Technology Co., Ltd.*  
Xibin Shao, *Hefei BOE Display Technology Co., Ltd.*

**51-4: [Design, Measurements, and Evaluation of Exterior Displays for Autonomous Cars](#)** (Page 669)

Nadine Nowak, *Pforzheim University*  
Karlheinz Blankenbach, *Pforzheim University*

## Session 52: OLED Displays I

Chair: Yifan Zhang, *Apple, Inc.*

Co-Chair: Sangmoo Choi, *Google LLC*

**52-1:** [Invited Paper: Technical Progress of OLED Displays for Premium TVs](#) (Page 673)

Hong-Jae Shin, *Large Display Business Unit*

Soo-Hong Choi, *Large Display Business Unit*

Seong-Hwan Hong, *Large Display Business Unit*

Chang-Hoon Lee, *Large Display Business Unit*

Du-Hwan Oh, *Large Display Business Unit*

Sung-Joon Bae, *Large Display Business Unit*

Tae-Shick Kim, *Large Display Business Unit*

Hong-Sung Song, *Large Display Business Unit*

Han-Seop Kim, *Large Display Business Unit*

Chang-Ho Oh, *Large Display Business Unit*

**52-2:** [Ultrawide-Color Gamut, Low-Power Consumption White OLEDs for Large 8K OLED TV](#) (Page 677)

Juanjuan You, *Hefei BOE Joint Technology Co., Ltd.*

Bin Bo, *Hefei BOE Joint Technology Co., Ltd.*

Chang-Yen Wu, *Hefei BOE Joint Technology Co., Ltd.*

Linlin Wang, *Hefei BOE Joint Technology Co., Ltd.*

Yongqi Shen, *Hefei BOE Joint Technology Co., Ltd.*

Wenfeng Song, *Hefei BOE Joint Technology Co., Ltd.*

Guang Yan, *BOE Technology Group Co., Ltd.*

Li Sun, *Hefei BOE Joint Technology Co., Ltd.*

Wei Quan, *Hefei BOE Joint Technology Co., Ltd.*

Donghui Yu, *Hefei BOE Joint Technology Co., Ltd.*

Xiang Wan, *Hefei BOE Joint Technology Co., Ltd.*

Xinxin Wang, *Hefei BOE Joint Technology Co., Ltd.*

Huai-Ting Shih, *Hefei BOE Joint Technology Co., Ltd.*

Zhongyuan Wu, *Hefei BOE Joint Technology Co., Ltd.*

Jianwei Yu, *Hefei BOE Joint Technology Co., Ltd.*

**52-3:** [Enhanced Viewing-Angle Performance of an Advanced WRGB OLED Technology](#) (Page 681)

Don Gyou Lee, *LG Display Co., Ltd.*

JungHyun Ham, *LG Display Co., Ltd.*

SungJin Kim, *LG Display Co., Ltd.*

SeonMee Lee, *LG Display Co., Ltd.*

SeRi Oh, *LG Display Co., Ltd.*

DongWoo Kang, *LG Display Co., Ltd.*

BuYeol Lee, *LG Display Co., Ltd.*

SooYoung Yoon, *LG Display Co., Ltd.*

**52-4:** [Novel Polarizer-Free OLED Structure with High Optical Gain](#) (Page 685)

Jongbeom Hong, *Samsung Display*

Gunshik Kim, *Samsung Display*

Choongyoul Im, *Samsung Display*

Youngjun Yoo, *Samsung Display*

Younho Han, *Samsung Display*

Seungin Back, *Samsung Display*

Yongjo Kim, *Samsung Display*

**52-5:** [A Color Gamut Mapping Method Using an OLED Display Model](#) (Page 688)

Deoksoo Park, *Samsung Electronics Co., Ltd.*



Hoseok Shin, *Samsung Electronics Co., Ltd.*  
Byoungju Song, *Samsung Electronics Co., Ltd.*  
Seungwan Kim, *Samsung Electronics Co., Ltd.*  
Joohyuk Yum, *Samsung Electronics Co., Ltd.*

### **Session 53: Foldable Displays**

Chair: Yifan Zhang, *Apple, Inc.*

Co-Chair: Sangmoo Choi, *Google LLC*

**53-1:** [Foldable Display Architecture Technique Depending on Wide Temperature Range and Folding Curvature](#) (Page 692)

Min-Ho Lee, *LG Display*

Se-Jin Jang, *LG Display*

Byoung-Har Hwang, *LG Display*

Tae-hyoung Kwak, *LG Display*

Jeom-Jae Kim, *LG Display*

SooYoung Yoon, *LG Display*

**53-2:** [Analysis of the Advantages of a Water-Drop Shape Foldable Display](#) (Page 696)

Shiming Shi, *BOE Technology Group Co., Ltd.*

Zhao Li, *BOE Technology Group Co., Ltd.*

Xiaofei Luo, *BOE Technology Group Co., Ltd.*

Wenxiu Zhu, *BOE Technology Group Co., Ltd.*

Song Zhang, *BOE Technology Group Co., Ltd.*

Dawei Wang, *BOE Technology Group Co., Ltd.*

Shuang Du, *BOE Technology Group Co., Ltd.*

Tao Wang, *BOE Technology Group Co., Ltd.*

Xuekai Yang, *BOE Technology Group Co., Ltd.*

**53-3:** [Worldwide First Real Borderless and High-Resolution MicroLED Display](#) (Page 700)

Tin Kang, *AU Optronics Corp.*

Tsung-Ying Ke, *AU Optronics Corp.*

Zih-Shuo Huang, *AU Optronics Corp.*

Kun-Long Hsieh, *AU Optronics Corp.*

Yu-Ling Lin, *AU Optronics Corp.*

Fu-Jung Chen, *AU Optronics Corp.*

Yi-Shao Li, *AU Optronics Corp.*

Wei-Chih Chen, *AU Optronics Corp.*

Chia-Ting Hsieh, *AU Optronics Corp.*

Hsiu-Hua Wang, *AU Optronics Corp.*

Chan-Jui Liu, *AU Optronics Corp.*

Wei-Ting Lin, *AU Optronics Corp.*

Chun-Cheng Cheng, *AU Optronics Corp.*

Yen-Huei Lai, *AU Optronics Corp.*

Wan-Tsang Wang, *AU Optronics Corp.*

Yu-Chieh Lin, *AU Optronics Corp.*



Fu-Jung Chen, *AU Optronics Corp.*  
Yi-Shao Li, *AU Optronics Corp.*  
Wei-Chih Chen, *AU Optronics Corp.*  
Chia-Ting Hsieh, *AU Optronics Corp.*  
Hsiu-Hua Wang, *AU Optronics Corp.*  
Chan-Jui Liu, *AU Optronics Corp.*  
Wei-Ting Lin, *AU Optronics Corp.*  
Chun-Cheng Cheng, *AU Optronics Corp.*  
Yen-Huei Lai, *AU Optronics Corp.*  
Wan-Tsang Wang, *AU Optronics Corp.*  
Yu-Chieh Lin, *AU Optronics Corp.*

## Session 54: HUD and Transparent Automotive Displays

Chair: David Hermann, *Volvo Car Corporation AB.*

Co-Chair: Haruhiko Okumura, *Toshiba Corporation*

- 54-1: *Invited Paper: AR in an Automobile: 3D AR-HUD*** (Page 704)  
Eunyoung Jeong, *Naver Labs*  
Junho Jeon, *Naver Labs*  
Sujung Kim, *Naver Labs*  
Jae Won Cha, *Naver Labs*
- 54-2: *A Measurement-Based Image Compositing for 3D Head-Up Display*** (Page 708)  
Akinori Sato, *Kyocera Corporation*  
Ayuki Hayashishita, *Kyocera Corporation*  
Kaoru Kusafuka, *Kyocera Corporation*
- 54-3: *Reduced Solar-Loading Using Micro-Mirror Array in Automotive HUD*** (Page 712)  
Kenneth Li, *Optonomous Technologies Inc.*
- 54-4: *Distinguished Student Paper: Low-Diffraction Transparent  $\mu$ LED Displays with Optimized Pixel Structure*** (Page 715)  
Qian Yang, *University of Central Florida*  
Zhiyong Yang, *University of Central Florida*  
Yi-Fen Lan, *AU Optronics Corp.*  
Shin-Tson Wu, *University of Central Florida*
- 54-5: *Consideration of Image Distance on Cognitive Tunneling with Augmented-Reality Head-Up Displays*** (Page 719)  
Joseph Pullukat, *NS North America/Nippon Seiki*  
Ethan To, *NS North America/Nippon Seiki*

## Session 55: Advanced Manufacturing Process Technologies

Chair: Joerg Winkler, *PLANSEE SE*

Co-Chair: Tian Xiao, *NEXT Biometrics Inc.*

- 55-1: *Deposition of Conductive and Insulating Materials at Micrometer Scale for Display-Component Prototyping*** (Page 723)  
Mateusz Łysień, *XTPL SA & Polish Academy of Sciences*  
Łukasz Witczak, *XTPL SA*  
Jolanta Gadzalińska, *XTPL SA*  
Iwona Grądzka-Kurzaj, *XTPL SA*  
Ludovic Schneider, *XTPL SA*  
Aneta Wiatrowska, *XTPL SA*  
Karolina Fiączyk, *XTPL SA*  
Piotr Kowalczewski, *XTPL SA*  
Filip Granek, *XTPL SA*
- 55-2: *Roll-to-Plate Nanoimprint Lithography as Etching Mask Creating Large-Area Structured Surfaces*** (Page 727)  
Jan Matthijs ter Meulen, *Morphotonics B.V.*  
L. W. (Pim) Veldhuizen, *Morphotonics B.V.*  
Danielle A. C. van der Heijden, *Morphotonics B.V.*  
Erhan Ercan, *Morphotonics B.V.*  
Bram J. F. Titulaer, *Morphotonics B.V.*
- 55-3: *Development of Low-Temperature Metal Dry-Etching Equipment via ECR Plasma Source*** (Page 729)  
Chiwoo Kim, *APS Research*  
Jae Hoon Jung, *APS Holdings*  
Jin Nyoung Jang, *APS Research*  
Jong Hwa Lee, *APS Research*  
Kiro Jung, *APS Research*  
Ho-Won Yoon, *Korea University*  
Sangheon Lee, *Korea University*  
Donghoon Kim, *Korea University*  
Mun-Pyo Hong, *Korea University*  
Sang-Gab Kim, *Samsung Display*

## Session 56: System Architectures for VR/AR/MR

Chair: W. Hendrick, *Collins Aerospace*

Co-Chair: Brian Berkeley, *Highlight Display, LLC*

- 56-1: Novel Optical Structure of OLED Panel for Immersive and Seamless VR** (Page 733)  
Kwang Soo Bae, *Samsung Display*  
Minjeong Oh, *Samsung Display*  
Gun Hee Kim, *Samsung Display*  
Sang Hwan Cho, *Samsung Display*  
Sung-Chan Jo, *Samsung Display*
- 56-2: A Distraction-Free Display System Using Embedded Asynchronous Time Warp** (Page 736)  
Wook Hong, *RAONTECH Inc.*  
Sanghyun Park, *RAONTECH Inc.*  
Hokwon Kim, *RAONTECH Inc.*  
Joon Goo Lee, *RAONTECH Inc.*
- 56-3: New Ultra Low-Power High Brightness Microdisplays Enabling Broad Applications** (Page 740)  
Philipp Wartenberg, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Andreas Fritscher, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Stephan Brenner, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Bernd Richter, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Simone Lenk, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Martin Rolle, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Judith Baumgarten, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Karsten Fehse, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Christian Schmidt, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*  
Uwe Vogel, *Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP*

## Session 57: Micro-LED Displays II

Chair: Ioannis Kymissis, *Columbia University*

Co-Chair: Jonathan Steckel, *ST Microelectronics*

- 57-1: ActiveHogel Light-Field Display: An Application of Next-Generation  $\mu$ LED Pixels** (Page 744)  
Thomas Burnett, *FoV<sup>3D</sup>*  
Kyle Roman, *FoV<sup>3D</sup>*
- 57-3: MicroLED Display Integration on 300mm Advanced CMOS Platform** (Page 748)  
Soeren Steudel, *MICLEDI Microdisplays BV*  
Johan Vertommen, *MICLEDI Microdisplays BV*  
Emmanuel Le Boulbar, *MICLEDI Microdisplays BV*  
Giuseppe Buscemi, *MICLEDI Microdisplays BV*  
Lars Bach, *MICLEDI Microdisplays BV*  
Stefaan Van Huylenbroeck, *imec*  
Hariharan Arumugam, *imec*  
Douglas Charles La Tulipe, *imec*  
Joeri De Vos, *imec*  
Andy Miller, *imec*  
Haris Osman, *imec*  
Kenneth June Rebbis, *imec*
- 57-4: Invited Paper: Progress on Key Innovations in Direct-View  $\mu$ LED Display Manufacturing** (Page 752)  
Mingwei Zhu, *Applied Materials, Inc.*  
Hou T. Ng, *Applied Materials, Inc.*  
Sivapackia Ganapathiappan, *Applied Materials, Inc.*  
Zhiyong Li, *Applied Materials, Inc.*  
Robert Visser, *Applied Materials, Inc.*  
Nag Patibandla, *Applied Materials, Inc.*

## Session 58: Smart Windows

Chair: Abhishek Srivastava, *Hong Kong University of Science & Technology*

Co-Chair: Karlheinz Blankenbach, *Pforzheim University*

- 58-1: Invited Paper: LC Dynamic Glazing – The Window Becomes a Pixel and the Façade a Giant Display** (Page 754)  
Michael Grund, *Merck KGaA*  
Céline Glipa, *eyrise B.V.*  
Jens Osterodt, *Merck KGaA*  
Peter-Paul Michiels, *eyrise B.V.*

- 58-2: ELM: A Revolutionary New Smart Glass Technology** (Page 757)  
 Romaric Massard, *eLstar Dynamics*  
 Anthony Slack, *eLstar Dynamics*
- 58-3: Switchable Liquid-Crystal Phase Grating with Rainbow-Free Hazy States** (Page 760)  
 Chin-An Lin, *AU Optronics Corporation*  
 Kun-Cheng Tien, *AU Optronics Corporation*  
 Chien-Huang Liao, *AU Optronics Corporation*
- 58-4: Factors Affecting the Thermal Performance of Dye-doped Liquid Crystal Smart Window** (Page 764)  
 Zhan Li, *Beijing BOE Sensor Technology Co., Ltd.*  
 Xiaoqian Ju, *Beijing BOE Sensor Technology Co., Ltd.*  
 Chuncheng Che, *Beijing BOE Sensor Technology Co., Ltd.*  
 Zhi Hou, *Beijing BOE Sensor Technology Co., Ltd.*  
 Chunlei Wang, *Beijing BOE Sensor Technology Co., Ltd.*  
 Yuansheng Zang, *Hefei BOE Optoelectronics Technology Co., Ltd.*  
 Juan Chen, *Beijing BOE Sensor Technology Co., Ltd.*  
 Yue Li, *Beijing BOE Sensor Technology Co., Ltd.*  
 Sikai Zhang, *Beijing BOE Sensor Technology Co., Ltd.*  
 Xuebo Zhang, *Beijing BOE Sensor Technology Co., Ltd.*  
 Ying Wang, *Beijing BOE Sensor Technology Co., Ltd.*  
 Shuai Xu, *Beijing BOE Sensor Technology Co., Ltd.*  
 Deshen Zhai, *Beijing BOE Sensor Technology Co., Ltd.*  
 Peng Liang, *Beijing BOE Sensor Technology Co., Ltd.*  
 Changyin Wang, *Beijing BOE Sensor Technology Co., Ltd.*  
 Xiaolong Wu, *Beijing BOE Sensor Technology Co., Ltd.*

