Session 1: Annual SID Business Meeting

Session 2: Opening Remarks / Keynote Addresses
2.1: **Keynote Address 1:** Display Technology Requirements for Next Generation PCs, James Johnson, Corporate Vice President, Intel
2.2: **Keynote Address 2:** The Future of Display Technologies, SooYoung Yoon, SVP, LG Display
2.3: **Keynote Address 3:** Quantum Computing System, Robert Wisnieff, CTO, Quantum Computing/Distinguished Research Staff Member, IBM TJ Watson Research Center

Session 3: 8K, High Resolution LCDs (Liquid Crystal Technology)
**Chair:** Miyoshi Ayama, Utsunomiya University
**Co-Chair:** Philip Chen, National Chiao Tung University
3.1: **Invited Paper:** Super Bright 8K LCD with 10,000 nit has been Realized with Excellent Light-Resistance Characteristics of IGZO TFT Backplane
Jun Nishimura, Sharp Corp, Display Device Company, Kameyama, Japan
3.2: **Invited Paper:** A Wide Color Gamut LCD with a Polarized Laser Backlight
Shinichi Komura, Japan Display Inc., Mobra, Japan
3.3: **Novel Microstructure Film to Improve Viewing Angle of Multi-Domain Polymer Sustained Alignment LCD**
Kan-Cheng Tien, AU Optronics, Hsinchu, Taiwan
3.4: **Novel LCD Pixel Design with Extra Large Aperture Ratio for PsVA Mode Display**
Shiraga Taro, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co. Ltd., Shenzhen, China
3.5: **Late-News Paper:** Two-Dimensionally Aligned Array with 1µm Pixel Pitch Using Ferroelectric Liquid Crystal Pixels for Holography Application
Shintaro Aso, Japan Broadcasting Corporation, Tokyo, Japan

Session 4: Automotive Display Components (Automotive/Vehicular Displays and HMI Technologies)
**Chair:** David Hermann, Volvo Car Corporation AB
**Co-Chair:** Karlheinz Blankenbach, Pforzheim University
4.1: **Invited Paper:** Technical Cover Glass Designed for Automotive Infotainment Display
Casey Kang, Corning Incorporated, Corning, NY
4.2: **Anti-Glare Cover Glass Optical Properties Dependence on the Display Module Configuration**
Masanobu Iwashita, AGC Inc., Yokohama, Japan
4.3: **Late-News Paper:** OLED Device Technologies for Automotive Application
Shigeru Mori, Tianma Japan, Ltd., Kawasaki, Japan
4.4: **Increase of Contrast in 3D HUD Using an Active Parallax Barrier**
Akinori Sato, KYOCERA Corporation, Shiga, Japan

Session 5: AR/VR Invited Session (Augmented, Virtual and Mixed Reality / Display Systems)
**Chair:** Achin Bhowmik, Starkey Hearing Technologies
**Co-Chair:** Seung Woo Lee, Kyung Hee University
5.1: **Invited Paper:** Human Factors in Virtual and Augmented Reality
Martin Banks, University of California Berkeley, Berkeley, CA
5.2: **Invited Paper:** Computational Eyeglasses and Near-eye Displays with Focus Cues
Gordon Wetzstein, Stanford University, Stanford, CA
5.3: **Invited Paper:** Towards Cost-Effective AR/MR Displays Mass Production: The Emergence of an Industrial Hardware Ecosystem for Waveguide Combiners and Micro iLED Displays
Bernard Kress, Microsoft, Redwood City, CA
5.4: **Invited Paper:** Current Challenges in Augmented-Reality Waveguide Display Technology
Jonathan Waldern, DigiLens Inc., Sunnyvale, CA

Session 6: OLED Materials I (OLEDs)
**Chair:** Denis Kondakov, DuPont
**Co-Chair:** Sven Zimmermann, Novaled GmbH
6.1: **Invited Paper:** Lifetime Improvement of TADF-OLEDs
Jun-Yun Kim, LG Display, Seoul, South Korea
6.2: **Invited Paper:** Innovative Technological Progress of Lifetime in Hyperfluorescence
Session 7: Reliability (Active Matrix Devices)
Chair: Hsing-Hung Hsieh, HP International Pte. Ltd.
Co-Chair: Xiaojun Guo, Shanghai Jiao Tong University
7.1: Distinguished Paper: Alleviation of Abnormal NBTI Phenomenon in LTPS TFTs on Polyimide Substrate for Flexible AMOLED
Jaeseob Lee, Samsung Display Co., Ltd., Yongin, South Korea
7.2: Invited Paper: Hot Carrier Degradation in High Mobility Metal Oxide Thin Film Transistors
Yukiharu Uraoka, Nara Institute of Science and Technology, Ikoma, Japan
7.3: High ESD Robustness and Low Visible Light Reflectance Design for LTPS-TFTs on Glass Substrates in Modular Micro-LED Displays
Seongho Son, Samsung Electronics Co., Ltd., Suwon, South Korea
7.4: Late-News Paper: Development of High-Mobility Top-Gate IGZTO-TFT and Suppression of Threshold Voltage Shift in Short Channel Utilizing Laser Irradiation Process
Mitsuru Nakata, NHK Science & Technology Research Laboratories, Tokyo, Japan

Session 8: Advances in Lighting: OLEDs, Materials, and Manufacturing (Lighting)
Chair: Eric Margulies, Universal Display Corporation
Co-Chair: J. Norman Bardsley, Bardsley Consulting
8.1: Invited Paper: Development of High-Temperature Stable Red OLEDs for Automotive Lighting
Marina Kondakova, OLEDWorks LLC, Rochester, NY US
8.2: Invited Paper: High Refractive Index Material for Display and Lighting Applications
Selina Monickam, Pixelligent Technologies, LLC, Baltimore, MD US
8.3: Invited Paper: OLED Lighting Design and Roll-to-Roll Manufacturing
Christian May, Fraunhofer-Institute for Organic Electronics, Dresden, Germany
8.4: Invited Paper: Flexible Glass Substrate for OLED Lighting Application and Efficient Internal Light Extraction for OLED Lighting Devices
Dipak Chowdhury, Corning Technology Center Korea, Seoul, South Korea

Session 9: MicroLED Manufacturing (Display Manufacturing)
Chair: Ion Bita, Google LLC
Co-Chair: Bradley Bowden, Corning Research and Development Corporation
9.1: Invited Paper: Colloidal Lead Halide Perovskite Nanocrystals as Classical and Quantum Light Sources
Maksym Kovalenko, ETH Zurich and Empa, Zurich, Switzerland
9.2: Manufacturing Process for Mass-Production of Micro LED Displays
Koichi Kajiyama, V-Technology Co., Ltd, Yokohama, Japan
9.3: Advanced Process and Structure of Backplane for Micro LED Display
Hua-Fei Xie, Peking University, Shenzhen, China
9.4: Applying FPD Panel and Manufacturing Technologies to Alternative Applications and New Business Models
Charles Annis, IHS Markit, Tokyo, Japan
9.5: Late-News Paper: A 3.9-inch LTPS TFT Full Color MicroLED Display with Novel Driving and Reflector Cavity Process
Masaya Tamaki, Kyocera Corporation, Shiga, Japan

Session 10: HDR LCDs I (Liquid Crystal Technology / Display Systems / High-Dynamic-Range LCDs)
Chair: Brian Berkeley, Highlight Display LLC
Co-Chair: Shin-Tson Wu, University of Central Florida
10.1: Invited Paper: High Dynamic Range Mini-LED and Dual-Cell LCDs
Shin-Tson Wu, University of Central Florida, Orlando, FL US
10.2: Invited Paper: Development of Dual-Cell LCD with Mega Contrast
Lei Guo, Hefei Xinteng Optoelectronics Technology Co., Ltd., Hefei, China
10.3: Invited Paper: Active Matrix Mini-LED Backlight on Glass for 75-inch LCDs
Jiayang Fei, TCL China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
Mingxia (Vincent) Gu, Apple Inc., Cupertino, CA US

Session 11: Automotive Display Technologies and Systems (Automotive/Vehicular Displays and HMI Technologies)
Chair: Casey Kang, Corning Incorporated
Co-Chair: Rashmi Rao, Harman International
11.1: High Reliability Flexible AMOLED Display with Algorithm Compensation for Automotive Application
Youxiong Feng, BOE Technology Group Co., Ltd., Chengdu, China
11.2: **Late-News Paper**: Display/Projection Features: The Next Growth Driver for Automotive Lighting
Pars Mukish, Yole Développement, Villeurbanne, France

11.3: **Invited Paper**: Display/Projection Features: Advanced Methods for Safe Visualization on Automotive Displays
Benjamin Axmann, Daimler AG Group Research, Boeblingen, Germany

11.4: **Invited Paper**: Virtual prototyping and testing of automotive capacitive touch sensors
George Bouzianas, Fieldscale PC, Thessaloniki, Greece

Session 12: **OLED AR/VR (Augmented, Virtual and Mixed Reality / OLEDs)**
Chair: Qi Wang, eMagin Corporation
Co-Chair: Franky So, North Carolina State University

12.1: **Invited Paper**: Directional SPP Emission in OLEDs Using Diffractive Optical Elements
Xiangyu Fu, North Carolina State University, Raleigh, NC US

12.2: **Late-News Paper**: How to Reduce Harmful Blue Light on OLED Device
Jinsook Bang, Samsung Display Corporation, Youngin, South Korea

12.3: **Late-News Paper**: High Performance OLED Microdisplays Made with Multi-Stack OLED Formulations
John Hamer, OLEDWorks LLC, Rochester, NY US

12.4: **Late-News Paper**: Organic Light-Emitting Diode Microdisplay with a 32:9 Aspect Ratio for Wide Field of View
Hyunkoo Lee, Electronics and Telecommunications Research Institute, Daegu, South Korea

Session 13: **OLED Materials II (OLEDs)**
Chair: Hitoshi Kuma, Idemitsu Kosan Co., Ltd.
Co-Chair: Nicholas Thompson, Universal Display Corporation

Russell Holmes, University of Minnesota, Minneapolis, MN US

13.2: **Late-News Paper**: Improvement of Blue Pixels in OLED Panels with More Efficient Fluorescent and TADF Emitters
Thomas Baumann, Cynora GmbH, Bruchsal, Germany

13.3: **Late-News Paper**: How to Reduce Harmful Blue Light on OLED Device
Jinsook Bang, Samsung Display Corporation, Youngin, South Korea

13.4: **Late-News Paper**: Organic Light-Emitting Diode Microdisplay with a 32:9 Aspect Ratio for Wide Field of View
Hyunkoo Lee, Electronics and Telecommunications Research Institute, Daegu, South Korea