## Session 59: OLED Displays II

Chair: DZ Peng, *Tianma*

Co-Chair: Yuan-Chun Wu, *China Star Optoelectronics*

- 59-1: Invited Paper: Scaling Down of OLED Pixels Enabled by Photolithography** (Page 768)  
 Tung-Huei Ke, *imec*  
 Arjun Singh, *FUJIFILM Electronic Materials*  
 Firat Tankut, *imec*  
 Erwin Vandenplas, *imec*  
 Marc Ameys, *imec*  
 Pawel Malinowski, *imec*  
 Jan Genoe, *imec*  
 Paul Heremans, *imec*
- 59-2: Invited Paper: High-Color-Gamut Organic Light-Emitting Diode Microdisplay for Augmented-Reality/Virtual-Reality Devices** (Page 772)  
 Dae Hyun Ahn, *Electronics and Telecommunications Research Institute*  
 Jin-Wook Shin, *Electronics and Telecommunications Research Institute*  
 Kukjoo Kim, *Electronics and Telecommunications Research Institute*  
 Chul Woong Joo, *Electronics and Telecommunications Research Institute*  
 Hyunsu Cho, *Electronics and Telecommunications Research Institute*  
 Sukyung Choi, *Electronics and Telecommunications Research Institute*  
 Byoung-Hwa Kwon, *Electronics and Telecommunications Research Institute*  
 Gi Heon Kim, *Electronics and Telecommunications Research Institute*  
 Chun-Won Byun, *Electronics and Telecommunications Research Institute*  
 Nam Sung Cho, *Electronics and Telecommunications Research Institute*  
 Jeong-Ik Lee, *Electronics and Telecommunications Research Institute*  
 Soobin Shim, *Sookmyung Women's University*  
 Jinha Ryu, *Sookmyung Women's University*  
 Hyunkoo Lee, *Sookmyung Women's University*  
 Hyoc Min Youn, *Dongjin Semichem Co., Ltd.*  
 Young Jae An, *Dongjin Semichem Co., Ltd.*  
 Jin Sun Kim, *Dongjin Semichem Co., Ltd.*  
 Jeong Hwan Lee, *RAONTECH*  
 Hokwon Kim, *RAONTECH*  
 Minseok Kim, *RAONTECH*  
 Chan-mo Kang, *Electronics and Telecommunications Research Institute*
- 59-3: A Thin, Transparent Encapsulation Film with Excellent Gap-filling Performance for Ultra-High-Resolution OLEDs via Vapor-phase Deposited Polymeric Layer** (Page 776)  
 Byeong Gyu Roh, *LG Display Co. LTD.*  
 Han Il Kim, *LG Display Co. LTD.*  
 Seung Chul Park, *LG Display Co. LTD.*  
 Ji Ho Baek, *LG Display Co. LTD.*  
 Yong Cheon Park, *KAIST*  
 Youson Kim, *KAIST*  
 Sung Gap Im, *KAIST*

**59-4: Premium Black for Large White OLED** (Page 780)

Ga-ram Hong, *LG Display Co., Ltd.*  
Jung Hyun Ham, *LG Display Co., Ltd.*  
Chung Sun Lim, *LG Display Co., Ltd.*,  
Sang Min Lee, *LG Display Co., Ltd.*  
Tae Rim Lee, *LG Display Co., Ltd.*  
Han Seop Kim, *LG Display Co., Ltd.*  
Chang Ho Oh, *LG Display Co., Ltd.*

**Session 60: E-Paper Technologies**

Chair: Makoto Omodani, *Tokyo Denki University*

Co-Chair: Keisuke Hashimoto, *E Ink Holdings*

**60-1: Distinguished Paper: Electrophoretic E-Paper Device with Stretchable, Washable, and Rewritable Functions** (Page 784)

Zhiguang Qiu, *Sun Yat-Sen University*  
Simu Zhu, *Sun Yat-Sen University*  
Hao Lu, *Sun Yat-Sen University*  
Yifan Gu, *Sun Yat-Sen University*  
Ziyi Wu, *Sun Yat-Sen University*  
Gaofan Zhang, *Sun Yat-Sen University*  
Boru Yang, *Sun Yat-Sen University*

**60-2: Image-Plane Separation Artifacts in Multi-Layer Color-Reflective Displays** (Page 788)

Alex Henzen, *South China Normal University & Shenzhen Liquid Light Technology Co., Ltd. & Shenzhen Guohua Optoelectronics Tech. Co., Ltd.*  
Dong Yuan, *South China Normal University*  
Yuanyuan Guo, *Shenzhen Guohua Optoelectronics Tech. Co., Ltd.*

**60-3: Invited Paper: Active-Matrix Digital Microfluidics System for Single-Cells Manipulation** (Page 791)

Dongping Wang, *Suzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences*  
Siyi Hu, *Suzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Sciences*  
Hanbin Ma, *Guangdong ACXEL Micro & Nano Tech Co., Ltd.*

**Session 61: Novel Large-Area Automotive Displays**

Chair: Casey Kang, *Corning Incorporated*

Co-Chair: Eric Margulies, *Universal Display Corporation*

**61-1: Invited Paper: OLED Technology for Automotive Display Applications** (Page 794)

Tomasz Tarnowski, *Mercedes - Benz AG*  
Markus Kreuzer, *Mercedes - Benz AG*  
Robert Haidenthaler, *Mercedes - Benz AG*  
Markus Aichholz, *Mercedes - Benz AG*  
Matthias Pohl, *Mercedes - Benz AG*  
Achim Pross, *Mercedes - Benz AG*

**61-2: Invited Paper: ShyTech Displays - High-Resolution Displays Hidden Behind Decorative Surfaces** (Page 798)

Juergen Baethis, *Continental Automotive GmbH*  
Kai Hohmann, *Continental Automotive GmbH*

**61-3: Invited Paper: Switchable Privacy Mode Applied to Automotive Displays** (Page 802)

Zhi Peng Zhang, *BOE Optoelectronics Technology Co., Ltd.*  
Yue Zhai, *BOE Optoelectronics Technology Co., Ltd.*  
Xiao Qiao Dong, *BOE Optoelectronics Technology Co., Ltd.*  
Si Te Cai, *BOE Optoelectronics Technology Co., Ltd.*  
Yoon DK, *BOE Optoelectronics Technology Co., Ltd.*  
Qing Ma, *BOE Optoelectronics Technology Co., Ltd.*  
Rui Han, *BOE Optoelectronics Technology Co., Ltd.*  
Jie Yu, *BOE Optoelectronics Technology Co., Ltd.*  
Dong Cui, *BOE Optoelectronics Technology Co., Ltd.*  
Yuan Zhu, *BOE Optoelectronics Technology Co., Ltd.*

**61-4: Display Visual Security: From Laptop Privacy to No Driver Distraction for Automotive Passenger Infotainment** (Page 804)

Graham J. Woodgate, *Rain Technology Research Ltd.*  
Michael G. Robinson, *Rain Technology*  
Jonathan Harrold, *Rain Technology Research Ltd.*  
Benjamin C. Ihas, *Rain Technology*  
Robert A. Ramsey, *Rain Technology*

**Session 62: Innovative Glass Substrates and Processing**

Chair: Andriy Romanyuk, *Glas Troesch AG*

Co-Chair: Kazutaka Hayashi, *AGC, Inc.*

- 62-1: Large-Area Ion Implantation Source for Production of Anti-Reflection Surfaces in Glass and Sapphire Substrates** (Page 808)  
 Alexander Welsh, *Malachite Technologies, Inc.*  
 Robert Weiss, *Malachite Technologies, Inc.*  
 David Brown, *Malachite Technologies, Inc.*  
 Nicholas White, *Albion Systems*
- 62-2: Ultra-Flat, Low-Density, and High-Refractive-Index Glass Wafers for Augmented Reality: Weight Reduction as Key Enabler for Consumer Devices** (Page 812)  
 Frederik Bachhuber, *SCHOTT AG*  
 Ruediger Sprengard, *SCHOTT AG*  
 Matthias Jotz, *SCHOTT AG*  
 Clemens Ottermann, *SCHOTT AG*  
 Stefan Weidlich, *SCHOTT AG*  
 Bianca Schreder, *SCHOTT AG*  
 Lenka Deneke, *SCHOTT AG*  
 Olaf Claussen, *SCHOTT AG*  
 Zhengyang Lu, *Schott Glass Technologies*  
 Alex Wang, *Schott Glass Technologies*  
 Congshan Wan, *Schott Glass Technologies*
- 62-3: Distinguished Paper: High, Precise Laser Glass Cutting for Future Displays** (Page 815)  
 Woohyun Jung, *Samsung Display*  
 Hyungsik Kim, *Samsung Display*  
 Alexander Voronov, *Samsung Display*  
 Sunggyu Park, *Samsung Display*  
 Jekil Ryu, *Samsung Display*  
 SeongHo Jeong, *Samsung Display*  
 Cheol Lae Roh, *Samsung Display*
- 62-4: Investigation of the Influence of Film Stress on Glass Strength** (Page 819)  
 Wencheng Hu, *HeFei BOE Photoelectric Technology Co., Ltd.*  
 Zhengwei Zhu, *HeFei BOE Photoelectric Technology Co., Ltd.*  
 Sheng Wang, *HeFei BOE Photoelectric Technology Co., Ltd.*  
 SeungKyu Lee, *HeFei BOE Photoelectric Technology Co., Ltd.*  
 Man Wang, *HeFei BOE Photoelectric Technology Co., Ltd.*  
 Jianwei Ni, *HeFei BOE Photoelectric Technology Co., Ltd.*

### Session 63: Emerging Approaches for AR/VR/MR

Chair: Ian Underwood, *University of Edinburgh*

Co-Chair: Soon-Gi Park, *LetinAR*

- 63-1: Distinguished Student Paper: Microsecond High-Contrast Continuous  $2.25\pi$  Phase Modulation Based on Non-Linear Kerr Effect of VADHFLC** (Page 823)  
 Zheng-Nan Yuan, *Hong Kong University of Science and Technology*  
 Zhi-Bo Sun, *Hong Kong University of Science and Technology*  
 Xin-Yi Yu, *Hong Kong University of Science and Technology*  
 Ming Cheng, *Hong Kong University of Science and Technology*  
 Yue-chu Cheng, *Hong Kong University of Science and Technology*  
 An-ran LI, *HKUST*  
 Valerii Vashchenko, *Hong Kong University of Science and Technology*  
 Hoi-Sing Kwok, *Hong Kong University of Science and Technology*  
 Abhishek K. Srivastava, *Hong Kong University of Science and Technology*
- 63-2: Research on Stray Light Affecting the Imaging of Fresnel Lens in Virtual-Reality Equipment** (Page 827)  
 Haitao Huang, *BOE Technology Group Co., Ltd.*  
 Ruijun Dong, *BOE Technology Group Co., Ltd.*  
 Na Han, *BOE Technology Group Co., Ltd.*  
 Jiarong Bai, *BOE Technology Group Co., Ltd.*  
 Yulong Wu, *BOE Technology Group Co., Ltd.*  
 Ke Li, *BOE Technology Group Co., Ltd.*  
 Chenru Wang, *BOE Technology Group Co., Ltd.*  
 Zhanshan Ma, *BOE Technology Group Co., Ltd.*  
 Lili Chen, *BOE Technology Group Co., Ltd.*  
 Hao Zhang, *BOE Technology Group Co., Ltd.*
- 63-3: Student Paper: High-Directivity Emitting Pixel Devices for Advanced Display Applications** (Page 830)  
 Po-Jui Chen, *National Taiwan University*  
 Chi-Jui Chang, *National Taiwan University*  
 Wei-Kai Lee, *National Taiwan University*  
 Zih-Rou Cyue, *National Taiwan University*  
 Li-Yu Yu, *National Taiwan University*  
 Hoang Yan Lin, *National Taiwan University*  
 Guo-Dung J. Su, *National Taiwan University*



Chung-Chia Chen, *Applied Materials, Inc.*  
Wan-Yu Lin, *Applied Materials, Inc.*  
B. Leo Kwak, *Applied Materials, Inc.*  
Robert Jan Visser, *Applied Materials, Inc.*  
Chung-Chih Wu, *National Taiwan University*

**63-4: A Novel Real-Time Full-Color 3D Holographic (Diffractive) Video Capture, Processing, and Transmission Pipeline Using Off-the-Shelf Hardware** (Page 833)

Ankur Samanta, *R42 Institute*  
Gregor Mackenzie, *R42 Institute*  
Tyler Rathkamp, *R42 Institute*  
Adrian Cable, *R42 Institute*  
Darran Milne, *VividQ*  
Andrzej Kaczorowski, *VividQ*  
Ronjon Nag, *R42 Institute*

**Session 64: Mini-LED BLU for HDR Display**

Chair: K. Kälantär, *Global Optical Solutions*

Co-Chair: Daming Xu, *Apple Inc*

**64-1: Local Dimming Technology of Scene Adaptation for Massive MiniLED** (Page 837)

Xitong Ma, *BOE Technology Group Co., Ltd.*  
Shuguo Zhang, *BOE Technology Group Co., Ltd.*  
Ran Duan, *BOE Technology Group Co., Ltd.*  
Congrui Wu, *BOE Technology Group Co., Ltd.*  
Xian Wang, *BOE Technology Group Co., Ltd.*  
Lihua Geng, *BOE Technology Group Co., Ltd.*  
Tao Li, *BOE Technology Group Co., Ltd.*

**64-2: Ultra-Thin RGB-MiniLED Direct Back Light for High-End Professional Liquid-Crystal Displays** (Page 841)

Xianqin Meng, *BOE Technology Group Co., Ltd.*  
Xiaochuan Chen, *BOE Technology Group Co., Ltd.*  
Weiting Peng, *BOE Technology Group Co., Ltd.*  
Shunhang Zhang, *BOE Technology Group Co., Ltd.*  
Wei He, *BOE Technology Group Co., Ltd.*  
Shuang Sun, *BOE Technology Group Co., Ltd.*  
Wei Wang, *BOE Technology Group Co., Ltd.*  
Pengxia Liang, *BOE Technology Group Co., Ltd.*  
Qiaofeng Tan, *Tsinghua University*  
Xue Dong, *BOE Technology Group Co., Ltd.*

**64-3: Patterned Glass Diffuser for MiniLED Count Reduction** (Page 845)

Xiang-Dong Mi, *Corning Incorporated*  
Donglei Li, *BOE Technology Group Co., Ltd.*  
Jie Gao, *BOE Technology Group Co., Ltd.*  
Xiaofei Xu, *BOE Technology Group Co., Ltd.*  
Haiwei Sun, *BOE Technology Group Co., Ltd.*  
Lily Jia, *BOE Technology Group Co., Ltd.*  
Songfeng Han, *Corning Incorporated*  
Chengshuai Li, *Corning Incorporated*  
Kirk R. Allen, *Corning Incorporated*  
Wei Yi, *Corning Incorporated*  
Kaihui Chen, *Corning Incorporated*  
James F. Lamacchia, *Corning Incorporated*  
Elfren Elvenia, *Corning Incorporated*  
Michael X. Ouyang, *Corning Incorporated*  
Tzu-Ling Niu, *Corning Incorporated*  
Guanglei Du, *Corning Incorporated*  
Horst Schreiber, *Corning Incorporated*

**64-4: Student Paper: MiniLED Driving Circuit with Power-Saving Mechanism for Use in LCD Backlight Module** (Page 849)

Sung-Chun Chen, *National Cheng Kung University*  
Chieh-An Lin, *National Cheng Kung University*  
Cheng-Rui Lu, *National Cheng Kung University*  
Chia-En Wu, *AU Optronics Corp.*  
Jia-Tian Peng, *AU Optronics Corp.*  
Chih-Lung Lin, *National Cheng Kung University*

**64-5: Glass Circuit Board for MiniLED Backlight of LCD** (Page 853)

Young-suk Lee, *CTCK (Corning Technology Center Korea)*  
Joon-soo Kim, *CTCK (Corning Technology Center Korea)*  
Byung-doo Moon, *CTCK (Corning Technology Center Korea)*  
Toru Nakamura, *CJKK (Corning Japan K. K.)*  
Hyung-soo Moon, *CTCK (Corning Technology Center Korea)*

## Session 65: Machine Learning for Image Enhancement

Chair: Chaohao Wang, *Apple Inc.*

Co-Chair: Mainak Biswas, *Google*

- 65-1: Deep Learning-Enabled Image Content Adaptive Driving Algorithm for Field-Sequential Color LCDs with MiniLED Backlight** (Page 857)  
Guowei Zou, *Sun Yat-Sen University*  
Zeyu Wang, *Sun Yat-Sen University*  
Wenchao Yang, *Sun Yat-Sen University*  
Bo-Ru Yang, *Sun Yat-Sen University*  
Zong Qin, *Sun Yat-Sen University*
- 65-2: A Light and Fast Branched Neural Network Using Perceptual Optimization for High-Quality Visual Restoration of UDC images** (Page 861)  
Jaihyun Koh, *Samsung Display*  
Jangho Lee, *Seoul National University*  
Junghoon Kim, *Samsung Display*  
Youngwook Yoo, *Samsung Display*  
Bonghyun You, *Seoul National University*  
Sungroh Yoon, *Seoul National University*
- 65-3: Invited Paper: Deep Learning-Based Image Enhancement for HDR Imaging** (Page 865)  
Ye-In Park, *Sogang University*  
  
Jou Won Song, *Sogang University*  
Suk-Ju Kang, *Sogang University*
- 65-4: Foveated Super-Resolution Network for Virtual-Reality Head-Mounted Displays** (Page 869)  
Hyoungsik Nam, *Kyung Hee University*  
Hangyeol Kang, *Kyung Hee University*  
Hyeonseong Cho, *Kyung Hee University*
- 65-5: AI-Based Simulation and Design-Space Exploration for Pixel Layout** (Page 873)  
Keuk Jin Jeong, *Samsung Display Co., Ltd.*  
Myunghun Lim, *Samsung Display Co., Ltd.*  
Min Kang, *Samsung Display Co., Ltd.*  
Yougwoo Lee, *Samsung Display Co., Ltd.*  
Yongjo Kim, *Samsung Display Co., Ltd.*

## Session 66: OLED Materials I

Chair: Chihaya Adachi, *Kyushu University*

Co-Chair: Changwoong Chu, *Samsung Display Company*

- 66-1: Invited Paper: Hole-Transport Materials – Key Enablers for Future OLED Display Evolution** (Page 877)  
Jens Engelhart, *Merck KGaA*  
Elvira Montenegro, *Merck KGaA*  
Rachel Tuffin, *Merck KGaA*  
You-Hyun Kim, *Merck KGaA*  
Martin Kraska, *Merck KGaA*  
Leo Weegels, *Merck KGaA*  
Falk May, *Merck KGaA*  
Joachim Kaiser, *Merck KGaA*
- 66-2: Invited Paper: Delayed Fluorescence from Energetically Inverted Singlet and Triplet Excited States for Efficient Organic Light-Emitting Diodes** (Page 881)  
Naoya Aizawa, *RIKEN Center for Emergent Matter Science (CEMS) & Osaka University*  
Daigo Miyajima, *RIKEN Center for Emergent Matter Science (CEMS)*  
Yong-Jin Pu, *RIKEN Center for Emergent Matter Science*
- 66-3: Active Learning for the Design of Novel OLED Materials** (Page 885)  
Hadi Abroshan, *Schrödinger Inc.*  
Anand Chandrasekaran, *Schrödinger Inc.*  
Paul Winget, *Schrödinger Inc.*  
Yuling An, *Schrödinger Inc.*  
Shaun Kwak, *Schrödinger Inc.*  
Christopher T. Brown, *Schrödinger Inc.*  
Tsuguo Morisato, *Schrödinger Inc.*  
Mathew D. Halls, *Schrödinger Inc.*
- 66-4: Understanding the Electron Injection/Transport Mechanism in OLEDs by Using a Superbase as Electron Injection Layer** (Page 889)  
Tsubasa Sasaki, *NHK Science & Technology Research Laboratories*  
Taku Oono, *NHK Science & Technology Research Laboratories*  
Takuya Okada, *NHK Science & Technology Research Laboratories*  
Munehiro Hasegawa, *Nippon Shokubai Co., Ltd.*  
Katsuyuki Morii, *Nippon Shokubai Co., Ltd.*



## Session 67: Flexible Displays

Chair: Arokia Nathan, *Darwin College, University of Cambridge*

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

- 67-1: Comparison of In-Folding and Out-Folding Stress on Electrical Performance of Poly-Si TFTs on Polyimide Substrate for Foldable AMOLED Display** (Page 893)  
Mohammad Masum Billah, *Kyung Hee University*  
Abu Bakar Siddik, *Kyung Hee University*  
Dongjin Kim, *Kyung Hee University*  
Suhui Lee, *Kyung Hee University*  
Young Jo Cho, *Kyung Hee University*  
Md Hasnat Rabbi, *Kyung Hee University*  
Jin Jang, *Kyung Hee University*
- 67-2: Invited Paper: Organic Thin-Film Transistor Flexible Hybrid Integration for Low-Power Ubiquitous Sensor Systems** (Page 897)  
Xiaojun Guo, *Shanghai Jiao Tong University*  
Bang Ouyang, *Shanghai Jiao Tong University*  
Yawen Song, *Shanghai Jiao Tong University*  
Lei Han, *Shanghai Jiao Tong University*  
Li'ang Deng, *Shanghai Jiao Tong University*
- 67-3: Predicting the Impact Resistance of Flexible Display Panels Based on Mo Thin-Film Residual Stress** (Page 900)  
Jung Hwa Park, *Samsung Display Co., Ltd.*  
Jincheol Jang, *Samsung Display Co., Ltd.*  
Jaehan Lee, *Samsung Display Co., Ltd.*  
Myeongkyu Park, *Samsung Display Co., Ltd.*  
Nari Ahn, *Samsung Display Co., Ltd.*
- 67-4: Research on Design and Lamination of 180° Curly CG** (Page 903)  
Yang Yang, *BOE OLED R&D Center*  
Mengyuan Pang, *BOE OLED R&D Center*  
Liqiang Chen, *BOE OLED R&D Center*  
Weifeng Zhou, *BOE OLED R&D Center*  
Dawei Wang, *BOE OLED R&D Center*

## Session 68: Displays and Visual Performance

Chair: Jennifer Gille, *Consultant*

Co-Chair: Youngshin Kwak, *Ulsan National Institute of Science and Technology*

- 68-1: Evaluation for Reaction Time of Gaming Displays** (Page 907)  
Yan Jin, *LG Display*  
Seungwon Yoo, *LG Display*  
Jaehong Kim, *LG Display*  
Hee Eun Lee, *LG Display*  
Junwoo Jang, *LG Display*  
Woongjin Seo, *LG Display*  
Jang Jin Yoo, *LG Display*  
Don Gyou Lee, *LG Display*
- 68-2: Considering the Effects of Display Persistence on Eye Movements and Readability in Virtual Reality** (Page 910)  
Xiuyun Wu, *Reality Labs at Meta & University of British Columbia*  
T. Scott Murdison, *Reality Labs at Meta*
- 68-3: Importance of Individual Adaptation in Visually Fidelitous Dynamic-Range Compression from HDR to SDR Images** (Page 914)  
Saki Iwaida, *Kagoshima Clinical Engineering College*  
Yuichiro Orita, *Kagoshima University*  
Shoko Hira, *Kagoshima University*  
Masayuki Kashima, *Kagoshima University*  
Sakuichi Ohtsuka, *International College of Technology*
- 68-4: A Text Legibility Improvement Method for OLED Devices** (Page 918)  
Hyunkyung Song, *Samsung Display Co., Ltd*  
Takeshi Kato, *Samsung Display Co., Ltd*  
Wonbok Lee, *Samsung Display Co., Ltd*  
Hyesang Park, *Samsung Display Co., Ltd*  
Jongwoong Park, *Samsung Display Co., Ltd*

## Session 69: Materials and Processes for Flexible Displays

Chair: Robert Visser, *Applied Materials*

Co-Chair: Toshiaki Arai, *JOLED Inc*

- 69-1: Inkjet-Printable Optically Clear Silicone Resin for Display Fabrication** (Page 922)  
 Ju Young Yook, *Dow Silicone Korea Co., Ltd.*  
 Jo Gunn, *Dow Silicone Korea Co., Ltd.*  
 Minkyu Kyeong, *Dow Silicone Korea Co., Ltd.*  
 Hyochul Kim, *Dow Silicone Korea Co., Ltd.*  
 Deokgu Kim, *Dow Silicone Korea Co., Ltd.*  
 Yoojun Park, *Dow Silicone Korea Co., Ltd.*
- 69-2: A Universal Method for the Lamination of Arbitrary Stretchable Substrate Pairs without Compromising the Elastic Properties of the Substrates** (Page 926)  
 Kihoon Jeong, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Yujin Lee, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Youson Kim, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Hyeonwoo Mun, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Ki-Uk Kyung, *Korea Advanced Institute of Science and Technology (KAIST)*  
 Sung Gap Im, *Korea Advanced Institute of Science and Technology (KAIST)*
- 69-3: Invited Paper: Opportunities for High-Performance Display Manufacturing Enabled by OTFTs Using an 80°C Maximum Process Temperature** (Page 929)  
 Simon Ogier, *SmartKem Ltd.*  
 Dan Sharkey, *SmartKem Ltd.*  
 Alejandro Carreras, *SmartKem Ltd.*  
 Steven Tsai, *SmartKem Ltd.*
- 69-4: Collimating and Recycling Linear Evaporation Source for AMOLED Mass Production** (Page 933)  
 Sungmoon Kim, *DepoLab*  
 Daejoon Chi, *DepoLab*  
 Taekgi Lee, *DepoLab*  
 Gyoung O Ko, *DepoLab*

## Session 70: Light-Field and Foveated Imaging for AR/VR/MR

Chair: Gary Jones, *Nanoquantum Corporation*

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

- 70-1: Distinguished Student Paper: Foveated Imaging by Polarization Multiplexing for Compact Near-Eye Displays** (Page 937)  
 Kun Yin, *University of Central Florida*  
 Ziqian He, *University of Central Florida*  
 Lingshan Li, *Goertek Electronics*  
 Shin-Tson Wu, *University of Central Florida*
- 70-2: A Design for Near Eye Light Field Display** (Page 941)  
 Jian Gao, *BOE*  
 Sen Ma, *BOE*  
 Tao Hong, *BOE*  
 Pengxia Liang, *BOE*
- 70-3: Invited Paper: High-Resolution Light-Field VR LCD** (Page 945)  
 Yung-Hsun Wu, *Innolux Corp.*  
 Chuan-Chung Chang, *Coretronic Corp.*  
 Yu-Shih Tsou, *Innolux Corp.*  
 Yi-Chien Lo, *Coretronic Corp.*  
 Chia-Hao Tsai, *Innolux Corp.*  
 Chih-hung Lu, *Coretronic Corp.*  
 Chiu-Lien Yang, *Innolux Corp.*  
 Fu-Ming Chuang, *Coretronic Corp.*

## Session 71: Projection Light Sources

Chair: David Eccles, *Salt Lake City*

Co-Chair: Hidekazu Hatanaka, *Ushio, Inc.*

- 71-1: Invited Paper: GaN-Based Watt-Class High-Power Edge-Emitting Lasers and Milliwatt-Class Vertical-Cavity Surface-Emitting Lasers** (Page 949)  
 Takuya Ozaki, *Nichia Corporation*  
 Eiichiro Okahisa, *Nichia Corporation*  
 Shingo Masui, *Nichia Corporation*  
 Tomoya Yanamoto, *Nichia Corporation*  
 Shin-ichi Nagahama, *Nichia Corporation*
- 71-2: Invited Paper: High-Power Red Laser Diodes for Display Applications** (Page 953)  
 Satoshi Kawanaka, *USHIO Inc.*  
 Seiji Kitamura, *USHIO Inc.*  
 Shintaro Miyamoto, *USHIO Inc.*  
 Manabu Hashizume, *USHIO Inc.*  
 Kazuaki Yano, *USHIO Inc.*  
 Masato Hagimoto, *USHIO Inc.*

**71-3: Static Laser Phosphor for Projectors with Rotating Tilted Mirror** (Page 957)

Kenneth Li, *Optonomous Technologies Inc.*  
Y. P. Chang, *Taiwan Color Optics, Inc.*  
Lion Wang, *Taiwan Color Optics, Inc.*  
Andy Chen, *Taiwan Color Optics, Inc.*  
W. H. Cheng, *National Chung Hsing University*  
Pin Han, *National Chung Hsing University*  
C. N. Liu, *National Chung Hsing University*

**71-4: Laser-Phosphor Light Source Using Compound Reflectors for Projection Display** (Page 960)

Kenneth Li, *Optonomous Technologies Inc.*  
Y. P. Chang, *Taiwan Color Optics, Inc.*