Session 14: **Image Sensors (Active Matrix Devices)**
Chair: Sang Hee Park, KAIST
Co-Chair: Tse Nga Tina Ng, University of California San Diego

14.1: **Invited Paper**: Flexible Large-Area Multi-Fingerprint Sensors Based on Thermal Mass Detection
Florian De Roose, imec, Leuven, Belgium

14.2: **Late-News Paper**: How to Reduce Harmful Blue Light on OLED Device
Jinsook Bang, Samsung Display Corporation, Youngin, South Korea

14.3: **Late-News Paper**: Organic Light-Emitting Diode Microdisplay with a 32:9 Aspect Ratio for Wide Field of View
Hyunkoo Lee, Electronics and Telecommunications Research Institute, Daegu, South Korea

14.4: **Late-News Paper**: OLED Display Incorporating an Organic Image Sensor
Yasuhiro Nishida, Sharp Corporation, Taki, Japan

Session 15: **Advanced TFT Manufacturing (Display Manufacturing)**
Chair: Dr. Chiuwoo Kim, APS Holdings
Co-Chair: Greg Gibson, nTact

15.1: **Invited Paper**: Manufacturing Technology of HTPO TFT
Ui-Jin Chung, LG Display Co., Ltd., Paju, South Korea

15.2: **Gen 10 Excimer Laser Annealing System**
Takahiro Fuji, The Japan Steel Works, Ltd., Yokohama, Japan

15.3: **Resistance Reduction of Molybdenum Metallization by Tungsten Seed Layer**
Harald Köstenbauer, Plansee SE, Reutte, Austria

15.4: **New Gen. 6 Exposure Tools for 1.2 ?m Resolution**
Nobuhiko Yabu, Canon Inc., Utsunomiya, Japan

Session 16: **MicroLED Color Conversion (Emissive, Micro-LED, and Quantum-Dot Displays)**
Chair: Seth Coe-Sullivan, Luminit, LLC
Co-Chair: Ioannis Kymissis, Columbia University

16.1: **Invited Paper**: Hybrid Full-Color MicroLED Display with Quantum-Dot Color Conversion Using Inkjet-Printing and Photolithography Methods
Yang Gu, X-Vision Lab, Visionox Technology Inc., Kunshan, China

16.2: **Late-News Paper**: A 4-inch Full Color Active-matrix Mini-LED Display Based on 0408 Chip and 500um Pixel
Hong Meng, Peking University, Shenzhen, China
16.3: High-End Displays Applications by Micro-LEDs
Chien-Chung Lin, Industrial Technology Research Institute, Hsinchu, Taiwan ROC

16.4: Late-News Paper: High Color Gamut Mini-LED Backlight Demon Based on Dual-Emissive Perovskite Quantum Dots Films
Haizheng Zhong, Beijing Institute of Technology, Beijing, China

16.5: Late-News Paper: High Flux Stable Perovskite Quantum Dots-Polymer Composite for Down-Converting Applications
Lutfan Sinatra, Quantum Solutions LLC, Thuwal, Saudi Arabia

Session 17: HDR LCDs II (Liquid Crystal Technology / Display Systems / High-Dynamic-Range LCDs)
Chair: Jenn Jia Su, AU Optronics Corporation
Co-Chair: Matthew Sousa, 3M
17.1: Invited Paper: An Overview of Solutions for Achieving HDR LCDs
Jenn Jia Su, AU Optronics Corporation, Hsinchu, Taiwan ROC
17.2: A Method for Improving Image Contrast Based on Dual Cell Display
Yizhuo Zhao, TCL China Optoelectronics Technology Co., Shenzhen, China
17.3: Novel Mini-LED Backlit for 75-inch HDR LCD
Enhui Guan, BOE Technology Group Co., Ltd., Beijing, China
17.4: Enhancing the Picture Quality of Local Dimming Mini-LED LCD
Chun-Chi Chen, TCL China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
17.5: Distinguished Paper: Birefringent Light-Shaping Films for Mini-LED Backlights
Ziqian He, University of Central Florida, Orlando, FL US
17.6: Invited Paper: 4K HDR "Stacked-Panel" TV Based on Dual-Cell LCD
Weidong Liu, Hisense Visual Technology Co., Ltd, Qingdao, Shandong, China

Session 18: Head-Up Displays (HUD) (Automotive/Vehicular Displays and HMI Technologies)
Chair: Philippe Comi, THALES Avionics
Co-Chair: Haruhiko Okamura, Toshiba Corporation
18.1: Invited Paper: Holographic Optical Elements for Automotive Windshield Displays
Ian Redmond, Ceres Holographics Ltd, St Andrews, FL United Kingdom
18.2: Improvement of Light Leakage in HUD System
Kenta Kamoshida, KYOCERA Corporation, Shiga, Japan
18.3: Impact Study of Windshield Geometry on the Subjective Customer Perception for Augmented Reality Head-Up Displays (AR-HUD)
Daniel Wagner, Mercedes-Benz AG, Sindelfingen, Germany
18.4: Invited Paper: Switchable Lightfield Displays for Automotive Applications
David Fattal, Leia Inc, Menlo Park, CA US

Session 19: Human Factors with AR/VR (Augmented, Virtual and Mixed Reality / Applied Vision)
Chair: Takashi Shibata, Tokyo University of Social Welfare
Co-Chair: Paolo Sacchetto, Apple, Inc.
19.1: Distinguished Paper: Differences Between Oculomotor and Perceptual Artifacts for Temporally Limited Head-Mounted Displays
T. Scott Murdison, Facebook, Redmond, WA US
19.2: Vergence-Accommodation Conflicts in Augmented Reality: Impacts on Perceived Image Quality
Ian Erkelens, Facebook, Redmond, WA US
19.3: Foveated Brightness Control Technology for VR Applications
Seung-Woo Lee, Kyung Hee University, Seoul, South Korea
19.4: Research on Reducing Motion Sickness of Playing First Person Shooting VR Game with Texture Blur
Ting-Lan Tsai, National Taiwan University of Science and Technology, Taipei City, Taiwan ROC

Session 20: OLED Materials III (OLEDs)
Chair: Jang Hyuk Kwon, Kyung Hee University
Co-Chair: Changwoong Chu, Samsung Display Corporation
Ken-Tsung Wong, National Taiwan University, Taipei, Taiwan ROC
20.2: High Efficiency and Long Device Lifetime Green Organic Light Emitting Fiodes Using a Pt Complex
Sanghun Lee, Samsung Electronics, Suwon, South Korea
20.3: Universal Method to Inject Electrons Into Organic Semiconductors Utilizing Hydrogen Bonds
Hirohiko Fukagawa, NHK Science & Technology Research Laboratories, Tokyo, Japan
20.4: Study on the Effect of OLED Device Lifetime Improvement According to Hole Injection Barrier and p-Dopants
Jaechul Hong, Samsung Display Co., Ltd., Yongin, South Korea

Session 21: Super Resolution and Gen 11 (Active Matrix Devices)
Chair: Dr. Kalluri Sarma, Honeywell, Inc
Co-Chair: Hyun Jae Kim, Yonsei University
21.1: Invited Paper: 5291-ppi Microdisplay Using CAAC-IGZO FET with Channel Length of 60 nm
Hideaki Shishido, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
Chi-Sun Hwang, ETRI, Daejeon, South Korea

21.3:  *Invited Paper:* High Quality 8K4K Displays Driven by Oxide Semiconductor Thin Film Transistor in the Generation 11 Equipment  
Hyun-Sik Seo, TCL Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

**Session 22:** Flexible Technologies I: Manufacturing (Display Manufacturing / Flexible Displays and E-Paper)  
**Chair:** Yukio Endo, AGC Inc.  
**Co-Chair:** Kyung-Tae Kang, Korea Institute of Industrial Technology

22.1:  *Formation of Silicon-Based Thin Film Encapsulation for Fabrication of Highly Flexible OLED Devices*  
Eun Jung, Samsung Display, Yongin, South Korea

22.2:  *An Ultra-Thin Flexible Thin Film Encapsulation Structure with High Transmittance and Reliability*  
Youwei Wang, BOE Technology Group Co., Ltd., Beijing, China

22.3:  *Sum Thickness of Low-Retardation Plastic Foil with Gas Barrier and Transparent Conductive Layer for Bendable Devices*  
Hiroki Kinoshita, LINTEC Corporation, Saitama, Japan

22.4:  *Development of Rolled Long Ultra-thin Glass and Its Mass Production Technology*  
Hiroki Mori, Nippon Electric Glass Co., Ltd., Otsu, Japan

22.5:  *Late-News Paper:* Silicone-Based Low-k Material for Display  
Brandon Swatowski, Dow Chemical, Midland, MI US

**Session 23:** MicroLED Display Systems (Emissive, Micro-LED, and Quantum-Dot Displays)  
**Chair:** Yong-Seog Kim, Hongik University  
**Co-Chair:** Larry Weber, Consultant

Reza Chaji, VueReal, Waterloo, ON Canada

23.2:  *Distinguished Paper:* Wrap-Around Electrodes for MicroLED Tiled Displays  
David Pastel, Corning Inc., Corning, NY US

23.3:  *Highly Transparent, Ultra-Thin Flexible, Full Color Mini-LED Display with IGZO TFT Substrate*  
Yang Sun, TCL China Star Optoelectronics Technology Co. Ltd., Shenzhen, China

23.4:  *Full Color, Active-Matrix Micro-LED Display with Dual Gate a-IGZO TFT Backplane*  
Jin Jang, Kyung Hee University, Seoul, South Korea

23.5:  *Late-News Paper:* High-Resolution Monolithic Micro-LED Full-Color Micro-Display  
Xu Zhang, Hong Kong University of Science and Technology, Kowloon, Hong Kong

**Session 24:** LTPO (Active Matrix Devices)  
**Chair:** James Chang, Apple, Inc.  
**Co-Chair:** Man Wong, Hong Kong University of Science & Technology

24.1:  *Invited Paper:* Development of High Quality IGZO-TFT with Same On-Current as LTPS  
Kazuo Ito, Sharp Corporation, Tenri, Japan

24.2:  *Distinguished Paper:* Fluorination for Enhancing the Resistance of Indium-Gallium-Zinc Oxide Thin-Film Transistor against Hydrogen-Induced Degradation  
Sisi Wang, The Hong Kong University of Science and Technology, Hong Kong, China