## Session 72: Machine Learning for Failure and Artifact Detection

Chair: Hyoungsik Nam, *Kyung Hee University*

Co-Chair: Robert Visser, *Applied Materials*

**72-1: In-Line Mura Detection Using Convolutional Neural Network in Display Manufacturing** (Page 963)

Satoru Tomita, *Japan Display Inc.*  
Prarinya Siritanawan, *Japan Advanced Institute of Science and Technology*  
Kazunori Kotani, *Japan Advanced Institute of Science and Technology*

**72-2: A Proposal for Image-Compression Algorithm for Display Test Images** (Page 967)

Hao Tang, *Jingce Electronics USA*  
Jiakun Liu, *University of California at Berkeley*  
Gang Xu, *Jingce Electronics USA*

**72-3: Deep Learning-Based Visual-Defect Detection in Noisy and Imbalanced Data** (Page 971)

Qisen Cheng, *Samsung Display America Lab*  
Shuhui Qu, *Samsung Display America Lab*  
Janghwan Lee, *Samsung Display America Lab*

**72-4: Invited Paper: Synthetic Defect Generation for Display Front-of-Screen Quality Inspection: A Survey** (Page 975)

Shancong Mou, *Georgia Institute of Technology*  
Meng Cao, *Apple*  
Zhendong Hong, *Apple*  
Ping Huang, *Apple*  
Jiulong Shan, *Apple*  
Jianjun Shi, *Georgia Institute of Technology*

## Session 73: OLED Materials II

Chair: Jang Hyuk Kwon, *Kyung Hee University*

Co-Chair: Hitoshi Kuma, *Idemitsu Kosan Co., Ltd.*

**73-1: Invited Paper: Decoration Strategy in Para Boron Position: An Effective Way to Achieve Ideal Multi-Resonance Emitters** (Page 979)

Lian Duan, *Tsinghua University*

**73-2: Invited Paper: High-Efficiency Organic Light-Emitting Diodes Based on Purely Organic Emitters** (Page 982)

Xiaomei Peng, *South China University of Technology*  
Shi-Jian Su, *South China University of Technology*

**73-3: Student Paper: Achieving Deep-Blue Color in Diboron-Embedded Multi-Resonance Thermally Activated Delayed-Fluorescence Emitter for Narrowband OLEDs** (Page 986)

Kenkera Rayappa Naveen, *Kyung Hee University*  
Hyuna Lee, *Kyung Hee University*  
Ramanaskanda Braveenth, *Kyung Hee University*  
Ki joon Yang, *Kyung Hee University*  
Soon Jae Hwang, *Kyung Hee University*  
Jang Hyuk Kwon, *Kyung Hee University*

**73-4: Novel Materials and Structures for High Efficiency and Long Lifetime Green Phosphorescent OLEDs in Automotive Applications** (Page 990)

Soojung Youn, *Samsung Display*  
Hyein Jeong, *Samsung Display*  
Jungjin Yang, *Samsung Display*

## Session 74: Flexible Displays and Materials

Chair: Kyung Cheol Choi, *KAIST*

Co-Chair: Simon Kang, *Apple*

**74-1: 31-in. Flexible Printed OLED TV Display Technology: It's TV Mobiles** (Page 993)

Jueng Gil (James) Lee, *Guangdong Juhua Printed Display Technology Co. Ltd.*  
Zhuo Gao, *Guangdong Juhua Printed Display Technology Co. Ltd.*  
Dong Fu, *Guangdong Juhua Printed Display Technology Co. Ltd.*  
Xiaolin Yan, *Guangdong Juhua Printed Display Technology Co. Ltd.*

- 74-2: *Invited Paper: Highly Reliable Dielectric Interlayers for Flexible Displays and e-Paper*** (Page 998)

Atsuko Yamamoto, *Merck Electronics Ltd.*  
Daishi Yokoyama, *Merck Electronics Ltd.*  
Megumi Takahashi, *Merck Electronics Ltd.*  
Takashi Fuke, *Merck Electronics Ltd.*  
Seishi Shibayama, *Merck Electronics Ltd.*  
Akira Yamasaki, *Merck Electronics Ltd.*  
Cho-Yin Lin, *Merck Performance Materials Ltd.*

- 74-3: *Invited Paper: Getting Thinner and Thinner with a New Flexible Platform: Challenges and Solutions for Flexible Displays*** (Page 1002)

Dong-Mee Song, *The Electronics Business of Merck KGaA*  
Eduardo Beltran Gracia, *Beltran Consulting Solutions*  
Dieter Schroth, *The Electronics Business of Merck KGaA*  
Atsuko Yamamoto, *The Electronics Business of Merck KGaA*

- 74-4: *Development of Flexible Full-Color MiniLED Display Using Simultaneous Transfer and Bonding (SITRAB) Technology*** (Page 1005)

Jiho Joo, *Electronics and Telecommunications Research Institute*  
Gwang-Mun Choi, *Electronics and Telecommunications Research Institute*  
Chanmi Lee, *Electronics and Telecommunications Research Institute*  
In-seok Kye, *Electronics and Telecommunications Research Institute*  
Yong-Sung Eom, *Electronics and Telecommunications Research Institute*  
Ki-Seok Jang, *Electronics and Telecommunications Research Institute*  
Seok tae Hwang, *Nexstar Technology Corporation*  
Jeong Duck Kim, *Nexstar Technology Corporation*  
Kwang-Seong Choi, *Electronics and Telecommunications Research Institute*

## **Session 75: HDR and Color**

Chair: Sakuichi Ohtsuka, *International College of Technology*

Co-Chair: David Hoffman, *Google*

- 75-1: *Student Paper: Brightness and Vividness of High-Dynamic-Range Displayed Imagery*** (Page 1009)

Luke Hellwig, *Rochester Institute of Technology*  
Dale Stoltzka, *Samsung Display America Lab*  
Yongwoo Yi, *Samsung Display*  
Mark D. Fairchild, *Rochester Institute of Technology*

- 75-2: *The Effect of Chromatic Aberration Correction on Visually Lossless Compression*** (Page 1013)

Sanjida Sharmin Mohona, *York University*  
Domenic Au, *York University*  
Laurie M. Wilcox, *York University*  
Robert S. Allison, *York University*

- 75-3: *Field-Sequential Color Displays with Simultaneously Suppressed Color Breakup and Flicker Based on Multi-Objective Optimization*** (Page 1017)

Zeyu Wang, *Sun Yat-Sen University*  
Gouwei Zou, *Sun Yat-Sen University*  
Bo-Ru Yang, *Sun Yat-Sen University*  
Zong Qin, *Sun Yat-Sen University*

- 75-4: *Low Luminance JND and JNCD*** (Page 1021)

Sunyoung Park, *Samsung Display Co., Ltd.*  
TaeHo Kim, *Samsung Display Co., Ltd.*  
Youngnam Yun, *Samsung Display Co., Ltd.*

## **Session 76: Narrow Border Technologies**

Chair: Greg Gibson, *nTact*

Co-Chair: Seok-Lyul Lee, *AU Optronics Corp.*

- 76-1: *Invited Paper: MicroLED Display with Tiling Technology*** (Page 1024)

Wen-Lung Chen, *AU Optronics Corporation*  
Yi-Hsin Lin, *AU Optronics Corporation*  
Hao-An Chuang, *AU Optronics Corporation*  
Chao-Wei Huang, *AU Optronics Corporation*  
Te-Sheng Cheng, *AU Optronics Corporation*

- 76-2: *Development of Custom-Shaped OLED Display*** (Page 1028)

Zhongyuan Wu, *Hefei BOE Joint Technology Co., Ltd*  
Li Sun, *Hefei BOE Joint Technology Co., Ltd*  
Pan Xu, *Hefei BOE Joint Technology Co., Ltd*  
Zhidong Yuan, *Hefei BOE Joint Technology Co., Ltd*  
Bin Zhou, *Hefei BOE Joint Technology Co., Ltd*  
Jun Liu, *Hefei BOE Joint Technology Co., Ltd*  
Huihui Li, *Hefei BOE Joint Technology Co., Ltd*  
Hui Feng Wang, *Hefei BOE Joint Technology Co., Ltd*

Kaihong Ma, *Hefei BOE Joint Technology Co., Ltd*  
Fei yang, *Hefei BOE Joint Technology Co., Ltd*  
Yongqian Li, *Hefei BOE Joint Technology Co., Ltd*  
Huaiting Shih, *Hefei BOE Joint Technology Co., Ltd*  
Jianwei Yu, *Hefei BOE Joint Technology Co., Ltd*  
Xue Dong, *BOE Technology Group Co.*

**76-3: *Invited Paper: Slim MiniLED Backlight for HDR-Compatible Mobile Displays*** (Page 1031)

Hisashi Watanabe, *Sharp Display Technology Corporation*  
Takeshi Masuda, *Sharp Display Technology Corporation*  
Hirotoshi Yasunaga, *Sharp Display Technology Corporation*  
Atsuyuki Tanaka, *Sharp Display Technology Corporation*  
Kenji Takase, *Sharp Display Technology Corporation*

**76-4: *Invited Paper: Innovation Solutions that Lead to AMLED Technologies*** (Page 1035)

Minghua Xuan, *Beijing BOE Display Technology Co., Ltd.*  
Xiaochuan Chen, *Beijing BOE Display Technology Co., Ltd.*  
Guangcai Yuan, *Beijing BOE Display Technology Co., Ltd.*  
Dan Wang, *Beijing BOE Display Technology Co., Ltd.*  
Xue Dong, *Beijing BOE Display Technology Co., Ltd.*

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## POSTER SESSIONS

- P-1: Uni-Color Column-Line Pentile-Type Pixel Arrangement Design for Low-Driving-Power Consumption AMOLED Displays** (Page 1039)  
Sangmoo Choi, *Google LLC*  
Janghoon Song, *Google LLC*  
Sun-il Chang, *Google LLC*  
Jyothi Karri, *Google LLC*  
Ion Bitu, *Google LLC*
- P-2: Nitrogen Behaviors in PEALD-Grown SiO<sub>2</sub> Films Using N<sub>2</sub>O Plasma Reactant and Their Application in ALD-IZO TFTs** (Page 1043)  
Dong-Gyu Kim, *Hanyang University*  
Kwang Su Yoo, *Hanyang University*  
Hye-Mi Kim, *Hanyang University*  
Jin-Seong Park, *Hanyang University*
- P-3: High-Temperature Annealing Behavior of IGZO Using Plasma-Enhanced Atomic Layer Deposition** (Page 1047)  
Yoon-Seo Kim, *Hanyang University*  
Hyun-Jun Jeong, *Hanyang University*  
Seok-Goo Jeong, *Hanyang University*  
Jin-Seong Park, *Hanyang University*
- P-4: A New Evaluation System for Metal-Oxide Compound Semiconductor Film** (Page 1051)  
Kook Chul Moon, *Gachon University & Engion Co., Ltd.*  
Won-Young Kim, *Sungkyunkwan University*  
JungUn Na, *Engion Co., Ltd.*  
Hyoungsik Kim, *Engion Co., Ltd.*  
GyoHyuk Yoon, *Engion Co., Ltd.*  
Yeoungjin Chang, *Gachon University*  
Yong-Sang Kim, *Sungkyunkwan University*
- P-5: Student Poster: A New PWM Driving Circuit with Threshold Voltage and I-R Rise Compensating Capability for Mini-LED Backlight** (Page 1055)  
Jui-Hung Chang, *National Cheng Kung University*  
Chieh-An Lin, *National Cheng Kung University*  
Ming-Yang Deng, *AU Optronics Corporation*



Wen-Rei Guo, *AU Optronics Corporation*  
Chih-Lung Lin, *National Cheng Kung University*

- P-6:** **Student Poster: 2,731ppi OLED Display with Low Power Consumption and Wide Viewing Angle Using OS/Si VLSI Process Technology** (Page 1059)  
Kiyotaka Kimura, *Semiconductor Energy Laboratory Co., Ltd.*  
Yuki Tamatsukuri, *Semiconductor Energy Laboratory Co., Ltd.*  
Hideaki Shishido, *Semiconductor Energy Laboratory Co., Ltd.*  
Hidetomo Kobayashi, *Semiconductor Energy Laboratory Co., Ltd.*  
Toshiyuki Isa, *Semiconductor Energy Laboratory Co., Ltd.*  
Toshihiko Takeuchi, *Semiconductor Energy Laboratory Co., Ltd.*  
Hitoshi Kunitake, *Semiconductor Energy Laboratory Co., Ltd.*  
Hajime Kimura, *Semiconductor Energy Laboratory Co., Ltd.*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co., Ltd.*
- P-7:** **Student Poster: AMOLED Pixel Circuit for Strain Compensation in Stretchable Display** (Page 1063)  
Jimin Kang, *Seoul National University*  
Kyeong-Soo Kang, *Seoul National University*  
Ji-Hwan Park, *Seoul National University*  
Soo-Yeon Lee, *Seoul National University*
- P-8:** **Analysis of Degradation Mechanism of Oxide Semiconductor FETs with High Tolerance to Intense NBTIS** (Page 1066)  
Yasuharu Hosaka, *Semiconductor Energy Laboratory Co., Ltd.*  
Toshimitsu Obonai, *Semiconductor Energy Laboratory Co., Ltd.*  
Masayoshi Dobashi, *Semiconductor Energy Laboratory Co., Ltd.*  
Tomonori Nakayama, *Semiconductor Energy Laboratory Co., Ltd.*  
Yukinori Shima, *Semiconductor Energy Laboratory Co., Ltd.*  
Masakatsu Ohno, *Semiconductor Energy Laboratory Co., Ltd.*  
Shunpei Yamazaki, *Semiconductor Energy Laboratory Co., Ltd.*
- P-9:** **Student Poster: Two-Mode PWM Driven Micro-LED Displays with Dual-Gate Metal-Oxide TFTs** (Page 1070)  
Jia Fu, *Peking University*  
Congwei Liao, *Peking University*  
Hezi Qiu, *Peking University*  
Shuang Jin, *TCL China Star Optoelectronics Technology Co. Ltd.*  
Jiangbo Yao, *TCL China Star Optoelectronics Technology Co. Ltd.*  
Limei Zeng, *TCL China Star Optoelectronics Technology Co. Ltd.*  
Xin Zhang, *TCL China Star Optoelectronics Technology Co. Ltd.*  
Shengdong Zhang, *Peking University*
- P-10:** **Emit Signals Reused Gate Driver Design for Ultra-Narrow-Bezel Micro-LED Display Based on Metal-Oxide TFTs** (Page 1074)  
Xin Zheng, *Peking University*  
Congwei Liao, *Peking University*  
Shuang Jin, *TCL*  
Jiangbo Yao, *TCL*  
Limei Zeng, *TCL*  
Xin Zhang, *TCL*  
Shengdong Zhang, *Peking University*
- P-11:** **Effects of Ar Dilution on N<sub>2</sub>O/SiH<sub>4</sub> PECVD for the Growth of Silicon-Oxide Thin Films with Improved Breakdown Voltage Characteristics** (Page 1078)  
Aram Kim, *LG Display*  
Bokyoung Lee, *LG Display*  
Hyeona Kim, *LG Display*  
Jung-ho Bang, *LG Display*  
Seung Hee Nam, *LG Display*  
Kwon-Shik Park, *LG Display*  
Jeomjae Kim, *LG Display*  
Soo Young Yoon, *LG Display*
- P-12:** **Exponential Dependence of Photocurrent on Reciprocal of Channel Length in Amorphous InZnO Thin-Film Transistors with Short Channel** (Page 1081)  
Jie Chen, *Peking University Shenzhen Graduate School*  
Xiaoliang Zhou, *Peking University Shenzhen Graduate School*  
Fanyou Tang, *Peking University Shenzhen Graduate School*  
Tengyan Huang, *Peking University Shenzhen Graduate School*  
Hao Liu, *Peking University Shenzhen Graduate School*  
Lei Lu, *Peking University Shenzhen Graduate School*  
Shengdong Zhang, *Peking University Shenzhen Graduate School*
- P-13:** **Student Poster: Comprehensive Study of TFTs Fabricated in a (100)-Oriented Grain-Boundary-Free Silicon Thin Film Obtained by Green CW-Laser Lateral Crystallization** (Page 1085)  
Satoshi Takayama, *Nara Institute of Science and Technology*

Nobuo Sasaki, *Sasaki Consulting*  
Yukiharu Uraoka, *Nara Institute of Science and Technology*

- P-14: Effects of Film Density on IGZO-Based TFT Device Reliability** (Page 1089)  
Jaeyoon Park, *LG Display*  
Yong-Sung Kim, *Korea Research Institute of Standards and Science*  
Ju-Heyuck Baeck, *LG Display*  
Sehee Park, *LG Display*  
Jungseok Seo, *LG Display*  
Jiyong Noh, *LG Display*  
Kwon-Shik Park, *LG Display*  
JeomJae Kim, *LG Display*  
SooYoung Yoon, *LG Display*
- P-15: Student Poster: Charge Trap-Based Synaptic Transistor Employing In-Ga-Zn-O as Channel and Trap Layers for Bio-Inspired Neuromorphic Computing** (Page 1092)  
Junhyeong Park, *Seoul National University*  
Yuseong Jang, *Seoul National University*  
Jinkyu Lee, *Seoul National University*  
Soo-Yeon Lee, *Seoul National University*
- P-16: Student Poster: New a-IGZO TFT Pixel Circuit Compensating Threshold Voltage and Mobility for Active-Matrix OLED with Source Follower Method** (Page 1096)  
Ji-Hwan Park, *Seoul National University*  
Kyeong-Soo Kang, *Seoul National University*  
Jimin Kang, *Seoul National University*  
Soo-Yeon Lee, *Seoul National University*
- P-17: Outstanding Image-Sticking Performance via L-SWTFT Channel Tuning in AMOLED Display Application** (Page 1100)  
Xing Wu, *BOE Optoelectronics Technology Co.,Ltd.*  
Di Zhang, *BOE Optoelectronics Technology Co.,Ltd.*  
Haitao Xie, *BOE Optoelectronics Technology Co.,Ltd.*  
Zilin Zhou, *BOE Optoelectronics Technology Co.,Ltd.*  
Qiang Fu, *BOE Optoelectronics Technology Co.,Ltd.*  
Kai Zhang, *BOE Optoelectronics Technology Co.,Ltd.*  
Dong Li, *BOE Optoelectronics Technology Co.,Ltd.*  
Zunqing Song, *BOE Optoelectronics Technology Co.,Ltd.*  
Ruilin Bi, *BOE Optoelectronics Technology Co.,Ltd.*  
Zheng Liu, *BOE Optoelectronics Technology Co.,Ltd.*  
Yinglong Huang, *BOE Optoelectronics Technology Co.,Ltd.*
- P-18: Student Poster: Low-Voltage Oxide Transistor with High Dielectric Tantalum Oxide Gate Insulator by Thermal Oxidation of Tantalum** (Page 1103)  
Eun Seong Yu, *Hoseo University*  
Seo Jin Kang, *Hoseo University*  
Hyuck Su Lee, *Hoseo University*  
Jong Mo Lee, *Hoseo University*  
Byung Seong Bae, *Hoseo University*  
Jae Geun Woo, *Hoseo University*
- P-19: Performance Development of Oxide Semiconductor Photodiode with High-Work-Function Electrode Suitable for Mass Production** (Page 1106)  
Pengfei Gu, *BOE Technology Group Co. Ltd*  
Jie Huang, *BOE Technology Group Co. Ltd*  
Feifei Li, *BOE Technology Group Co. Ltd*  
Rui Huang, *BOE Technology Group Co. Ltd*  
Yuhang Lu, *BOE Technology Group Co. Ltd*  
Dini Xie, *BOE Technology Group Co. Ltd*  
Hongda Sun, *BOE Technology Group Co. Ltd*  
Ce Ning, *BOE Technology Group Co. Ltd*  
Guangcai Yuan, *BOE Technology Group Co. Ltd*
- P-20: High-Quality Self-Aligned Coplanar Thin-Film Transistors with SOG Materials for Highly Transparent AMOLED Display** (Page 1110)  
Wei Liu, *BOE Technology Group Co., Ltd.*  
Xing Zhang, *BOE Technology Group Co., Ltd.*  
Fengjuan Liu, *BOE Technology Group Co., Ltd.*  
Pengfei Gu, *BOE Technology Group Co., Ltd.*  
Jianye Zhang, *BOE Technology Group Co., Ltd.*  
YuHang Lu, *BOE Technology Group Co., Ltd.*  
Haoran Wang, *BOE Technology Group Co., Ltd.*  
Hongda Sun, *BOE Technology Group Co., Ltd.*  
Ce Ning, *BOE Technology Group Co., Ltd.*  
Guangcai Yuan, *BOE Technology Group Co., Ltd.*  
Young Suk Song, *BOE Technology Group Co., Ltd.*

- P-21: *Student Poster: Indium-Gallium-Zinc Oxide Thin-Film Transistors for High-Resolution Active-Matrix Ferroelectric Liquid-Crystal Displays*** (Page 1114)  
Sisi Wang, *The Hong Kong University of Science and Technology*  
Zhibo Sun, *The Hong Kong University of Science and Technology*  
Zhihe Xia, *The Hong Kong University of Science and Technology*  
Zhengnan Yuan, *Peking University*  
Lei Lu, *The Hong Kong University of Science and Technology*  
Abhishek Kumar Srivastava, *The Hong Kong University of Science and Technology*  
Hoi Sing Kwok, *The Hong Kong University of Science and Technology*  
Man Wong, *The Hong Kong University of Science and Technology*
- P-22: *Effects of Self-Assembled Monolayer on Contact Resistance Between IGZO and Electrode for High-Resolution Display*** (Page 1118)  
Hyuk Park, *POSTECH*  
Juyoung Yun, *POSTECH*  
Yoonyoung Chung, *POSTECH*
- P-23: *A Monolithically Integrated Artificial Compound Eye for Proximity Pattern Recognition*** (Page 1122)  
Zhichao Zhou, *Hong Kong University of Science and Technology*  
Yushen Hu, *Hong Kong University of Science and Technology*  
Runxiao Shi, *Hong Kong University of Science and Technology*  
Sisi Wang, *Hong Kong University of Science and Technology*  
Zhihe Xia, *Hong Kong University of Science and Technology*  
Man Wong, *Hong Kong University of Science and Technology*
- P-24: *Distinguished Student Poster: Gate Driver with LTPO-TFT Circuits for Low-Power Consumption and Narrow-Bezel AMOLED Displays*** (Page 1126)  
Junyeong Kim, *Kyung Hee University*  
Jin Jang, *Kyung Hee University*
- P-25: *Student Poster: Solution-Processed CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>/ZnO Phototransistor with High Photodetectivity*** (Page 1130)  
Farjana Haque, *Kyung Hee University*  
Md Mehedi Hasan, *Kyung Hee University*  
Mallory Mativenga, *Kyung Hee University*
- P-26: *Student Poster: AMOLED Pixel Circuit Compensating for Stretching and I-R Drop*** (Page 1134)  
Hyuck Su Lee, *Hoseo University*  
Jong Mo Lee, *Hoseo University*  
Jae Geun Woo, *Hoseo University*  
Seo Jin Kang, *Hoseo University*  
Eun Seong Yu, *Hoseo University*  
Byung Seong Bae, *Hoseo University*
- P-27: *A Novel PWM Driving Pixel Circuit with Metal-Oxide TFTs for MicroLED Displays*** (Page 1137)  
Ko-Ruey Jen, *AU Optronics Corporation*  
Yi-Chien Chen, *AU Optronics Corporation*  
Yu-Ching Chang, *AU Optronics Corporation*  
Yang-Shun Fan, *AU Optronics Corporation*  
Chen-Shuo Huang, *AU Optronics Corporation*  
Ying-Hsuan Tang, *AU Optronics Corporation*  
Chia-Wei Chiang, *AU Optronics Corporation*  
Po-Jui Huang, *AU Optronics Corporation*  
Kai-Chuin Lim, *AU Optronics Corporation*  
Chih-Cheng Chen, *AU Optronics Corporation*  
Yung-Chih Chen, *AU Optronics Corporation*  
Kuo-Kuang Chen, *AU Optronics Corporation*
- P-28: *Development of Low-Resistivity Gate-Metal Process for LTPS-TFT-Array Backplane Applications*** (Page 1141)  
Jia-Hong Ye, *AU Optronics Corporation*  
Ching-Liang Huang, *AU Optronics Corporation*  
Kuo-Yu Huang, *AU Optronics Corporation*  
Maw-Song Chen, *AU Optronics Corporation*  
Wen-Rei Guo, *AU Optronics Corporation*  
Wei-Ming Huang, *AU Optronics Corporation*  
Yang-An Wu, *AU Optronics Corporation*
- P-29: *Influence of Static Bending Stress on LTPS TFT*** (Page 1145)  
Shuang Guo, *Hefei Visionox Technology Co., Ltd.*  
Fa-Hsyang Chen, *Yungu Gu'anTechnology Co., Ltd.*  
Xin Xin Yuan, *Hefei Visionox Technology Co., Ltd.*  
Xue Liu, *Yungu Gu'anTechnology Co., Ltd.*  
yang zheng Li, *Hefei Visionox Technology Co., Ltd.*  
Feng Jun Li, *Yungu Gu'anTechnology Co., Ltd.*  
Bo Ru Xing, *Yungu Gu'anTechnology Co., Ltd.*

Qi Shan, *Hefei Visionox Technology Co., Ltd.*

- P-30: Thermally Activated and Field-Enhanced Diffusion of Dopants in a-InGaZnO TFTs Under Circuit Operations and Correlation to Device Stabilities** (Page 1149)  
Chang Il Ryoo, *Kookmin University & LG Display Co.*  
Tae Jun Yang, *Kookmin University*  
Hee Jun Lee, *Kookmin University*  
Jong-Ho Bae, *Kookmin University*  
Sung-Jin Choi, *Kookmin University*  
Dong Myong Kim, *Kookmin University*  
Byung Du Ahn, *LG Display Co.*  
Jong Uk Bae, *LG Display Co.*  
Woo-Sup Shin, *LG Display Co.*  
Dae Hwan Kim, *Kookmin University*
- P-31: Student Poster: Low Temperature of 150°C Processed IGTO Thin-Film Transistor for Flexible Display Application** (Page 1153)  
Cheol Hee Choi, *Hanyang University*  
Taikyu Kim, *Hanyang University*  
Jae Kyeong Jeong, *Hanyang University*
- P-32: Investigation on Mechanism of Illumination Mura in AMOLED Display with LTPS-TFT Backplane After Long-Term Localized Illumination** (Page 1157)  
Enqing Guo, *Visionox Technology Inc.*  
Cuili Gai, *Visionox Technology Inc.*  
Junfeng Li, *Visionox Technology Inc.*  
Rubo Xing, *Visionox Technology Inc.*  
Fa-Hsyang Chen, *Visionox Technology Inc.*  
Lidong Ding, *Visionox Technology Inc.*
- P-137: High-Performance Coplanar IGZO TFT Image Sensor with Partial Passivation-Less Structure for Digital X-Ray Detector** (Page 1160)  
Jaeho Yoon, *LG Display Co., Ltd.*  
Soyoung Kim, *LG Display Co., Ltd.*  
Moon-Soo Kang, *LG Display Co., Ltd.*  
Chul-Sang Shin, *LG Display Co., Ltd.*  
Hoon Jeong, *LG Display Co., Ltd.*  
Kwon-Shik Park, *LG Display Co., Ltd.*  
Jeong-Ki Park, *LG Display Co., Ltd.*  
Hyung-Seok Choi, *LG Display Co., Ltd.*
- P-139: Process Simulation Reflecting Hydrogen/Oxygen for Oxide Semiconductor Thin Film Transistor** (Page 1164)  
Kihwan Kim, *Samsung Display Company*  
Myungbo Sim, *Samsung Display Company*  
Sukhwan Bang, *Samsung Display Company*  
Joon Seok Park, *Samsung Display Company*  
Byungtaek Son, *Samsung Display Company*  
Seunghyun Jang, *Samsung Display Company*  
Tae Young Choi, *Samsung Display Company*  
Seungin Baek, *Samsung Display Company*  
Yongjo Kim, *Samsung Display Company*
- P-141: Student Poster: Modulation of Subthreshold Current in In-Ga-Zn-O Thin-film Transistor for OLED Display using Electrohydrodynamic Jet Printing** (Page 1168)  
Sujin Jung, *Yonsei University*  
I Sak Lee, *Yonsei University*  
Won-Gi Kim, *Yonsei University*  
Kyungho Park, *Yonsei University*  
Jong Bin An, *Yonsei University*  
Gwan In Kim, *Yonsei University*  
Hyun Jae Kim, *Yonsei Univ50, Yonsei-roersity*
- P-33: Measuring Color Strength for Wide-Color-Gamut OLEDs** (Page 1172)  
YungKyung Park, *Ewha Womans University*
- P-34: Automotive Local Dimming Integrated System for LCD MDL** (Page 1176)  
Xiaoxia Wang, *BOE Corporation*  
Xiaoqiao Dong, *BOE Corporation*  
Jie Yu, *BOE Corporation*  
Rui Han, *BOE Corporation*  
Qing Ma, *BOE Corporation*  
Cui Dong, *BOE Corporation*  
D.K. Yoon, *BOE Corporation*  
Yicai Zhang, *BOE Corporation*  
Site Cai, *BOE Corporation*