24.3:  *Complementary LTPO Technology, Pixel Circuits and Integrated Gate Drivers for AMOLED Displays Supporting Variable Refresh Rates*  
Jiahao Kang, Royole Corporation, Fremont, CA US

24.4:  *Distinguished Paper:* High Refresh Rate and Low Power Consumption AMOLED Panel Using Top-gate n-Oxide and p-LTPS TFTs  
Ryo Yonebayashi, Sharp Corporation, Tenri, Japan

**Session 25:** Innovative Display Driving Circuits (Display Electronics)  
**Chair:** Ya Hsiang Tai, National Chiao Tung University  
**Co-Chair:** Soo-Youn Lee, Seoul National University

25.1:  *Multi-Bit MIP (Memory-in-Pixel)-Based Pixel Circuit of CMOS Backplane for Micro-LED Display*  
Jewoo Seong, Ulsan National Institute of Science and Technology (UNIST), Ulsan, UNK South Korea

25.2:  *LTPO TFT Technology for Level Shifter Integrated Gate Driver in UHD 4K Displays*  
Invited Paper

25.3:  *Fault-Tolerant Integrated Gate Driver for Flexible Displays*  
Seung-Woo Lee, Kyung Hee University, Seoul, South Korea

**Session 26:** Novel Waveguides for AR Glasses (Augmented, Virtual and Mixed Reality / Display Systems)  
**Chair:** Nikhil Babram, Google Inc.  
**Co-Chair:** Brian Schowengerdt, Magic Leap

26.1:  *Distinguished Paper:* Chirped Polarization Volume Grating for Wide FOV and High Efficiency Waveguide-Based AR Displays  
Kan Yin, University of Central Florida, Orlando, FL US

Session 27: Printed OLEDs (OLEDs)
Chair: Changwoong Chu, Samsung Display Corporation
Co-Chair: Yasunori Kijima, Huawei Technologies Japan K.K.
Daisuke Fukushima, Sumitomo Chemical Co., Ltd., Tsukuba, Japan
Sebastian Meyer, Merck KGaA, Darmstadt, Germany
27.3: Improved Device Performance for Inkjet Printed OLEDs via Interfacial Mixing Control
Heung Gyu Kim, Samsung Display Co., Ltd., Yongin, South Korea
27.4: Late-News Paper: Key Materials for High Performance Solution-Process OLEDs
Koichiro Iida, Mitsubishi Chemical Corporation, Yokohama, Japan

Session 28: Seeing Through the Display (Interactive Displays and Systems)
Chair: Steven Bathiche, Microsoft
Co-Chair: Jeff Han, Consultant
28.1: Image Capture Through TFT Arrays
Neil Emerton, Microsoft Applied Sciences, Redmond, WA US
Quan Tang, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China
28.3: Pixel Design for Transparent MicroLED Display with Low Blurring
Zhengyu Feng, Peking University, Shenzhen, China
28.4: Investigation of Moiré Interference in Pinhole Matrix Fingerprint on Display Technology
Yang Zeng, Shanghai Tianma Microelectronics, Shanghai, China

Session 29: Flexible/Foldable Device Manufacturing (Display Manufacturing)
Chair: Tian Xiao, NEXT Biometrics Inc.
Co-Chair: Wei Lung Liau, AU Optronics Corp.
29.1: Invited Paper: Analysis of Dynamic Strain on Foldable Devices
Naotsugu Ando, Yuasa System, Okayama, Japan
29.2: Invited Paper: Mechanics of Bendable Glass Substrates
Timothy Gross, Corning Incorporated, Corning, NY US
29.3: WITHDRAWN
29.4: Edge Strength Measurement of Free-Form Displays
Bosun Jang, Corning Incorporated, Corning, NY US

Session 30: MicroLED Displays (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Francois Templier, CEA-LETI
Co-Chair: Jean-Jacques Drolet, Osram Opto Semiconductors
30.1: Invited Paper: Development of MicroLED Display by PixelLED Technology
Ying-Tsang Liu, PlayNitride Inc., Zhubei, Taiwan ROC
30.2: WITHDRAWN
30.3: Distinguished Paper: Sub-Micron Full-Color LED Pixels for Micro-Displays and Micro-LED Main Displays
Seth Coo-Sullivan, NS Nanotech, Ann Arbor, MI US
30.4: MicroLED Display Technology Trends and Intellectual Property Landscape
Eric Virey, Yole Developpement, Portland, OR US
30.5: Late-News Paper: Glass Based High Brightness AMLED Using Dual Gate Coplanar a-IGZO TFT
Jin-Woo Choi, Samsung Display, Yongin, South Korea

Session 31: Structure Engineering (Active Matrix Devices)
Chair: Norbert Fruehauf, University of Stuttgart
Co-Chair: Kwon-Shik Park, LG Display
31.1: Invited Paper: The Multimodal Thin-Film Transistor (MMT): A Versatile Low-Power and High-Gain Device with Inherent Linear Response
Radu Sporea, University of Surrey, Guildford, United Kingdom
31.2: Invited Paper: Nanostructures Oxide Thin-Film Transistors Fabricated by Near-Field Nanolithography with Enhanced Device Performance
Chuan Liu, Sun Yat-sen University, Guangzhou, China
Session 32: Algorithms for Image Quality Improvement (Display Electronics)
Chair: Mainak Biswas, Google
Co-Chair: Moon-Sang Hwang, Samsung Display Co., Ltd.
32.1: Weak Sub-Color Sub-Sampling for High Resolution Image Bandwidth Reduction
Joon Hee Lee, LG Display, Seoul, South Korea
32.2: Improvement in Directional Cubic Convolution Image Interpolation
Liu Xiao Lei, Beijing BOE Optoelectronics Technology Corporation, Beijing, China
32.3: AMOLED IR Drop Compensation for Channel Length Modulation
Feng-Ting Pai, Novatek Microelectronics Corp., Hsinchu, Taiwan ROC
32.4: Late-News Paper: OLED Display Gamma LUT Optimization Based on Principal Component Analysis
Hyunchul Kim, Google, Inc., Mountain view, CA US

Session 33: 3D and Holographic (Augmented, Virtual and Mixed Reality / Display Systems)
Chair: W. Hendrick, Collins Aerospace
Co-Chair: Zong Qin, National Chiao Tung University
33.1: Invited Paper: Tabletop True 3D Display Systems Based on Projection Light Field and Integral Imaging
Qiong-Hua Wang, Beihang University, Beijing, China
33.2: Improving Image Quality of 360-Degree Tabletop 3D Screen System
Motohiro Makiguchi, NTT Service Evolution Laboratories, Kanagawa, Japan
33.3: Viewing Angle Enhanced DMD Holographic Display with Reduced Speckle Noise
Byoung Hyo Lee, School of Electrical and Computer Engineering, Seoul National University, Seoul, South Korea

Session 34: Printed OLEDs II (OLEDs)
Chair: CC Lee, BOE Technology Group Co., Ltd.
Co-Chair: JJ Lih, CPT Technology Group
34.1: Invited Paper: Towards Efficient and Stable Printed Single-Layer OLEDs
Paul Blom, Max Planck Institute for Polymer Research, Mainz, Germany
34.2: Development of 55-inch SK AMOLED TV by Inkjet Printing Process
Zhongyuan Wu, BOE Technology Group Co., Ltd., Hefei, China
34.3: Distinguished Paper: OLED Display with High Resolution Fabricated by Electrohydrodynamic Printing
Lan Mu, South China University of Technology, Guangzhou, China

Session 35: Touch Sensing on Flexible Displays (Interactive Displays and Systems / Flexible Displays and E-Paper)
Chair: Martin Grunthaner, Apple
Co-Chair: Shiming Shi, BOE Technology Group Co., Ltd.
35.1: The Mechanism and Solution of Horizontal Line Defects by Mutual Interference of Flexible OLED and Touch Sensor
Hyun Wook Cho, Samsung Display, Yongin, South Korea
35.2: Influence of Low Ground Mass and Moisture Touch in On-Cell Touch with Foldable AMOLED
Shih-Hsuan Huang, AC Optronics Corporation, Hsinchu, Taiwan ROC
35.3: The Application of Metal Mesh Manhattan Patterns in Flexible Touch Panel
Shuang Wang, Shanghai Tianma Micro-Electronics Co., Ltd., Shanghai, China
35.4: High Sensitive Pen Writing Solution Based on Mechanical Sensing
Hee Seoomoon, Samsung Display, Yongin, South Korea

Session 36: Novel Process for Printed Displays (Display Manufacturing / Printed Displays)
Chair: Toshihito Araki, JOLED Inc
Co-Chair: Yong Taeck Hong, Seoul National University
36.1: Invited Paper: High-Resolution Induced-Electrohydrodynamic (iEHD) Jet Printing for Display
Doyoung Byun, Sungkyunkwan University, Suwon, South Korea
36.2: Invited Paper: The Latest Breakthrough of Printing Technology for Next Generation Premium TV
Jueng Gil James Lee, Guangdong Juhua Printed Display Technology Co. Ltd., Guangzhou, China
36.3: Novel and Simple Pattern Process of Quantum dots via Transfer Printing for Active Matrix QD-LED
Soo Deok Han, University of Cambridge, Cambridge, United Kingdom
36.4: Solution-Processed Transparent Top Electrode for QD-LED
Hywel Hopkin, Sharp Laboratories of Europe Ltd., Oxford, United Kingdom

Session 37: MicroLEDs: Manufacturing and Characterization (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Ioannis Kymissis, Columbia University
Co-Chair: Zhaojun Liu, Southern University of Science and Technology
37.1: Yield Statistics for Fault Tolerant Micro LED Displays
Session 38: Circuit and New Application of TFTs (Active Matrix Devices)
Chair: Takashi Nakamura, Japan Display Inc.
Co-Chair: Chen Xi, BOE Technology Group Co., Ltd.
38.1: Invited Paper: High-Performance Metal-Oxide Semiconductor Based Optoelectronics
Sung Kyu Park, Chung-Ang University, Seoul, South Korea
38.2: Distinguished Paper: A 14-Gb/s Dual Mode Receiver with MIPI D-PHY and C-PHY Interfaces for Mobile Display Drivers
Tae-Jin Kim, Samsung Electronics, Hwaseong, South Korea
38.3: Distinguished Paper: A Novel Gate Driver Circuit Employing IGZO TFTs for External Compensation
Xuehuan Feng, BOE Technology Group Co., Ltd., Hefei, China
38.4: AMOLED Display Global Dimming Using PWM on Backgate
Lynn Verschueren, imec, Leuven, Belgium