Xuanxuan Qiao, *BOE Corporation*

- P-35: Study of Vehicle Bright Backlights with Local Dimming Effect** (Page 1178)  
YuanYuan Zhu, *BOE Optoelectronics Technology Co., Ltd.*  
WeiNing Chi, *BOE Optoelectronics Technology Co., Ltd.*  
XiaoXia Wang, *BOE Optoelectronics Technology Co., Ltd.*  
DK Yoon, *BOE Optoelectronics Technology Co., Ltd.*  
Qing Ma, *BOE Optoelectronics Technology Co., Ltd.*  
Rui Han, *BOE Optoelectronics Technology Co., Ltd.*  
Dong Cui, *BOE Optoelectronics Technology Co., Ltd.*  
Jie Yu, *BOE Optoelectronics Technology Co., Ltd.*  
SiTe Cai, *Dept. of Automotive BOE optoelectronics technology CO., LTD*
- P-144: Effect of the Reference Image on the Side Window of a Car on Motion Sickness** (Page 1181)  
Chien Ju Li, *Industrial Technology Research Institute*  
Hen Yu Lien, *Chang Gung University*  
Chia Tu, *Industrial Technology Research Institute*  
Yu Hsiang Tsai, *Industrial Technology Research Institute*  
Ya Ju Chang, *Chang Gung University*  
Kuan Ting Chen, *Industrial Technology Research Institute*
- P-145: Student Poster: AR-HUD System Realized by Holographic Display Technology** (Page 1185)  
Tzu An Chou, *National Taiwan University of Science And Technology*  
Tzu Han Pan, *National Taiwan University of Science And Technology*  
Chih Hao Chuang, *National Taiwan University of Science And Technology*  
Bohr Ran Huang, *National Taiwan University of Science And Technology*  
Chien Yu Chen, *National Taiwan University of Science And Technology*
- P-37: Adaptive Frequency Driving Scan Driver with NOR Logic Gate Based on a-InGaZnO TFTs** (Page 1188)  
Jinho Moon, *Soongsil University*  
Eseudeo Yun, *Soongsil University*  
Yongchan Kim, *Soongsil University*  
Hojin Lee, *Soongsil University*
- P-38: Low-Power a-IGZO TFT Shift Register Featuring i-PUA Gate Dielectric** (Page 1192)  
Eseudeo Yun, *Soongsil University*  
Yongchan Kim, *Soongsil University*  
Hanbin Choi, *Hanyang University*  
Dukhyun Choi, *Sungkyunkwan University*  
Do Hwan Kim, *Hanyang University*  
Hojin Lee, *Soongsil University*
- P-39: The IR-Drop Compensation Method in AMOLED Display for Dynamic Power Control** (Page 1196)  
Wei-Jhe Ma, *Novatek Microelectronics Corp.*  
Jun-Yu Yang, *Novatek Microelectronics Corp.*  
Hsin-Yu Pan, *Novatek Microelectronics Corp.*  
Feng-Ting Pai, *Novatek Microelectronics Corp.*  
Ching-Chun Lin, *Novatek Microelectronics Corp.*
- P-40: Techniques of Touch Sensing and Display Driving for Avoiding Display Artifacts for Flexible OLED Applications** (Page 1200)  
Daisuke Ito, *Synaptics Japan G.K.*  
Masaaki Shiomura, *Synaptics Japan G.K.*  
Jonathan L Losh, *Synaptics Incorporated.*  
Nobukazu Tanaka, *Synaptics Japan G.K.*  
Hiroshi Takeyama, *Synaptics Japan G.K.*
- P-41: Combined PAM/PWM Driving Scheme for High Uniformity of MicroLED Displays** (Page 1204)  
Julian Ritter, *Saarland University*  
Chihao Xu, *Saarland University*
- P-42: Student Poster: A New Integrated Scan/Emission Driver Circuit with Progressive Emission Driving Method for MicroLED Display** (Page 1208)  
Sung-Hyuck Ahn, *Sungkyunkwan University*  
Eun kyo Jung, *Sungkyunkwan University*  
Yong-Hoo Hong, *Sungkyunkwan University*  
Hwarim Im, *Sungkyunkwan University*  
Yong-Sang Kim, *Sungkyunkwan University*
- P-43: Finely Programmable Pulse-Width Shift Register for Luminance Control of AMOLED Displays** (Page 1212)  
Min-Kyu Chang, *Kyung Hee University*  
Yun Jang Pyun, *Kyung Hee University*  
Hyoungsik Nam, *Kyung Hee University*



- P-44: MPRT Enhancement Gate Driver Circuit Employing IGZO TFTs for Image-Quality Improvement** (Page 1215)  
Xuehuan Feng, *Hefei BOE Joint Technology Co. Ltd.*  
Yongqian Li, *Hefei BOE Joint Technology Co. Ltd.*  
Pengfei Yin, *Hefei BOE Joint Technology Co. Ltd.*  
Wenchao Bao, *Hefei BOE Joint Technology Co. Ltd.*  
Tianji Li, *Hefei BOE Joint Technology Co. Ltd.*  
Pan Xu, *Hefei BOE Joint Technology Co. Ltd.*  
Ying Han, *Hefei BOE Joint Technology Co. Ltd.*  
Xing Zhang, *Hefei BOE Joint Technology Co. Ltd.*  
Jianye Zhang, *Hefei BOE Joint Technology Co. Ltd.*  
Xuelian Cheng, *Hefei BOE Joint Technology Co. Ltd.*  
Zhongyuan Wu, *Hefei BOE Joint Technology Co. Ltd.*  
Jianwei Yu, *Hefei BOE Joint Technology Co. Ltd.*  
Xue Dong, *Hefei BOE Joint Technology Co. Ltd.*
- P-45: High-Efficiency DC-DC Converter for IT OLED Displays** (Page 1219)  
Yoon-Young Lee, *Samsung Display*  
Sung-Chun Park, *Samsung Display*  
Eun-Ryeol Baek, *Samsung Display*
- P-46: New Type of Unbounded Screen Full-Attachment TV Set** (Page 1223)  
Wenbo Dong, *Hefei BOE Display Technology Co., Ltd.*  
Jianming Liu, *Hefei BOE Display Technology Co., Ltd.*  
Yinhu Huang, *Hefei BOE Display Technology Co., Ltd.*  
Byung Cheon Lim, *Hefei BOE Display Technology Co., Ltd.*  
Zhangtao Wang, *BOE Technology Group Co., Ltd.*  
Guanbao Hui, *Hefei BOE Display Technology Co., Ltd.*  
Chaoyue Wang, *Hefei BOE Display Technology Co., Ltd.*  
Wei Kang, *Hefei BOE Display Technology Co., Ltd.*  
Xunwang Yu, *Hefei BOE Display Technology Co., Ltd.*
- P-47: A Repair Method for Improving Pad Damage of COG MiniLED** (Page 1226)  
Hai Tang, *BOE MLED Technology Co., Ltd.*  
Yutian Chu, *BOE MLED Technology Co., Ltd.*  
Chengcheng Kong, *BOE MLED Technology Co., Ltd.*  
Liang Gao, *BOE MLED Technology Co., Ltd.*  
Ming Zhai, *BOE MLED Technology Co., Ltd.*  
Haiwei Sun, *BOE MLED Technology Co., Ltd.*
- P-48: Analysis of Degree of Imidization of Polyimide Organic Film Through Retardation Measurement** (Page 1229)  
Nakcho Choi, *Samsung Display Co., Ltd.*  
Sanghee Yu, *Samsung Display Co., Ltd.*  
Jonghyun Yun, *Samsung Display Co., Ltd.*
- P-50: Inkjet Printing Design and Analysis for Thin and Uniform Organic Encapsulation Layer on OLEDs** (Page 1231)  
Heechang Yoon, *Samsung Display Co., Ltd.*  
Seungyong Song, *Samsung Display Co., Ltd.*  
Wooyong Sung, *Samsung Display Co., Ltd.*  
Hyoungsub Lee, *Samsung Display Co., Ltd.*  
Jinho Hyun, *Samsung Display Co., Ltd.*  
Hyemin Lee, *Samsung Display Co., Ltd.*  
Seungyeon Chae, *Samsung Display Co., Ltd.*
- P-51: Study on the Sealing Property of Narrow-Border Display** (Page 1234)  
Zhenyu Zhang, *BOE Technology Group Co., Ltd.*  
Feifei Zhu, *BOE Technology Group Co., Ltd.*  
Xinxia Zhang, *BOE Technology Group Co., Ltd.*  
Fengzhen Lv, *BOE Technology Group Co., Ltd.*  
Ran Zhang, *BOE Technology Group Co., Ltd.*  
Zhangtao Wang, *BOE Technology Group Co., Ltd.*
- P-52: Novel Forming Technology of 3D Cover Glass with Induction Heating System for Curved-Corner Displays** (Page 1238)  
Seungho Kim, *Samsung Display Co., Ltd.*  
Hyunseung Seo, *Samsung Display Co., Ltd.*  
Jinsu Nam, *Samsung Display Co., Ltd.*  
Jong-soo Baek, *Innoworks Corporation*
- P-54: Development of Heat-Free/Low-Temperature Process High-Refractive-Index Materials for Displays** (Page 1242)  
Kazuki Urakawa, *Tokyo Ohka Kogyo Co., Ltd.*  
Hiroki Chisaka, *Tokyo Ohka Kogyo Co., Ltd.*  
Jiro Hikida, *Tokyo Ohka Kogyo Co., Ltd.*



Atsushi Yamanouchi, *Tokyo Ohka Kogyo Co., Ltd.*  
Dai Shiota, *Tokyo Ohka Kogyo Co., Ltd.*  
Katsumi Ohmori, *Tokyo Ohka Kogyo Co., Ltd.*

- P-55: Development of Photosensitive Material for Mini/MicroLED Displays** (Page 1245)  
Yoshihito Tanaka, *Sumitomo Bakelite Co., Ltd.*  
Kazuki Inoue, *Sumitomo Bakelite Co., Ltd.*  
Yasunori Takahashi, *Sumitomo Bakelite Co., Ltd.*
- P-142: Cost of Operation Reduction and Performance Improvement of Crystallized a-Si Backplanes for OLED-Displays by Solid-State-Laser Annealing (SLA)** (Page 1249)  
Sebastian Geburt, *INNOVAVENT GmbH*  
Johannes Richter, *INNOVAVENT GmbH*  
Ralf Mueller, *INNOVAVENT GmbH*  
Hans-Juergen Kahlert, *INNOVAVENT GmbH*
- P-56: Simulation and Improvement of TCO Luminance Angular Uniformity Based on Techwiz and LightTools Software** (Page 1253)  
Han-yan Sun, *Beijing BOE Display Technology Co., Ltd.*  
Wei-tao Chen, *Beijing BOE Display Technology Co., Ltd.*  
Ming-hui Zhang, *Beijing BOE Display Technology Co., Ltd.*  
Xiao-na Liu, *Beijing BOE Display Technology Co., Ltd.*  
Xiao-peng Cui, *Beijing BOE Display Technology Co., Ltd.*  
Yu Ma, *Beijing BOE Display Technology Co., Ltd.*
- P-57: Student Poster: Improved Modulation Transfer Function (MTF) for Aerial Image Formed with AIRR by Use of Two Transparent Spheres** (Page 1257)  
Kazuaki Takiyama, *Utsunomiya University*  
Haotong Guo, *Utsunomiya University*  
Kengo Fujii, *Utsunomiya University*  
Masaki Yasugi, *Utsunomiya University*  
Shiro Suyama, *Utsunomiya University*  
Hirotosugu Yamamoto, *Utsunomiya University*
- P-58: Measurement of AR Displays in Positioning Accuracy** (Page 1261)  
Xi Mou, *Hangzhou SanTest Technology Co., Ltd.*  
Tongsheng Mou, *Zhejiang University*
- P-59: In-Fab Raman Spectroscopy for Defect Analysis of Random Failures** (Page 1264)  
Yong-Woon Lim, *Samsung Display*  
Hyo-Jin Kim, *Dongduk University*  
Won Hyuk Jang, *Samsung Display*  
Yunyoung Kyeong, *Samsung Display*  
Kyong-Hun Lee, *Nanophoton Korea*  
Bongjoon Park, *Samsung Display*  
Hyeon Hwan Kim, *Samsung Display*
- P-60: New Flexible and Lightweight RGB LED Video Foil for Digital Signage** (Page 1268)  
Florian Kall, *LightnTec*  
Karlheinz Blankenbach, *Pforzheim University*
- P-61: Dual-Cell Display System for Intelligent Viewing-Adjustable LCDs** (Page 1272)  
Sijun Lei, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Yansheng Sun, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Yuxu Geng, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Zhi Zhang, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Shounian Chen, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Jin Sha, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Yong Deng, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Yijun Wang, *Chongqing BOE Optoelectronics Technology Co., Ltd.*  
Lan Xin, *Chongqing BOE Optoelectronics Technology Co., Ltd.*
- P-62: Adaptive Pixel-Based Local Color Uniformity Compensation for AMOLED Displays** (Page 1276)  
Wan-Nung Tsung, *Novatek Microelectronics Corporation*  
Jun-Yu Yang, *Novatek Microelectronics Corporation*  
Shang-Yu Su, *Novatek Microelectronics Corporation*  
Feng-Ting Pai, *Novatek Microelectronics Corporation*  
Ching-Chun Lin, *Novatek Microelectronics Corporation*
- P-63: Design and Fabrication of Wide-Viewing-Angle Ambient Light Rejection Front-Projection Screen** (Page 1280)  
Fung-Hsu Wu, *BenQ Materials Corp.*
- P-64: Micro-LC Lens for 2D/3D Switchable Displays** (Page 1283)  
Weili Zhao, *BOE Technology Group Co., Ltd.*  
Zhongxiao Li, *BOE Technology Group Co., Ltd.*  
Zhiqiang Xu, *BOE Technology Group Co., Ltd.*

Lin Li, *BOE Technology Group Co., Ltd.*  
Liwei Liu, *BOE Technology Group Co., Ltd.*  
Chengtan Zhao, *BOE Technology Group Co., Ltd.*  
Pengxia Liang, *BOE Technology Group Co., Ltd.*  
Xiaochuan Chen, *BOE Technology Group Co., Ltd.*

- P-65: Autostereoscopic Display for Two Viewers Providing Images Specific to Each Viewpoint** (Page 1286)  
Garimagai Borjigin, *University of Tsukuba*  
Hideki Kakeya, *University of Tsukuba*
- P-66: Application of Ergonomics in VR HMD Exit Pupil Positioning Design** (Page 1290)  
Yuhong Liu, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Zheng Ge, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Hao Zhang, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Lili Chen, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Feng Zi, *Beijing BOE Optoelectronics Technology Co., Ltd.*
- P-67: Student Poster: Design and Analysis of Deflection Structure for Light-Field Display** (Page 1293)  
Yi Lin Chen, *National Taiwan University*  
Kai Siang Hsu, *National Taiwan University*  
Hoang Yan Lin, *National Taiwan University*
- P-68: Student Poster: A Miniaturized Polarization-Multiplexed Dual-Plane Head-Mounted Display System for Augmented Reality** (Page 1296)  
Zekun Yan, *Shanghai Jiao Tong University*  
Yan Li, *Shanghai Jiao Tong University*  
Lin Wang, *Shanghai Jiao Tong University*  
Bo Wang, *Shanghai Jiao Tong University*
- P-69: Omnidirectional and Self-Adaptive High-Dimensional 3D Display** (Page 1300)  
Shiming Shang, *BOE Technology Group Co., Ltd.*  
Xiaoqing Peng, *BOE Technology Group Co., Ltd.*  
Kaixuan Wang, *BOE Technology Group Co., Ltd.*  
Hongming Zhan, *BOE Technology Group Co., Ltd.*  
Xi Chen, *BOE Technology Group Co., Ltd.*
- P-70: Student Poster: Force Variation During Tactile Exploration Provides Crucial Information for Virtual Tactile Experience** (Page 1304)  
Dexing Qi, *BOE Technology Group Company, Ltd.*  
Youru Chen, *BOE Technology Group Company, Ltd.*  
Yanzhao Li, *BOE Technology Group Company, Ltd.*
- P-71: Methods for Adopting High-Resolution Mobile Displays in Alternative Applications, Products, and Markets** (Page 1307)  
Grant Jennings, *GOWIN Semiconductor*
- P-72: Student Poster: Highly Uniform Speckle Pattern Created via an Elastomeric Stencil Mask for High-Precision Digital-Image-Correlation Analysis of Substrate-Stretching Deformation** (Page 1309)  
Jinsu Yoon, *Seoul National University*  
Jong Ho Park, *Seoul National University*  
Geonhee Kim, *Seoul National University*  
Yongtaek Hong, *Seoul National University*
- P-73: Student Poster: MicroLED Pixel Circuit Based on Metal-Oxide Thin-Film Transistor with Progressive Emission Method Using Pulse-Width Modulation** (Page 1312)  
Eun Kyo Jung, *Sungkyunkwan University*  
Yong-Hoo Hong, *Sungkyunkwan University*  
Sung-Hyuck Ahn, *Sungkyunkwan University*  
Hwarim Im, *Sungkyunkwan University*  
Yong-Sang Kim, *Sungkyunkwan University*
- P-74: Student Poster: High Efficiency  $\mu$ LED Light Engine for AR/VR Displays** (Page 1316)  
En-Lin Hsiang, *University of Central Florida*  
Ziqian He, *University of Central Florida*  
Zhiyong Yang, *University of Central Florida*  
Yi-Fen Lan, *AU Optronics Corp*  
Shin-Tson Wu, *University of Central Florida*
- P-75: Student Poster: MicroLED Pixel Circuit Capable of Always-On Display Mode Operation for Mobile and Wearable Displays** (Page 1320)  
Yong-Hoo Hong, *Sungkyunkwan University*  
Eun Kyo Jung, *Sungkyunkwan University*  
Sung-Hyuck Ahn, *Sungkyunkwan University*  
Hwarim Im, *Sungkyunkwan University*  
Yong-Sang Kim, *Sungkyunkwan University*

- P-76: Elimination of Nanorods by Tetramethylammonium Hydroxide for the Fabrication of AlGaIn-Based UV-C MicroLED Array** (Page 1324)  
Feng Feng, *Hong Kong University of Science and Technology*  
Yibo Liu, *Hong Kong University of Science and Technology*  
Ke Zhang, *Hong Kong University of Science and Technology*  
Ka-Wah Chan, *Hong Kong University of Science and Technology*  
Zhaojun Liu, *Hong Kong University of Science and Technology*  
Hoi-Sing Kwok, *Hong Kong University of Science and Technology*
- P-77: Advanced Encapsulation Film for MicroLED Display** (Page 1328)  
Shih-Chieh Teng, *BenQ Materials Corporation*  
Ju-Hui Huang, *BenQ Materials Corporation*  
Lung-Hai Wu, *BenQ Materials Corporation*  
Pei-Yi Liu, *BenQ Materials Corporation*
- P-78: Atomic-Scale Sidewall Passivation for MicroLED Devices** (Page 1331)  
Jouko Lång, *Comptek Solutions*
- P-81: Enhanced Color-Conversion Efficiency of Quantum-Dot Layer Using Low-Refractive-Index Layer** (Page 1335)  
Da Bin Kim, *LG Display*  
Kyungkook Jang, *LG Display*  
SeungRyong Lee, *LG Display*  
Younghoon Kim, *LG Display*  
Dae Heung Lee, *LG Display*  
Taehyoung Kwak, *LG Display*  
JeomJae Kim, *LG Display*  
SooYoung Yoon, *LG Display*
- P-82: Prediction Methodology for the Optical Properties of QDs with Arbitrary 3D Shapes** (Page 1338)  
Hyung Uk Cho, *Samsung Display*  
Bowoon Kim, *Samsung Display*  
Jintaek Cho, *Samsung Display*  
Richard James, *Samsung Display*  
Tae-Gon Kim, *Samsung Electronics*,  
Shinae Jun, *Samsung Electronics*  
Seungin Baek, *Samsung Display*  
Yongjo Kim, *Samsung Display*  
Changhee Lee, *Samsung Display*
- P-83: Oxygen Ratio's Effect on the Photoluminescence Property of Zinc-Oxide Thin-Film Phosphor** (Page 1340)  
Chaoyang Li, *Kochi University of Technology*  
Su Wai Htet, *Kochi University of Technology*  
Tetsuya Ueda, *Kochi University of Technology*
- P-84: Student Poster: Selective-Coating CdSe/ZnS Quantum Dots on Stretchable Substrate with Controlled Density by Inducing Ligand-Exchange Reaction** (Page 1344)  
Jong Ho Park, *Seoul National University*  
Jinsu Yoon, *Seoul National University*  
Yiseul Kim, *Seoul National University*  
Yongtaek Hong, *Seoul National University*
- P-86: Ink-Jet Printed Stable Full-Color Perovskite and Quantum-Rod Color Filter** (Page 1347)  
Yiyang Gao, *The Hong Kong University of Science and Technology*  
Chengbin Kang, *The Hong Kong University of Science and Technology*  
Maksym Prodanov, *The Hong Kong University of Science and Technology*  
Valerii Vashchenko, *The Hong Kong University of Science and Technology*  
Abhishek Kumar Srivastava, *The Hong Kong University of Science and Technology*
- P-87: Localized Surface Plasmon Resonance-Enhanced ZnSeTe Blue Quantum-Dot Light-Emitting Diodes with AuAg Alloy Nanoparticles** (Page 1351)  
Sun-Kyo Kim, *Hongik University*  
Sun-Hyoung Lee, *Hongik University*  
Dae-Yeon Jo, *Hongik University*  
Suk-Young Yoon, *Hongik University*  
Hyun-Min Kim, *Hongik University*  
Yuri Kim, *Hongik University*  
Ali Imran Channa, *Hongik University*  
Yang-Hee Kim, *Hongik University*  
Jiwan Kim, *Kyonggi University*  
Heesun Yang, *Hongik University*
- P-88: Efficiency Improvement of Top-Emission Green Quantum-Dot Light-Emitting Diode with Dielectric-Metal-Dielectric Cathode** (Page 1355)  
Bo-Yen Lin, *Yuan Ze University*

Chia-Hsun Chen, *National Taiwan University*  
Kun-Rong Lin, *National Taiwan University*  
Chun-Yu Lee, *AU Optronics Corporation*  
Tien-Lung Chiu, *Yuan Ze University*  
Jiun-Haw Lee, *National Taiwan University*

- P-89: High-Efficiency Red Quantum-Dot Light-Emitting Diodes with Acrylate-Treated ZnMgO as an Electron Transport Layer** (Page 1357)  
Suk-Young Yoon, *Hongik University*  
Sun-Hyoung Lee, *Hongik University*  
Dae-Yeon Jo, *Hongik University*  
Hyun-Min Kim, *Hongik University*  
Yuri Kim, *Hongik University*  
Sun-Kyo Kim, *Hongik University*  
Ali Imran Channa, *Hongik University*  
Yang-Hee Kim, *Hongik University*  
Jiwan Kim, *Kyonggi University*  
Heesun Yang, *Hongik University*
- P-90: Boosting the Efficiency of Cd-Free Blue Quantum-Dot Light-Emitting Diodes via Charge-Transport Layer Optimization** (Page 1361)  
Maocheng Jiang, *BOE Technology Group Co., Ltd.*  
Jingwen Feng, *BOE Technology Group Co., Ltd.*  
Tieshi Wang, *BOE Technology Group Co., Ltd.*  
Yuanming Zhang, *BOE Technology Group Co., Ltd.*  
Dong Li, *BOE Technology Group Co., Ltd.*  
Zhuo Chen, *BOE Technology Group Co., Ltd.*  
Yanzhao Li, *BOE Technology Group Co., Ltd.*  
Xinguo Li, *BOE Technology Group Co., Ltd.*  
Li Zhou, *BOE Technology Group Co., Ltd.*  
Chen Pei, *BOE Technology Group Co., Ltd.*  
Xiaoguang Xu, *BOE Technology Group Co., Ltd.*
- P-92: Effects of Self-Absorption and Photon Recycling in Metal-Halide Perovskite LEDs Assessed by Full Opto-Electronic Device Simulation** (Page 1365)  
Urs Aeberhard, *Fluxim AG*  
Simon Zeder, *Fluxim AG*  
Balthasar Blülle, *Fluxim AG*  
Beat Ruhstaller, *Fluxim AG & ZHAW - Zurich University of Applied Sciences*
- P-93: Development of Flexible Display for a Pen-Drop Function** (Page 1369)  
Shuang Du, *BOE Technology Group Co., Ltd.*  
Bao Ming Cai, *BOE Technology Group Co., Ltd.*  
Zhao Li, *BOE Technology Group Co., Ltd.*  
Zheng Dao Liu, *BOE Technology Group Co., Ltd.*  
Song Zhang, *BOE Technology Group Co., Ltd.*  
Shi Ming Shi, *BOE Technology Group Co., Ltd.*  
Chun Yan Xie, *BOE Technology Group Co., Ltd.*  
Xiao Fei Luo, *BOE Technology Group Co., Ltd.*  
Yun Jin Liu, *BOE Technology Group Co., Ltd.*  
Ren Hao Pan, *BOE Technology Group Co., Ltd.*
- P-94: Student Poster: Color-Tunable Textile-Based Organic Light-Emitting Diodes Toward a True Wearable Fashion Display** (Page 1373)  
Junwoo Lee, *Korea Advanced Institute of Science and Technology (KAIST)*  
Ha-Eun Cho, *Korea Advanced Institute of Science and Technology (KAIST)*  
Yongjin Park, *Korea Advanced Institute of Science and Technology (KAIST)*  
Yong Ha Hwang, *Korea Advanced Institute of Science and Technology (KAIST)*  
Kyung Cheol Choi, *Korea Advanced Institute of Science and Technology (KAIST)*
- P-95: Comparative Effectiveness Study on Foldable Display Module Application of Thin Metal Sheet** (Page 1377)  
JungKyu Park, *LG Display*  
MinKyung Kim, *LG Display*  
SangJun Lee, *LG Display*  
TaeWoo Kim, *LG Display*  
JiGeun Nam, *LG Display*  
SeungJun Han, *LG Display*
- P-96: Optimization Analysis for R1.5mm Teardrop-Shape Foldable AMOLED Module by Finite-Element Analysis** (Page 1381)  
Jia Zeng, *BOE OLED Product Development Center, Ltd.*  
Wei Qing, *BOE OLED Product Development Center, Ltd.*  
Shao kui Liu, *BOE OLED Product Development Center, Ltd.*  
Zhi hui Wang, *BOE OLED Product Development Center, Ltd.*  
Lei Zhang, *BOE OLED Product Development Center, Ltd.*

Hang Min, *BOE OLED Product Development Center, Ltd.*  
Fei Shang, *BOE OLED Product Development Center, Ltd.*

- P-97: Activegrid Advanced Materials Enabling Next-Generation Designs** (Page 1385)  
Xiaofeng Chen, *C3Nano Inc.*  
Ajay Virkar, *C3Nano Inc.*  
Yadong Cao, *C3Nano Inc.*
- P-136: Late-News Poster: Functional Hard Coatings for Foldable Displays** (Page 1389)  
Ari Kärkkäinen, *Optitune*  
Rakib Kabir, *Optitune*  
Sacha Legrand, *Optitune*  
Tiina Leppäjärvi, *Optitune*  
Neil Pschirer, *Optitune*
- P-138: High-Torque Hinge for Large Foldable Device** (Page 1393)  
Seoung Jun Lee, *AUFLEX*  
Hyun Min Park, *AUFLEX*  
Insun Hwang, *AUFLEX*
- P-98: Strategies for Improving Optical Performance of LCD In-Cell Fingerprint Identification** (Page 1397)  
Jin-Sen Yong, *National Yang Ming Chiao Tung University*  
Wei-Yu Wang, *National Yang Ming Chiao Tung University*  
Cheng-Huan Chen, *National Yang Ming Chiao Tung University*  
Yao-Chung Chang, *Novatek Microelectronics Corp.*  
Chih-Chang Lai, *Novatek Microelectronics Corp.*  
Ching-Chun Lin, *Novatek Microelectronics Corp.*
- P-99: Novel Transparent Infrared Flat-Panel Detector Used in Ultra-Large Display with Laser Interactive Function** (Page 1401)  
Lin Zhou, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Shoujin Cai, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Cheng Li, *Beijing BOE Optoelectronics Technology Co., Ltd.*  
Chungheng Che, *Beijing BOE Optoelectronics Technology Co., Ltd.*
- P-100: Driving Technology of Super-Large Full In-Cell Touch LCD** (Page 1404)  
Yin-long Zhang, *Beijing BOE Display Technology Co., Ltd.*  
Yan-ping Liao, *Beijing BOE Display Technology Co., Ltd.*  
Zhao-yu Peng, *Beijing BOE Display Technology Co., Ltd.*  
Dong-chuan Chen, *Beijing BOE Display Technology Co., Ltd.*  
Guo-huo Su, *Beijing BOE Display Technology Co., Ltd.*  
Qiu-jie Su, *Beijing BOE Display Technology Co., Ltd.*  
Xi-bin Shao, *Beijing BOE Display Technology Co., Ltd.*
- P-101: Self-Capacitive Ring-Like Touch Sensor Design and Algorithm for OLED On-Cell Touch Panel** (Page 1408)  
Yi-Ying Lin, *Novatek Microelectronics Corporation*  
Chih-Chang Lai, *Novatek Microelectronics Corporation*  
Ching-Chung Lin, *Novatek Microelectronics Corporation*
- P-102: Design Approach of NFC Antenna Integration into LCD Panel** (Page 1412)  
Xiuyun Chen, *Beijing BOE Display Technology Co., Ltd.*  
Yeyu Feng, *Beijing BOE Display Technology Co., Ltd.*  
Jingjun Du, *Beijing BOE Display Technology Co., Ltd.*  
Yujie Liu, *Beijing BOE Display Technology Co., Ltd.*  
Feng Long, *Beijing BOE Display Technology Co., Ltd.*  
Guangquan Wang, *Beijing BOE Display Technology Co., Ltd.*  
Site Cai, *Beijing BOE Display Technology Co., Ltd.*  
Xibin Shao, *Beijing BOE Display Technology Co., Ltd.*  
Lingyu Sun, *Beijing BOE Display Technology Co., Ltd.*  
Shuwei Guo, *Beijing BOE Display Technology Co., Ltd.*
- P-103: Imaging Quality Optimization of Full Display with Camera Based on Optical Simulation** (Page 1415)  
Bo Shi, *BOE Optoelectronics Technology Co., Ltd.*  
Ming Hu, *BOE Optoelectronics Technology Co., Ltd.*  
Taofeng Xie, *BOE Optoelectronics Technology Co., Ltd.*  
Chi Yu, *BOE Optoelectronics Technology Co., Ltd.*  
Quan Shi, *BOE Optoelectronics Technology Co., Ltd.*  
Wei Zhang, *BOE Optoelectronics Technology Co., Ltd.*  
Weiyun Huang, *BOE Optoelectronics Technology Co., Ltd.*  
Hui Guan, *BOE Optoelectronics Technology Co., Ltd.*  
Cuicui Tan, *BOE Optoelectronics Technology Co., Ltd.*  
Xingliang Xiao, *BOE Optoelectronics Technology Co., Ltd.*  
Xiangdan Dong, *BOE Optoelectronics Technology Co., Ltd.*  
Youngyik Ko, *BOE Optoelectronics Technology Co., Ltd.*  
Haijun Qiu, *BOE Optoelectronics Technology Co., Ltd.*