Session 39: Advanced Pixel and Driving Circuits (Display Electronics)
Chair: Richard McCartney, Pixel Scientific, Inc.
Co-Chair: Carlin Vieri, Google
39.1: SK Broadcast Monitor Display System
Ran Duan, BOE Technology Group Co., Ltd., Beijing, China
39.2: Distinguished Paper: A 14-Gb/s Dual Mode Receiver with MIPI D-PHY and C-PHY Interfaces for Mobile Display Drivers
Tae-Jin Kim, Samsung Electronics, Hwaseong, South Korea
39.3: Distinguished Paper: In-Pixel Temperature Sensor for High-Luminance Active-Matrix Micro-LED Display Using LTPO TFTs
Jin Jang, Kyung Hee University, Seoul, South Korea
39.4: A Method of Panel-Current Limitation for Automotive OLED Displays
Hyun-Chang Kim, Samsung Display Co., Yongin, South Korea

Session 40: Novel Optics for HMDs (Augmented, Virtual and Mixed Reality / Emerging Technologies and Applications)
Chair: Susan Jones, Nuluminia Corp.
Co-Chair: Gary Jones, Nanoquantum Corporation
40.1: Invited Paper: Fast-Switching Liquid Crystal Devices for Near-Eye and Head-Up Displays
Shin-Tson Wu, University of Central Florida, Orlando, FL US
40.2: Cost-Efficient Polymer Flat Lens for Chromatic Aberration Correction in Virtual Reality Displays
Tao Zhan, University of Central Florida, Orlando, FL US
40.3: Distinguished Paper: A Scanning Waveguide Display with 100° FOV
Jianghao Xiong, University of Central Florida, Orlando, FL US
40.4: Demonstration of a Novel Single-Layer Double-Pass Optical Architecture for a Pupil-Matched Occlusion-Capable Optical See-Through Head-Mounted Display
Hong Hua, University of Arizona, Tucson, AZ US
40.5: Invited Paper: A Large RGB-Achromatic Metalens for Virtual/Augmented Reality Applications
Federico Capasso, Harvard University, Cambridge, MA US

Session 41: Printed OLEDs III (OLEDs)
Chair: DZ Peng, Tlanma
Co-Chair: Yifan Zhang, Apple, Inc.
41.1: Invited Paper: Recent Technology of Printed OLED Display and Its World’s First Commercialization
Kazuhito Noda, JOLED Inc., Kyoto, Japan
41.2: Invited Paper: Recent Developments in Inkjet-Printed OLEDs for High Resolution, Large Area Applications
Jin-Goo Kang, Samsung Display Co., Ltd., Yongin, South Korea
41.3: 157.3 Inch UHD Resolution AMOLED Panel Fabricated by Ink Jet Printing Process
Peng-Yu Chen, AU Optronics Corporation, Hsinchu, Taiwan ROC
41.4: Preparation of High Performance Top-Emission OLED for Large Size Display
Chunjing Hu, BOE Technology Group Co., Ltd., Beijing, China

Session 42: Fingerprint Sensing Displays (Interactive Displays and Systems)
Chair: Patrick Worfolk, Synaptics
Co-Chair: Hong-Jye Hong, AU Optronics
42.1: A Controller IC for On-Display Touch and Multi-Fingerprint Sensor
Session 43: OLED Analysis and Mechanisms (OLEDs)
Chair: Nicholas Thompson, Universal Display Corporation
Co-Chair: Hitoshi Kuma, Idemitsu Kosan Co., Ltd.
43.1: Invited Paper: A Quantitative Microscopic Kinetic Model for Efficiency Roll-Off in OLEDs
Troy Van Voorhis, MIT, Cambridge, MA US
43.2: Application of Liquid Extraction Surface Analysis (LESA)-NanoESI-Orbitrap-MS to a Degradation Analysis of Organic EL Elements
Hikaru Takano, Toray Research Center, Inc., Otsu, Japan
43.3: Ab-Initio Simulation of Doped Injection Layers
Tobias Neumann, Nanomatch GmbH, Karlsruhe, Germany
43.4: Combining Steady-State, Frequency, and Time Domain Data for a Comprehensive Analysis of Multilayer TADF OLEDs
Sandra Jenatsch, Fluxim AG, Winterthur, Switzerland

Session 44: Highly Integrated Semiconductor Information Displays (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Qun Yan, Fuzhou University
Co-Chair: Kevin Gahagan, Corning Incorporated
44.1: Invited Paper: Micro-LEDs for Technological Convergence between Displays, Optical Communications, and Sensing and Imaging Systems
Martin Dawson, University of Strathclyde, Glasgow, United Kingdom
44.2: Invited Paper: More Than MicroLED: Mass Transfer of Pixel Engines for Emissive Displays
John Rogers, Northwestern University, Evanston, IL US
44.3: Invited Paper: Integration of Additional Functionalities into the Frontplane of AMOLED Displays
Pawel Malinowski, imec, Leuven, Belgium
44.4: A Brief Survey of MicroLED Technologies
Ioannis Kymissis, Columbia University, New York, NY, US

Session 45: Conformable LCDs (Liquid Crystal Technology)
Chair: Takahiro Ishinabe, Tohoku University
Co-Chair: Linghui Rao, Microsoft
45.1: Invited Paper: Multi-Spliced LCDs for Foldable Mobile Device - Seamless Technology and Applications
Yung Hsun Wu, Innolux Corporation, Malli County, Taiwan ROC
45.2: Distinguished Paper: Ultra-Narrow Border Display with a Cover Glass Using LCDs with a Polyimide Substrate
Shinichiro Oka, Japan Display Inc., Mabori, Japan
45.3: Late-News Paper: Homogeneous Alignment LCDs Could be Prime Candidate for Multiple Scene Interactive Interface and Devices
Ruizhi Yang, BOE Technology Group Co., Ltd., Beijing, China
45.4: Late-News Paper: Zero Light Leakage ADS Display Technology
Feifei Wang, BOE Technology Group Co., Ltd., Beijing, China

Session 46: Variable Refresh Rate (Display Electronics)
Chair: Taesung Kim, Google LLC
Co-Chair: Bong-Hyun You, Samsung Display Co.
46.1: Invited Paper: Variable Refresh Rate Displays
Gerrit Slavenburg, NVIDIA, Santa Clara, CA US
46.2: A Novel Hybrid Frame Rate Driving Method for Low Frequency OLED Displays
Nam-Young, Tianma Micro-Electronics Co., Ltd., Shanghai, China
46.3: Invited Paper: Image Adaptive Refresh Rate Technology for Ultra Low Power Consumption
Bong-Hyun You, Samsung Display, Yongin, South Korea
46.4: Novel OLED Low Frame Frequency Driving Method with Minimized Flicker
Jieliang Li, XiaMen Tianma Microelectronics, Xiamen, China

Session 47: Micro-Projection Technology (Augmented, Virtual and Mixed Reality / Display Systems)
Chair: Satoshi Ouchi, Hitachi, Ltd
Co-Chair: Fujio Okumura, NEC Corporation
47.1: The World Smallest OLED Microdisplay Projection Device Design Methodology
Kazuichiro Itonaga, Sony Corporation, Atsugi, Japan

47.2: Solid State Projection Display Based on Angular Color Projection and MicroLED
Yongqing Wang, Photonic Crystal Co. LTD, San Jose, CA, China

47.3: Invited Paper: High Brightness and RGB Integration of Eu-doped GaN-based Red LEDs for Ultrahigh-resolution Micro-LED Display
Yasufumi Fujiwara, Osaka University, Osaka, Japan

47.4: Fiber Scanning Technology with Rectangle Display Area for Projection Unit
Shinsuke Onoe, Hitachi, Ltd., Tokyo, Japan

Session 48: OLED Devices I (OLEDs)
Chair: Yasunori Kijima, Huawei Technologies Japan K.K.
Co-Chair: Denis Kondakov, DuPont

48.1: Invited Paper: Next Generation Highly Efficient and Stable Phosphorescent Emitting Materials For OLEDs
Byoung Ki Choi, Samsung Electronics, Suwon, South Korea

48.2: Design Strategies of Fluorescent Dopants toward Pure Blue for Highly Efficient Top Emission OLEDs
Ryota Takahashi, Idemitsu Kosan Co., Ltd., Sodegaura, Japan

48.3: Efficiency Color-Shift Tradeoffs in Strong-Cavity, Top-Emitting OLEDs
S. Matthew Menke, 3M, Saint Paul, MN US

48.4: Toward the Achieving Excellent Longevity of Blue OLED Device: A Computation Study on Importance of the Co-Optimization of Material and Device
Sangho Jeon, Samsung Display, Yongin, South Korea

Session 49: E-Paper (Flexible Displays and E-paper)
Chair: Makoto Omodani, Tokai University
Co-Chair: Keisuke Hashimoto, E Ink Holdings

49.1: Fast-Switching Electrophoretic E-Paper with Mixture of Liquid Crystal and E-ink for Charging and Rheological Optimizations
Bo-Ru Yang, Sun Yat-sen University, Guangzhou, China

49.2: Color Reproduction in Reflective Displays: Stacked CMY
Alex Henzen, South China Normal University, Guangzhou, China

49.3: Late-News Paper: Hybrid Capacitor Type Organic Electroluminescent Device for Multicolor Representation
Norihisa Kobayashi, Chiba University, Chiba, Japan

49.4: Late-News Paper: Prototyping of Practical e-Tile and Estimation of its Image Impression from Distant Observers
Makoto Omodani, Tokai University, Hiratsuka, Japan

Session 50: Display Measurement Standards I (Display Measurement)
Chair: Stephen Atwood, Eaton Corporation
Co-Chair: Thomas Fiske, Microsoft

50.1: Invited Paper: Color/White Light Output, Luminance Contours, and Colour Volume
David LeHoty, Independent, Mountain View, CA US

50.2: Distinguished Paper: Measuring the Color Capability of Modern Display Systems
Euan Smith, Kaptivo Ltd, Cambridge, United Kingdom

50.3: Electro-Optical Transfer Characteristic, the Undervalued Display Feature
Michael Becker, Instrument Systems GmbH, München, Germany

50.4: Standardizing Fundamental Criteria for Near Eye Display Optical Measurements: Determining the Eye-Box
Rupal Varshneya, Night Vision Electronic Sensors Directorate Department of the Army, Fort Belvoir, VA US

Session 51: Quantum Dot Electroluminescence I (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Michele Ricks, EMD Performance Materials
Co-Chair: Jean-Jacques Drolet, Osram Opto Semiconductors

51.1: Invited Paper: Charge Injection Control of Cadmium-Free Quantum Dot Light-Emitting Diodes
Baek Kim, NanoPhotonica Inc., Gainesville, FL US