- P-105: Cholesteric Liquid-Crystal Filters with Single-Layer Template** (Page 1419)  
Yao Gao, *Shanghai Jiao Tong University*  
Jiangang Lu, *Shanghai Jiao Tong University*
- P-106: Student Poster: Highly Thermal-Stable Polymer-Stabilized Cholesteric Liquid-Crystal Smart Windows** (Page 1423)  
Wenbing Zhu, *Donghua University*  
Yang Liu, *Donghua University*  
Dae-Shik Seo, *Yonsei University*
- P-107: Switchable Privacy Monitor Display Using Viewing-Angle Control Film** (Page 1426)  
Seung-Hwa Baek, *LG Display*  
Jongwook Jung, *LG Display*  
Sung-Il Kim, *LG Display*  
Dong-Jin Lee, *LG Display*  
Gwang Tae Kim, *LG Display*  
Jeong-Ki Park, *LG Display*
- P-108: Study of Trace Mura in ADS LCD** (Page 1430)  
Qianqian Zhang, *HeFei BOE Photoelectric Technology Co., Ltd.*  
Yun Bok Lee, *HeFei BOE Photoelectric Technology Co., Ltd.*  
Chun Wang, *HeFei BOE Photoelectric Technology Co., Ltd.*  
Hui Wang, *HeFei BOE Photoelectric Technology Co., Ltd.*  
Sheng Wang, *HeFei BOE Photoelectric Technology Co., Ltd.*  
SeungKyu Lee, *HeFei BOE Photoelectric Technology Co., Ltd.*
- P-109: Novel Anti-Peeping Technology Based on Dual-Cell and Special Customized Glasses** (Page 1433)  
Bowen Li, *Beijing BOE Display Technology Co.*  
Linlin Wang, *Beijing BOE Display Technology Co.*  
Feifei Wang, *Beijing BOE Display Technology Co.*  
Xi Chen, *Beijing BOE Display Technology Co.*  
Hongming Zhan, *Beijing BOE Display Technology Co.*  
Kaixuan Wang, *Beijing BOE Display Technology Co.*  
Xinli Ma, *Beijing BOE Display Technology Co.*
- P-110: Analysis of Light Leakage in the Dark State with W Pixel in Liquid-Crystal Display** (Page 1436)  
Mei Liu, *Wuhan China Star Photoelectric Technology Co., Ltd.*  
Jiuhui Zhu, *Wuhan China Star Photoelectric Technology Co., Ltd.*  
Qian Deng, *Wuhan China Star Photoelectric Technology Co., Ltd.*  
Wei Cheng, *Wuhan China Star Photoelectric Technology Co., Ltd.*  
Chao Wang, *Wuhan China Star Photoelectric Technology Co., Ltd.*  
Guanghui Liu, *Wuhan China Star Photoelectric Technology Co., Ltd.*
- P-111: Research on the Structure and Optical Performance of Reflective Liquid-Crystal Displays** (Page 1439)  
Kun Ma, *Wuhan China Star Optoelectronics Technology Co., Ltd.*  
Rong Ma, *Wuhan China Star Optoelectronics Technology Co., Ltd.*  
Rui He, *Wuhan China Star Optoelectronics Technology Co., Ltd.*  
Wei Cheng, *Wuhan China Star Optoelectronics Technology Co., Ltd.*  
Chao Wang, *Wuhan China Star Optoelectronics Technology Co., Ltd.*  
Guanghui Liu,
- P-112: A Super-Excellent Image-Quality LCD Technology** (Page 1442)  
Jianhua Huang, *Beijing BOE Display Technology Co.*  
Yingying Qu, *Beijing BOE Display Technology Co.*  
Dongchuan Chen, *Beijing BOE Display Technology Co.*  
Yanping Liao, *Beijing BOE Display Technology Co.*  
Seungmin Lee, *Beijing BOE Display Technology Co.*  
Xibin Shao, *Beijing BOE Display Technology Co.*  
Lingdan Bo, *Beijing BOE Display Technology Co.*  
Ting Dong, *Beijing BOE Display Technology Co.*  
Xiaohan Tian, *Beijing BOE Display Technology Co.*
- P-114: Optimization of Essential Factor to Fabricate High-Quality Polymer-Stabilized Vertically Aligned Liquid-Crystal Displays** (Page 1445)  
Yong-Woon Lim, *Samsung Display*  
Kiwan Park, *Samsung Display*  
Hyeon Hwan Kim, *Samsung Display*
- P-115: Student Poster: Super-Fast Optically Rewritable Liquid-Crystal Display Enabled by MoS<sub>2</sub>-Doped PI Bumpy Alignment Layer** (Page 1449)  
Shining Gao, *Donghua University*  
Yang Liu, *Donghua University*  
Dae-Shik Seo, *Yonsei University*



- P-116: *Student Poster: Transparent Displays Using Vertically Aligned Polyimide-Free Liquid-Crystal Polymer Composite*** (Page 1452)  
DaYeon Lee, *Jeonbuk National University*  
Minji Kang, *Jeonbuk National University*  
Eunji Kim, *Jeonbuk National University*  
Young Jin Lim, *Jeonbuk National University*  
MinSu Kim, *Jeonbuk National University*  
Seung Hee Lee, *Jeonbuk National University*
- P-117: *AI Analysis of HOP Circuit Failure and Improvement*** (Page 1455)  
Kyongtea Park, *Samsung Display Co., Ltd.*  
Jaebok Lee, *Samsung Display Co., Ltd.*  
Keunsoo Lee, *Samsung Display Co., Ltd.*
- P-118: *A New Architecture and Algorithm for Display Defect Compensation Based on CNN*** (Page 1458)  
Hao Tang, *Jingce Electronics USA*  
Gang Xu, *Jingce Electronics USA*
- P-120: *Solution for Imbalanced Image Data of Mass Production*** (Page 1462)  
Sukbin Jung, *Samsung Display*
- P-121: *CNN-Based Edge-Preserve Segmentation for FIB, TEM Image Analysis*** (Page 1467)  
Seokkwon Kim, *Samsung Display*  
Taeseok Jeong, *Samsung Display*  
Junghoon Jo, *Samsung Display*  
Kyunghun Shin, *Samsung Display*  
Seugin Baek, *Samsung Display*  
Yongjo Kim, *Samsung Display*
- P-122: *Bayesian Optimization with Gradients for OLED Efficiency Enhancement*** (Page 1470)  
Richard James, *Samsung Display*  
Bowoon Kim, *Samsung Display*  
Hyunguk Cho, *Samsung Display*  
Yongjo Kim, *Samsung Display*
- P-123: *Study for Correlation Between Solution-Processed OLED Performance and Film Profile*** (Page 1473)  
Insun Yoo, *LG Display*  
Jun Ho Youn, *LG Display*  
Heumell Baek, *LG Display*  
HyoDae Bae, *LG Display*
- P-124: *Student Poster: Multiple-Resonance-Type Blue Fluorescent OLEDs with High Efficiency of Over 25% and Long Device Lifetime of Over 500 H*** (Page 1477)  
Jinho Park, *Sungkyunkwan University*  
Junseop Lim, *Sungkyunkwan University*  
Ki Ju Kim, *Hongik University*  
Teakyung Kim, *Hongik University*  
Jun Yeob Lee, *Sungkyunkwan University*
- P-125: *Investigation of Mechanisms to Enhance Efficiency and Lifetime of Blue Organic-Emitting Diodes*** (Page 1481)  
Wenfeng Song, *Hefei BOE Joint Technology Co., Ltd.*  
Juanjuan You, *Hefei BOE Joint Technology Co., Ltd.*  
Chang-Yen Wu, *Hefei BOE Joint Technology Co., Ltd.*  
Linlin Wang, *Hefei BOE Joint Technology Co., Ltd.*  
Yongqi Shen, *Hefei BOE Joint Technology Co., Ltd.*  
Bin Bo, *Hefei BOE Joint Technology Co., Ltd.*  
Wei Quan, *Hefei BOE Joint Technology Co., Ltd.*  
Donghui Yu, *Hefei BOE Joint Technology Co., Ltd.*  
Huai-Ting Shih, *Hefei BOE Joint Technology Co., Ltd.*  
Zhongyuan Wu, *Hefei BOE Joint Technology Co., Ltd.*  
Jianwei Yu, *Hefei BOE Joint Technology Co., Ltd.*
- P-126: *Magnetic Field Effects on Electroplex-Based Organic Light-Emitting Diodes*** (Page 1484)  
Ki Ju Kim, *Hongik University*  
Seong Hwan Hong, *Hongik University*  
Hakjun Lee, *Hongik University*  
Kyo Min Hwang, *Hongik University*  
Bubae Park, *Hongik University*  
Young Kwan Kim, *Hongik University*  
Taekyung Kim, *Hongik University*
- P-127: *Student Poster: Highly Efficient Green Hyperfluorescent Organic Light-Emitting Diodes Using Tetradentate Pt(II) Complex as Phosphorescent Sensitizer*** (Page 1488)  
Seung Chan Kim, *Sungkyunkwan University*  
Chan Hee Ryu, *Kangwon National University*

Kang Mun Lee, *Kangwon National University*  
Jun Yeob Lee, *Sungkyunkwan University*

**P-128: [Student Poster: Optimizing OLED Pixel Structures for Consistently Low Ambient Light Reflection over Viewing Angles](#)** (Page 1492)

Chi-Jui Chang, *National Taiwan University*  
Chen-Han Lu, *National Taiwan University*  
Wei-Kai Lee, *National Taiwan University*  
Kai-Chen Lin, *National Taiwan University*  
Chih-Kai Teng, *AU Optronics Corporation*  
Mei-sheng Ma, *AU Optronics Corporation*  
Ching-Sheng Cheng, *AU Optronics Corporation*  
Li-Wei Shih, *AU Optronics Corporation*  
Chung-Chih Wu, *National Taiwan University*

**P-129: [Estimating Non-Radiative Decay Rates in TADF Emitters Using Steady-State and Transient Optical Data](#)** (Page 1495)

Stefano Sem, *University of Augsburg*  
Sandra Jenatsch, *Fluxim AG*  
Kleitos Stavrou, *University of Durham*  
Andrew Danos, *University of Durham*  
Andrew P. Monkman, *University of Durham*  
Beat Ruhstaller, *ZHAW - Institute of Computational Physics*

**P-130: [Organic Thin Films for OLED Applications: Simulating the Influence of Deposition Conditions and Substrate](#)** (Page 1499)

Paul Winget, *Schrödinger Inc*  
H. Shaun Kwak, *Schrödinger Inc*  
Christopher T. Brown, *Schrödinger Inc*  
Alexander Goldberg, *Schrödinger Inc*  
Andrea R. Browning, *Schrödinger Inc*  
Mathew D. Halls, *Schrödinger Inc*

**P-131: [Highly Efficient, Pure Hyperfluorescence Device with Organo-Boron-Based Thermally Activated Delayed Fluorescence Materials](#)** (Page 1503)

Hyuna Lee, *Kyung Hee University*  
Naveen Rayappa Kenkera, *Kyung Hee University*  
Jang Hyuk Kwon, *Kyung Hee University*

**P-132: [Simultaneous Enhancement of Efficiency and Lifetime in Blue Triplet-Triplet Annihilation Organic Light-Emitting Diodes Using Double-Emitting Layer Structure](#)** (Page 1506)

Chun-Chieh Chu, *National Taiwan University*  
Chia-Hsun Chen, *Yuan Ze University*  
Bo-Yen Lin, *Yuan Ze University*  
Han-Kang Liu, *Tetrahedron Technology Corporation*  
Yung-Cheng Tsai, *WiseChip Semiconductor Inc.*  
Chih-Hsien Yuan, *WiseChip Semiconductor Inc.*  
Tien-Lung Chiu, *Yuan Ze University*  
Jiun-Haw Lee, *Graduate Institute of Photonics and Optoelectronics and Department of Electrical Engineering, National Taiwan University*

**P-133: [Enhancement of Light-Emitting Efficiency Through Impurity Controls by Using Prep-NMR Technique](#)** (Page 1509)

Jeong-suk Baek, *Samsung Display Company*  
Eui-hyun Lee, *Samsung Display Company*  
Chang-woo Lee, *Samsung Display Company*

**P-134: [Detection of Ion Impurities in Organic Thin Films by Displacement-Current Measurement Method](#)** (Page 1513)

Takuro Iwata, *Japan Advanced Institute of Science and Technology*  
Masaru Inoue, *TOYOtech LLC*  
Noriaki Oyabu, *TOYO Corporation*  
Keisuke Ohdaira, *Japan Advanced Institute of Science and Technology*  
Hideyuki Murata, *Japan Advanced Institute of Science and Technology*

**P-135: [New Hole-Transport Materials Composed of Indenocarbazole-Based Copolymer for Ultra-High-Efficiency Solution-Processed OLED](#)** (Page 1517)

Thi Na Le, *Kyung Hee University*  
Haechan Kim, *Korea National University of Transportation*  
Jihoon Lee, *Korea National University of Transportation*  
Min Chul Suh, *Kyung Hee University*