51.2: High Efficiency and Long Lifetime InP-Based Red Quantum Dot Light-Emitting Diodes
Jang-Hyuk Kwon, Kyung Hee University, Seoul, South Korea

51.3: Efficient InP/ZnS Quantum Dot Light-Emitting Diodes with Improved Electron Confinement
Zhenghui Wu, Southern University of Science and Technology, Shenzhen, China

51.4: QLED-on-Silicon Microdisplays with Peripheral-CircuitCompensation Design
Sikai Su, Peking University, Shenzhen, China

Session 52: Fast Switching LCDs (Liquid Crystal Technology)
Chair: Dr Akihiro Mochizuki, J-CORE Technology, LLC
Co-Chair: Prof. Jian Gang Lu, Shanghai Jiao Tong University

52.1: Invited Paper: Liquid Crystal Materials and Devices for Displays and Photonics
Vladimir Chigrinov, Foshan University, Foshan, China

52.2: Fast-Response Liquid Crystals for AR and Head-Up Displays
Yananqi Li, University of Central Florida, Orlando, US
52.3: Fast-Response Cloud-Point Ferroelectric Liquid Crystal Dammann Grating for LiDAR Applications
Zhengnan Yuan, The Hong Kong University of Science and Technology, Hong Kong, China

52.4: Late-News Paper: 27" 240Hz Wide View ADS Gaming LCM Development Meeting 1x ms RT and VESA HDR Standard
Dongchuan Chen, Beijing BOE Display Technology Co., Ltd., Beijing, China

Session 53: Emerging Processes and Materials (Emerging Technologies and Applications)
Chair: Abhishek Srivastava, Hong Kong University of Science & Technology
Co-Chair: Ian Underwood, University of Edinburgh
53.1: 2D and 3D Printed Copper Conductors from Chemically Designed Nanomaterials
Sunho Jeong, Kyung Hee University, Yongin-si, South Korea
53.2: Composite Films with Ultra-Thin Glass and Polymer for Novel Optically-Functional Films
Takeshi Murashige, Nitto Denko Corporation, Osaka, Japan
53.3: CdSe/CdS Nanorod Enhancement Film for Blue-Laser Based Visible Light Communication Systems
Jerry Cheng, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong
53.4: Dielectric Metasurfaces: Design for Manufacturability
Khaled Ahmed, Intel Corporation, Santa Clara, CA US
53.5: Late-News Paper: a-IGZO TFT Based Active Matrix Pressure Sensor by Integrating ZnO Nanowires as Sensing Unit
Xuewen Shi, Institute of Microelectronics of Chinese Academy of Sciences, Beijing, China

Session 54: AR/VR Technologies (Augmented, Virtual and Mixed Reality / Display Systems)
Chair: Sergei Yakovenko, Apple
Co-Chair: Grace Lee, Google
54.1: Improved Polarizing Film for PBS Applications in HMDs
David Austuen, 3M Display Materials & Systems Division, St. Paul, MN US
54.2: Distinguished Paper: Doubling the Pixel Density for VR Displays with a Polymer Grating
Junyu Zou, University of Central Florida, Orlando, FL US
54.3: Digitally Switchable Micro-Lens Array for Integral Imaging
Hong Hua, University of Arizona, Tucson, AZ US
54.4: Prediction of Saccadic Eye Movement for Foveated Rendering
Anna Kruchinina, Lomonosov Moscow State University, Moscow, Russian Fed.
54.5: Measuring Direct Retinal Projection Displays
John Penczek, University of Colorado, Boulder, Boulder, CO US

Session 55: OLED Devices II (OLEDs)
Chair: Sven Zimmermann, Novaled GmbH
Co-Chair: Qi Wang, eMagin Corporation
55.1: Invited Paper: Self-Assembled Cathode Patterning in AMOLED for Under-Display Camera
Zhixin Wang, OTI Lumionics Inc., Toronto, ON Canada
55.2: Methods for Overcoming the Trade-Off Between Efficiency and Lifetime of Organic Light-Emitting Diodes: OLED Lifetime Simulation
Junyoung Lee, Samsung Display Corporation, Yongin, South Korea
55.3: Efficient, Low Haze Light Extraction for OLED Displays Using Micro-Optic Patterns Imprinted on Glass
Dmitri Kuksenkov, Corning Research & Development Corporation, Corning, NY US
55.4: Novel Methodology for Reproductibility of OLED Lifetimes and Identification of Killer Impurities
Hiroshi Fujimoto, Fukuoka i3-Center for Organic Photonics and Electronics Research (i3-opera), Fukuoka, Japan

Session 56: Foldable Displays I (Flexible Displays and E-paper)
Chair: Kyung Cheol Choi, KAIST
Co-Chair: Cheng-Chung Lee, ITRI
56.1: Invited Paper: Research on a Commercial Foldable AMOLED and Relevant Technologies
Shiming Shi, BOE Technology Group Co., Ltd., Beijing, China
56.2: A Foldable AMOLED Module with Excellent Bending Capability and Pencil Hardness after Low Temperature Testing
Takehiro Muroa, Sharp Corporation, Kameyama, Japan
56.3: Quantitative Evaluation of Neutral-plane Splitting for Foldable Displays
Masumi Nishimura, Japan Display, Inc., Mobara, Japan
56.4: Suppression of Angular Color Shift for Foldable OLEDs by Integrating an Advanced Circular Polarizer
Wei-Feng Xu, BenQ Materials Corporation, Taoyuan, Taiwan ROC

Session 57: Display Measurement Standards II (Display Measurement)
Chair: Udo Krueger, TechnoTeam
Co-Chair: Frank Rochow, Adviser
57.1: Spatiotemporal Noise Targets Inspired by Natural Imagery Statistics
Timo Kunkel, Dolby Labs, Inc., San Francisco, US
57.2: A New Approach to Motion Frequency Metrics Quantifies Motion-Induced Blur
Session 58: Quantum Dot Electroluminescence II (Emissive, Micro-LED, and Quantum-Dot Displays)  
Chair: Chang Hee Lee, Samsung Display Corporation  
Co-Chair: Xiao Wei Sun, Southern University of Science and Technology  
58.1: Invited Paper: Progress in High Efficiency Heavy Metal Free QD-LED Development  
Christian Ippen, Nanosys, Inc., Milpitas, CA US  
58.2: Distinguished Paper: Active Matrix QD-LED with Top Emission Structure by UV Lithography for RGB Patterning  
Yohei Nakanishi, SHARP Corporation, Tenri, Japan  
58.3: Distinguished Paper: High Efficient Quantum Dot Light Emitting Diodes with Blue Cadmium-Free Quantum Dots  
Tatsuya Ryowa, Sharp Corporation, Tenri, Japan  
58.4: Efficient Cadmium-Free Quantum Dot Light-Emitting Diodes  
Mo Hinwai, Fukuoka i3-Center for Organic Photonics and Electronics Research (i3-opera), Fukuoka, Japan  

Session 59: Privacy and Sunviewable Displays (Liquid Crystal Technology)  
Chair: Xiao-Yang Huang, Ebulent Technologies Corp  
Co-Chair: Gang Xu, Huawei  
59.1: FFS-Based Privacy LCD With High Contrast and Transmittance  
Koji Murata, SHARP, Nara, Japan  
59.2: Brightness Improvement of Reflective LCD  
Xidi Ma, Beijing BOE Display Technology Co., Ltd., Beijing, China  
59.3: A Transreflective 31.5” IGZO-TFT LCD with Twisted VA Mode  
Takahiro Sasaki, SHARP, Tenri, Japan  
59.4: Late-News Paper: High Transmittance and High Charging Rate 8K 120Hz ADS LCD TV  
He He Hu, BOE Technology Group Co., Ltd., Beijing, AL China  

Session 60: Machine Learning for Display Algorithms and Electronics (Machine Learning for Displays / Display Electronics)  
Chair: Chaohao Wang, Apple Inc.  
Co-Chair: Hyoungsik Nam, Kyung Hee University  
60.1: Novel Image Sticking Prevention Method Using Deep Learning  
Youngwook Yoo, Samsung Display, Youngin, South Korea  
60.2: Self-Supervised Perceptual Motion Deblurring Using a Conditional Generative Neural Network Guided by Optical Flow  
Jaihyun Koh, Samsung Display Corporation, Yongin, South Korea  
60.3: Invited Paper: Machine Learning Approaches to Active Stylus for Capacitive Touch-Screen Panel Applications  
Hyoungsik Nam, Kyung Hee University, Seoul, South Korea  
60.4: Implementation and Optimization of FSRCNN-α Algorithm Based on SDSoC Platform  
Yanan Ji, TCL China Star Optoelectronics Technology Co. Ltd., Guangdong, China  

Session 61: High-Resolution OLED Display Manufacturing (Augmented, Virtual and Mixed Reality / Display Manufacturing)  
Chair: Dr Robert Visser, Applied Materials  
Co-Chair: Joerg Winkler, Plansee SE  
61.1: A New Fine Metal Mask Pixel Patterning Technology for High Resolution OLED Displays  
Chiwoo Kim, APS Holdings, Hwaseong, South Korea  
61.2: 2-inch, 2000 ppi Silicon Nitride Mask for Patterning Ultrahigh-Resolution OLED Displays  
Yibin Jiang, Hong Kong University of Science and Technology, Kowloon, Hong Kong  
61.3: Distinguished Paper: Vertically Integrated, Double-Stack Oxide-TFT Layers for High Resolution AMOLED Backplane  
Jia Jang, Kyung Hee University, Seoul, South Korea  
61.4: Invited Paper: Development of the OLED Mass Production System (2:30 PM - 2:50 PM)  
Eiichi Matsumoto, Canon Tokki Corporation, Mitsuke Japan  

Session 62: OLED Devices III (OLEDs)  
Chair: Chang-Wook Han, LG Display Co., Ltd  
Co-Chair: Jang Hyuk Kwon, Kyung Hee University  
Youngmin You, Ewha Womans University, Seoul, South Korea  
62.2: Deep-Red and Near-Infrared OLEDs with High Efficiency and Long Lifetime for Display and Light-Source Applications  
Satoshi Seo, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan  
62.3: Design of High-Performance Tandem Blue Devices for Quantum Dot OLED Display
Session 63: Foldable Displays II (Flexible Displays and E-paper)
Chair: Kyung Cheol Choi, KAIST
Co-Chair: Meng-Ting Lee, Huawei Technology

63.1: Numerical Study on Module Stacking Design of Flexible Panel with Water-Drop Folding Shape
Liming Dong, BOE Technology Group Co., Ltd., Beijing, China

63.2: Continuous Observation of Neutral-Plane Splitting throughout the Folding Process of Foldable Displays Using Optical Microscopy and Digital Image Correlation Method
Masatomo Hishinuma, Japan Display, Inc., Mobara, Japan

63.3: Translating 2 Point Bend with Step Stress Methodology
Kurt Gerber, Corning Incorporated, Corning, NY US

Session 64: Flexible Technologies II: Measurement (Display Measurement)
Chair: Makoto Omodani, Tokai University
Co-Chair: Stephen Atwood, Eaton Corporation

64.1: Separating Specular Reflection from Diffuse Haze for ePaper Using the Extended Variable Aperture Source Method
Dirk Hertel, E Ink Corporation, Billerica, MA US

64.2: Metrology of Non-Planar Light Sources Using Near-Field Goniometric Measurement Method
K Kalantar, Global Optical Solutions, Tokyo, Japan

64.3: Simulation of Beam Shaping by Micro-Textures for Curved Displays
Urs Aeberhard, Fluxim AG, Winterthur, Switzerland

Session 65: Quantum Dot Electroluminescence III (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Dr. Jonathan Steckel, ST Microelectronics
Co-Chair: Yajie Dong, University of Central Florida

65.1: Invited Paper: Enhanced Efficiency of InP-Based Red and Green Quantum Dot Light-Emitting Diodes
Yanzhao Li, BOE Technology Group Co., Ltd., Beijing, China

65.2: High Luminescent Red Quantum Dot Light-Emitting Diodes by Inkjet Printing
Xiao Wei Sun, Southern University of Science and Technology, Shenzhen, China

65.3: Green Top-Emission Quantum Dot Light-Emitting Diodes (TE-QLED) with Normal and Inverted Structure
Juan-Hau Lee, National Taiwan University, Taipei, Taiwan ROC

65.4: Control of Carrier Injection and Transport Behavior in QLEDs via Modulating the Schottky Barrier
Yong-Seog Kim, Hongik University, Seoul, South Korea

Session 66: Self-Aligned LCDs (Liquid Crystal Technology)
Chair: Michael Wittek, Merck KGaA
Co-Chair: Shui Chih Lien, CSOT

66.1: Invited Paper: Liquid Crystal Mixture with a Composition Including Highly Reliable Fluorinated Diluter and RM-Monomer for PSVA and PI-less IPS LCDs
Toshihiro Shibata, Chiracol Co.LTD, Saitama, Japan

66.2: Invited Paper: Reactive Mesogen Multi-Twist Retarders for Advanced AR/VR Displays
Michael Escuti, ImagineOptix Corporation, Durham, NC US

66.3: The Way To Improve Black Circle Mura in Curved Display by Polyimide-Less Technology
Weili Chen, TCL China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

66.4: Reactive Monomers Optimized for Fast Response Liquid Crystals with High Reliability
Wei Cui, Peking University, Shenzhen, China

66.5: Late-News Paper: Fast Response Texture Free Polymer Stabilized Vertically Aligned Liquid Crystal Displays
Yong-Woon Lim, Samsung Display, Asan, South Korea

Session 67: Emerging Applications with Machine Learning (Machine Learning for Displays / Emerging Technologies and Applications)
Chair: K Käläntär, Global Optical Solutions
Co-Chair: Fang-Cheng Lin, Apple Inc

67.1: Distinguished Paper: Efficient Multi-Quality Super-Resolution Using a Deep Convolutional Neural Network for an FPGA Implementation
Min Beom Kim, LG Display Co., Ltd., Seoul, South Korea

67.2: Lightweight Tone-Mapped HDRNET with Exposure Stack Generation
Sukju Kang, Sogang University, Seoul, South Korea

67.3: ColorNet: A Neural Network-Based System for Consistent Display of Brand Colors for Video
Erica Walker, Clemson University, Clemson, SC US

67.4: Visual Simultaneous Localization and Mapping with Deep Neural Network Based Loop Detection for Augmented Reality
Chao Ping Chen, Shanghai Jiao Tong University, Shanghai, China
Session 68: Light Field 3D (Display Systems)
Chair: Shinichi Uehara, AGC Inc.
Co-Chair: K Käläntär, Global Optical Solutions
68.1: Investigation on Defocusing-Induced Accommodation Shift in Microlens Array-Based Near-Eye Light Field Displays  
Zong Qin, Sun Yat-Sen University, Guangzhou, China
68.2: View-Dependent Light-Field Display that Supports Accommodation Using a Commerically-Available High Pixel Density LCD Panel  
Ronald Azuma, Intel Labs, Santa Clara, CA US
68.3: A Super-Multiview Display with Horizontal and Vertical Parallax by Time Division and Color Multiplexing  
Yuta Watanabe, University of Tsukuba, Tsukuba, Japan
68.4: Late-News Paper: 3D/2D Partially Convertible Integral Imaging Display Using Geometric Phase Lens Array  
Hayato Watanabe, NHK (Japan Broadcasting Corporation), Tokyo, Japan

Session 69: OLED Devices IV (OLEDs)
Chair: Franky So, North Carolina State University
Co-Chair: Chihaya Adachi, Kyushu University
Jaesang Lee, Seoul National University, Seoul, South Korea
69.2: Transparent Conductive Hybrid Cathode Structure for Top-Emitting Organic Light-Emitting Devices  
Wei Quan, Hefei BOE Joint Technology Co., Ltd., Beijing, China
69.3: Examination of Degradation Analysis of p-i-n Type OLEDs Device  
Daichi Shikakura, Toray Research Center Inc., Otsu, Shiga, Japan
69.4: Late-News Paper: High Transparency Adhesive Encapsulation Film for OLED Device  
Satoru Ohashi, Ajinomoto Fine-Techno Co., Inc., Kawasaki, Japan

Session 70: Flexible Technologies III (Flexible Displays and E-paper)
Chair: Yong Taek Hong, Seoul National University
Co-Chair: Simon Kang, Apple
70.1: Invited Paper: Advances in the Development of Flexible AMOLED Display  
Ze Yuan, Royole Corporation, Fremont, CA US
70.2: Invited Paper: Low Temperature Process and Material Development for Flexible/Stetchable Transparent Conductor  
Seung Hwan Ko, Seoul National University, Seoul, South Korea
70.3: Distinguished Paper: Flexible OLED Display with 620 Degree Celsius LTPS TFT and Touch Sensor Manufactured by Weak Bonding Method  
Tsung-Ying Ke, AU Optronics Corp., Hsinchu, Taiwan ROC
70.4: Distinguished Paper: Flexible OLED-based Photonic Skin for Attachable Phototherapeutics  
Kyung Cheol Choi, Korea Advanced Institute of Science and technology (KAIST), Daejeon, South Korea

Session 71: Spatial Uniformity (Display Measurement)
Chair: Thomas Fiske, Microsoft
Co-Chair: Frank Rochow, Adviser
71.1: Fractional Pixel Method for Improved Pixel-Level Measurement and Correction (Demura) of High-Resolution Displays  
Douglas Kreysnar, Radiant Vision Systems LLC, Redmond, WA US
71.2: Subpixel Non-Uniformity Correction for Displays  
Xiaofan Feng, Jingge Electronic (USA), Camas, WA US
71.3: Meeting Optical Testing Challenges of High-Resolution µLED-Displays  
Martin Wolf, Instrument Systems GmbH, Munich, Germany
71.4: Imaging Luminance Measuring Devices (ILMDs) – Characterization and Standardization with Respect to Display Measurements  
Udo Krüger, TechnoTeam Bildverarbeitung GmbH, Ilmenau, Germany

Session 72: Quantum Dot Electroluminescence IV (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Kevin Gahagan, Corning Incorporated
Co-Chair: Yanzhao Li, BOE Technology Group Co., Ltd.
72.1: Invited Paper: Realizing Long Lifetime Blue Quantum Dots Light Emitting Diodes (QLEDs) through Quantum Dot Structure Tailoring  
Yixing Yang, TCL Corporate Research, Shenzhen, China
72.2: Highly Efficient Cadmium-Free Quantum Dot Light-Emitting Diodes Employing Top-Emitting Architecture  
Myoungin Park, Samsung Display Co., Ltd., Yongin, South Korea
72.3: Influence of Mobility Effect on Top-Emission Red Quantum Dot Light Emitting Diode with Weak-Cavity Structure  
Ming-Yi Lin, National United University, Miaoli, Taiwan ROC
72.4: Spectrum Narrowing and Efficiency Enhancement of Quantum Dot Light-Emitting Diodes by Microcavity  
Xiao Wei Sun, Southern University of Science and Technology, Shenzhen, China
Session 73: Displays and Health (Applied Vision / Lighting)
Chair: Chien-Yu Chen, National Taiwan University of Science & Technology
Co-Chair: Marina Kondakova, OLEDWorks
73.1: Invited Paper: Pediatric Device Use: Implications for Myopia Development
Elise Harb, UC Berkeley School of Optometry, Berkeley, CA US
73.2: Invited Paper: Effects of Displays on Myopia and Possible Countermeasures Based on Epidemiology in Japan
Takashi Kawamorita, Kitasato University, Sagamihara, Japan
73.3: Invited Paper: Influences of Circadian Illuminances from Lighting and TV on the Human Locomotor Activity, Sleep Disorder, EGG, HRV, and Melatonin Secretion
Dae Hwan Kim, Kookmin University, Seoul, South Korea
73.4: Invited Paper: Are Displays Giving Us the Blues?
John Bullough, Rensselaer Polytechnic Institute, Troy, NY US

Session 74: Seeing Through the Display Image Reconstruction Techniques (Machine Learning for Displays / Interactive Displays and Systems)
Chair: Steven Bathiche, Microsoft
Co-Chair: Jeff Han, Consultant
74.1: Image Restoration for Display-Integrated Camera
Sehoon Lim, Microsoft Applied Sciences, Redmond, WA US
74.2: Diffracted Image Retrieving with Deep Learning
Seungin Baek, Samsung Display, Yongin, South Korea
74.3: WITHDRAWN

Session 75: Display Systems and Backlights (Display Systems)
Chair: Jean-Pierre Guillou, Apple, Inc.
Co-Chair: Masaru Suzuki, Kriya Materials
75.1: Invited Paper: Digital Signage: Advances, Requirements, and Solutions
Michael Schmid, Ströer SE & Co. KGaA, Köln, Germany
75.2: Design Criteria in the Development of Anti-Glare Surfaces
Brett Sitter, 3M, Saint Paul, MN US
75.3: Highly Collimated Backlight for Liquid Crystal Displays
Brecht Berteloot, Ghent University, Ghent, Belgium
75.4: All-Glass Light Guide Plate with Tapered Lenticular Lens Array by Mask and Etch
Shenping Li, Corning Research & Development Corporation, Corning, NY US

Session 76: OLED Displays I (OLEDs)
Chair: Yifan Zhang, Apple, Inc.
Co-Chair: DZ Peng, Tianma
76.1: Invited Paper: Electroforming Fine Metal Mask for High Resolution OLED Displays
Xialing Chen, Changzhou U.G.Oled Technology Co., Ltd., Changzhou, China
76.2: Distinguished Paper: A High Image Quality OLED Display with Motion Blur Reduction for Ultra-High Resolution and Premium TVs
Hong-Jae Shin, LG Display, Paju, South Korea
76.3: Ultra High Efficiency OLED Display by 3D Pixel Configuration
Robert Visser, Applied Materials, Santa Clara, CA US
76.4: Late-News Paper: Aromatic Hydrocarbon Macrocycles for Highly Efficient Organic Light-Emitting Devices with Simple-Layer Architectures
Tomoo Izumi, Konica Minolta, Inc., Hachioji, Japan

Session 77: Free Form Displays I (Flexible Displays and E-paper)
Chair: Jennifer Lin, AU Optronics
Co-Chair: Hajime Yamaguchi, Japan Display Inc.
77.1: Design of Stretchable AMOLED Display with Transitional Area
Qian Yang, BOE Technology Group Co., Ltd., Beijing, China
77.2: Wearable Organic Light-Emitting Diode Displays – From Fibers to Textiles
Young Hyun Son, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea
77.3: Wearable Organic Light-Emitting Diode Displays – From Fibers to Textiles
Kyung Cheol Choi, Korea Advanced Institute of Science and technology (KAIST), Daejeon, South Korea

Session 78: Novel Display Applications (Emerging Technologies and Applications)
Chair: Gary Jones, Nanoquantum Corporation
Co-Chair: Vincent Gu, Apple, Inc.
78.1: **Invited Paper**: Application of OLED Area Light in Textiles: Approaches, Challenges, Limitations and Perspectives  
Jan Hesse, Fraunhofer FEP, Dresden, Germany

78.2: **Using Physical Books as Interfaces to Digital Displays**  
Georgios Bairaktaris, University of Surrey, Guildford, United Kingdom

78.3: **Distinguished Paper**: Vein Detection with Near-infrared Organic Photodetectors for Biometric Authentication  
Daniel Tordera, TNO / Holst Centre, Eindhoven, Netherlands

78.4: IGZO-Based Identification Tags Communicating with Everyday Touchscreens  
Nikoalaos Papadopoulos, imec, Leuven, Belgium

**Session 79: Quantum Dot Color Conversion I (Emissive, Micro-LED, and Quantum-Dot Displays)**  
**Chair**: John Van Derlofske, 3M  
**Co-Chair**: Seth Coe-Sullivan, Luminit, LLC

79.1: **Invited Paper**: A New Generation of QD Diffusion Plate Technology for TV  
Honglei Ji, TCL Electronics Holdings Limited, Shenzhen, China

79.2: Ambient Light Excitation in Quantum Dot-Converted Micro-LED Displays  
Fangwang Gou, University of Central Florida, Orlando, FL US

79.3: **Invited Paper**: The Past, the Present and the Future of Perovskite QDs  
Norman Lüchinger, Avantama AG, Stafa, Switzerland

79.4: Theoretical Prediction of Changes in Spectra of InP- and InGaP-Based Quantum Dots and Comparison with Experimental Measurement of InP-Based Quantum Dots  
Seungin Baek, Samsung Display, Yongin, South Korea

79.5: **Late-News Paper**: Bright and Narrow Green Emitting InP-based Quantum Dots for Wide Color Gamut Displays  
Eunjoo Jang, Samsung Electronics, Suwon, South Korea

**Session 80: Color Perception (Applied Vision)**  
**Chair**: Youngshin Kwak, Ulsan National Institute of Science and Technology  
**Co-Chair**: Youn Jin Kim, Xiaomi Corporation

80.1: OLED Gamut Mapping Method to Generate Exact Standard Color Results  
Jongwoong Park, Samsung Display Co., Ltd., Yongin, South Korea

80.2: Spatiochromatic Model for Image Quality Prediction of High Dynamic Range and Wide Color Gamut Content  
Robert Wanat, Dolby Laboratories, Inc, Sunnyvale, CA US

80.3: Immanent Dichromaticity in Trichromatic Observer: 2nd Coordinate in MDS Analyses of R-G Neutral- and Y-B Only Changed-Stimuli Reflects Chromatic Saliency  
Shoko Hira, Kagoshima University, Kagoshima, Japan

Sakaeichi Ohtsuka, Kagoshima University, Kagoshima, Japan

80.5: An Experimental Study of the Effect of Subpixel Arrangements on Subjective Spatial Resolution  
Midori Tanaka, Chiba University, Chiba, Japan

**Session 81: Machine Learning for Manufacturing and Calibration (Machine Learning for Displays / Display Manufacturing / Display Measurement)**  
**Chair**: Dr. Andriy Romanyuk, Glas Troesch AG  
**Co-Chair**: Stephen Atwood, Eaton Corporation

81.1: **Invited Paper**: Data Augmentation for Applying Deep Learning to Display Manufacturing Defect Detection  
Wei Xiong, Samsung Electronics, Co., Ltd., San Jose, CA US

81.2: **Invited Paper**: Neural Network Based Quantitative Evaluation of Display Non-Uniformity Corresponds Well with Human Visual Evaluation  
Yusuke Bamba, EIZO Corporation, Hakusan, Japan

81.3: Display Graylevel Gamma Tuning Algorithm and System Implementation  
Gang Xu, Jinge Electronics (USA) Inc., San Jose, CA US

81.4: Array Defect Detection and Repair Based on Deep Learning  
Kai Guo, BOE Technology Group Co., Ltd., Beijing, China

81.5: Image Quality Predication System in Display Fabrication Process  
Yongwoo Lee, Samsung Display, Yongin, South Korea

**Session 82: Projectors and Light Sources (Display Systems)**  
**Chair**: David Eccles, Collins Aerospace  
**Co-Chair**: Hidekazu Hatanaka, Ushio Inc.

82.1: **Invited Paper**: Latest Status of Blue and Green Laser Diodes and Laser Packages for Display Applications  
Eiichiro Okahisa, Nichia Corporation, Toushima, Japan

82.2: **Invited Paper**: Latest Progress of Laser Phosphor Projection Display  
Fei Hu, Appotronics, Shenzhen, China

82.3: Red-Enhanced Laser Phosphor Light Source with Quantum Dot Conversion Layer  
Tomohiro Kaji, Sony Corporation, Atsugi, Japan

82.4: **Invited Paper**: Speckle Reduction in Laser Projectors by Angular, Wavelength, and Polarization Diversities
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Co-Chair: Chang-Wook Han, LG Display Co., Ltd
83.1: **Invited Paper:** Optimization of High Performance Deep Red OLEDs Using Tandem Structure for Automotive Lighting Application
Huiqing Pang, Beijing Summer Sprout Technology Co., Ltd., Beijing, China
83.2: **Reliability Characterization of Luminescence Degradation of OLED Mobile Display Considering Color Difference Index Based on Usage Patterns**
Yoonsuk Choi, Technology Quality Reliability, Samsung Display Co. Ltd., Yongin, South Korea
83.3: **TE-Type AMOLED Display with Wide Viewing Angle and Ultra-Low Reflectance**
Kaoru Abe, Sharp Corporation, Sakai, Japan
83.4: **Techniques to Achieve an AMOLED Display with Ultra-Narrow Border**
Quan Liu, Kunshan Govesionox Optoelectronics Co., Ltd., Kunshan, China

Session 84: Free Form Displays (Flexible Displays and E-paper)
Chair: Paul Drzaic, Apple, Inc.
Co-Chair: Joon Young Yang, LG Display Co. Ltd
84.1: **Invited Paper:** 30-inch 4K Rollable OLED Display
Tohru Sonoda, Sharp Corporation, Osaka, Japan
84.2: **Study on Reliability for Impact and Rolling of Film Stacks in Rollable AMOLED Display by Finite Element Analysis**
Aries Chen, Tianmu Micro-Electronics Group, Wuhan, China
84.3: **Invited Paper:** Advanced Cover Window and Thin-film Encapsulation Technologies for Foldable AMOLED Display
Kuang-Jung Chen, ITRI, Hsinchu, Taiwan ROC
84.4: **New Barrier Fabrication Method Based on an Infiltration Technology for Flexible OLED Displays**
Seung Hun Kim, Samsung Display, Yongin, South Korea
84.5: **Late-News Paper:** Flexible Cover Window Film with Improved Optical Clarity
Min Sang Park, SK Innovation, Daejeon, South Korea

Session 85: Novel Displays and Optics (Emerging Technologies and Applications)
Chair: Timothy Large, Microsoft Corp
Co-Chair: Adi Abileah, Adi - Displays Consulting LLC
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James Harding, FlexEnable, Cambridge, United Kingdom
85.2: **Invited Paper:** Fourth Gen Optics - Planar Optics Revolutionized by LCD Technology
Nelson Tabiryan, BEAM Engineering for Advanced Measurements Co., Orlando, FL US
85.3: **In-Cell Optical Compensation Technology for OLED Demura Application**
Yunke Qin, BOE Technology Group Co., Ltd., Beijing, China
85.4: **Enhancing Ambient Viewing Performance of Anisotropic Nano-Structure Light Control Film**
Lang-Hai Wu, BenQ Materials, Taoyuan, Taiwan ROC
85.5: **Late-News Paper:** Real Time Dynamic Holographic Display Based on Perovskite Doped Liquid Crystal
Gufeng He, Shanghai Jiao Tong University, Shanghai, China

Session 86: Quantum Dot Color Conversion II (Emissive, Micro-LED, and Quantum-Dot Displays)
Chair: Jean-Jacques Drolet, Osram Opto Semiconductors
Co-Chair: John Van Derlofske, 3M
86.1: **Invited Paper:** Nano-particle heat sinking for quantum-dot colour conversion
Jinhyun Cho, Samsung Electronics, Suwon, South Korea
86.2: **Color Conversion Using Quantum Dots for LCD, OLED and MicroLED Displays**
Ravisubhash Tangiral, Nanoys Inc, Milpitas, CA US
86.3: **Ultra-Stable Deep-Dyed Perovskite-Polymer Composites as Tunable Downconverters**
Caicai Zhang, University of Central Florida, Orlando, FL US
86.4: **Color Conversion Enhancement of Perovskite Quantum Dots by Integrating with Cholesteric Liquid Crystals**
Su Pan, TCL China Star Optoelectronics Technology Co. Ltd., Shenzhen, China
86.5: **Late-News Paper:** Giant Shell Quantum Dots for Color Conversion and as Active Material in QLEDs
Jan Niehaus, Fraunhofer CAN, Hamburg, Germany

Poster Session

Active Matrix Devices
P.1: **New P-Type LTPS Pixel Circuit with Negative Feedback for AMOLED Smartwatch Displays**
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan ROC
P.2: **Hydrogenated SnO for p-Channel Oxide Thin Film Transistor**
Kenji Nomura, University of California, San Diego, La Jolla, CA US
P.3: Effects of Negative Bias Illumination Stress on IGZO Device and Luminance Behaviors in OLED Display Panel Operated by AC Conditions
Kiju Im, Samsung Display Co., Ltd., Yongin, South Korea

P.4: Enhanced the Scalability and the Reliability of High Mobility Elevated-Metal Metal-Oxide Thin-Film Transistors with Bandgap Engineering
Zhile Xia, Department of Electronic and Computer Engineering, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.5: Compact Modeling of Independent Dual Gate TFTs and OLED for Display Panel Circuit Simulations
Jiahao Kang, Royole Corporation, Fremont, CA US

P.6: Four-Sided Micro-Border 8K4K LCD with Oxide-TFT Gate Driver Embedded Array
ManHong Na, AU Optronics Corp., Hsinchu, Taiwan ROC

P.7: Improvement of Electrical Stability of In-Ga-Zn-O Thin-Film Transistors by Incorporation of Polytetrafluoroethylene in the Back Channel Region
Hyun Jae Kim, Yonsei University, Seoul, South Korea

P.8: Degradation Model of LTPS TFT under Off-State Bias Stress on Flexible Substrate
Kihwan Kim, Samsung Display, Yongin, South Korea

P.9: Timing Model and Maximum-Aperture Pixel Design of an Active-Matrix Display
Xuchi Liu, Department of Electronic and Computer Engineering, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.10: Advantages of Active Pixel Circuit Using Gap-Type TFT as the Photo Device to Sense Low Intensity Light
Cheng-Che Tu, National Chiao Tung University, Hsinchu, Taiwan ROC

P.11: High Performance All-Solution Processed InZnO Thin-Film Transistors via Photo-Functionalization at Varying Fluence and Annealing Environment
Dianne Corsino, Nara Institute of Science and Technology, Ikoma, Japan

P.12: A Robust a-IGZO TFT Integrated Scan/Emission Driver with Dynamic Inverter for AMOLED Display
Lei Tengteng, Peking University, Taki, Japan

P.13: Large Subthreshold Swing of LTPS TFTs by Efficient Annealing Method for Light Emitting Diode Displays
Takao Saito, Sharp Corporation, Taki, Japan

P.14: Electrical Characteristics of P3HT:TIPS-Pentacene Blend Organic Thin-Film Transistor Under Light irradiation
Hyunji Shin, Hongik University, Seoul, South Korea

P.15: Thermal Conductivity Measurement of Indium-Gallium-Zinc-Oxide Thin Films Utilizing Three-Omega Method
Reiji Hattori, Kyushu University, Fukuoka, Japan

P.16: Homojunction Indium–Gallium–Zinc Oxide Thin-Film Transistors by Selective Simultaneous UV and Thermal Treatment
Cheng-Chieh Hsu, National Taiwan University, Taipei, Taiwan ROC

P.17: Large Subthreshold Swing of LTPS TFTs by Efficient Annealing Method for Light Emitting Diode Displays
Takao Saito, Sharp Corporation, Taki, Japan

P.18: Ultra-Compact Multi-Level Digital-to-Analog Converter Based on Linear Multimodal Thin-Film Transistors
Eva Bestelink, University of Surrey, Guildford, United Kingdom

P.19: A Study of Oxide TFT Vth Shift Behavior by Characterizing with Nano-Scale SIMS
Hyungil Park, Sungkyunkwan University, Suwon, South Korea

P.20: Image Distortion and Image Correction of Curved OLED Displays
Po-Jui Chen, National Taiwan University, Taipei, Taiwan ROC

P.21: A New Perceptual-Driven Approach to Foveated Head-Mounted Displays
Hong Hua, University of Arizona, Tucson, AZ US

P.22: Correlation Analysis for Subjective and Non-Subjective Evaluation of Holograms Generated by Digital and Analog Spatial Light Modulators
Chih-Hao Chuang, National Taiwan University, Taipei City, Taiwan ROC

P.23: A Subjective Method for Evaluating Foveated Image Quality in HMDs
Vijayaraghavan Thirumalai, Samsung Display America Lab, San Jose, CA US

P.24: The Visual Effect Evaluation of High Frame Rate Gaming LCD
Jian Chen, XiaMen TianMa Microelectronics Co., Ltd., Xiamen, China

P.25: Visual Advantages of Curved Displays for Working Efficiency
YungKyung Park, Ewha Womans University, Seoul, South Korea
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P.25: Effects of Image Distance on Cognitive Tunneling with Augmented Reality Head Up Displays
Joe Pullukat, NS International, Ltd., Troy, MI US

P.26: Development of Image Enhancement Technology for 3D-HUD
Ryo Tadauchi, KYOCERA Corporation, Shiga, Japan

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Yu-Chen Chueh, National Chiao Tung University, Hsinchu, Taiwan ROC

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Mark Smith, GE Aviation Systems, Cheltenham, United Kingdom

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Yu-Chun Chang, BenQ Materials Corporation, Taoyuan, Taiwan ROC

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Pierre Boher, United Visual Researchers, Paris, France

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Kenneth Li, Optonomous Technologies Inc., Westlake Village, CA US

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Seung-A Lee, Sungkyunkwan University, Suwon, South Korea

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Daisuke Ito, Synaptics Japan G.K., Tokyo, Japan

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Liu Ping, Xiamen Tianma Microelectronics Co., Ltd., Xiamen, China

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MingXin Wang, Nanjing CEC Panda LCD Technology Co., Ltd., Nanjing, China

P.33: A High Current-Drive, Step-Up Capacitive Power Converter for Display Driver
Min Zhang, Peking University, Shenzhen, China

P.34: New P-type Gate Driver Circuit with Simultaneous and Progressive Output Waveforms Per Frame for AMOLED Displays with Simultaneous Emission Driving
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan ROC

P.35: Applying Human Vision Science to Construct a Subpixel Rendering Algorithm for Displays with non-RGB-Stripe Patterns
Baojun Wang, TCL China Star Optoelectronics Technology Co., Ltd., Guangdong, China

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Young-Sang Kim, Sungkyunkwan University, Suwon, South Korea

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Robert Manley, Corning Incorporated, Corning, NY US

P.41: Mechanical Reliability of Glass in Curved Displays
Baohua Jang, Corning Incorporated, Corning, NY US

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Touaichi Ichimaru, Nippon Electric Glass Co. Ltd., Otsu, Japan

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Kazutaka Hayashi, AGC Inc., Yokohama, Japan

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Radu Reit, AvS Materials, Plano, TX US

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Changhui Fan, Peking University, Shenzhen, China

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Li Gao, Peking University, Shenzhen, China

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Hai An, BOE Technology Group co., Ltd., Hefei, China

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Changhun Hwang, OLEDON, Yongin, South Korea

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Steve Jeons, BOE Display Technology Co., Ltd, Chongqing, China

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Hayato Kikuta, Japan Electronics and Information Technology Industries Association (JEITA), Tokyo, Japan

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Kun Tsai Huang, HSD, Tainan, Taiwan ROC

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Hung-Ta Chien, Coretronic Corporation, Hsinchu, Taiwan ROC

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Qiong-Hua Wang, Beihang University, Beijing, China

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Yuhong Liu, Beijing BOE Optoelectronics Technology Co., Ltd., Beijing, China

AR/VR

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Roberts Zabels, LightSpace Technologies SIA, Marupe, Latvia
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Yasuhiro Takaki, Tokyo University of Agriculture and Technology, Tokyo, Japan

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Bing Shen, Bright View Technologies, Durham, NC US

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Yunho Shin, Kent State University, Kent, OH US

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Jiyoue Song, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China

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Yasuo Miyata, Konica Minolta Inc., Tokyo, Japan

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Sungtae Lee, LG Display, Gyunggi, South Korea

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Jongsu Kim, Pukyong National University, Busan, South Korea

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Jicheng Liu, Shanghai University, Shanghai, China

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Xuan Cao, Visionox Technology Incorporation, Gu'an, China

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Yani Chen, Peking University Shenzhen Graduate School, Shenzhen, China

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Chuan Yang, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China

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Chenggang Wang, Visionox Technology Incorporation, Gu'an, China

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Ray-Kuang Chiang, Nanomaterials Laboratory, Far East University, Tainan, Taiwan ROC

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Ting Wang, Xiamen Tianma Microelectronics Co., Ltd., Xiamen, China

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David Montgomery, Sharp Laboratories of Europe, Oxford, United Kingdom

P.92: Low-Power Perovskite Photodetector Based on ZnO/CsPbBr3/TFB Heterojunction
Qing Li, Southeast University, Nanjing, China

P.94: Compact Stable Quantum Dots via Amide-Mediated Synthesis of PMO-Based Multifunctional Ligand
Jinjie Hao, University of Bordeaux, Pessac, France

P.95: A Facile Multi-Transfer Method by Flexible Tape for Micro-LED Display Applications
Zhibo Yao, Visionox Technology Incorporation, Gu'an, China

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Jianhang Fu, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

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Bernard Wenger, Helio Display Materials, Oxford, United Kingdom

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Miao Duan, TCL China Star Optoelectronics Technology Co. Ltd., Shenzhen, China

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Zelong Bai, Beijing Institute of Technology, Beijing, China

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Chengbin Kang, The Hong Kong University of Science and Technology, Hong Kong, China

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Manuel Triana, University of Central Florida, Orlando, FL US

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Yongwei Wu, TCL China Star Optoelectronics Technology Co. Ltd., Shenzhen, China

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Zhiping Hu, Peking University, Shenzhen, China

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Bo Lu, Southern University of Science and Technology, Shenzhen, China

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Yan Wang, Southern University of Science and Technology, Shenzhen, China

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Ke Zhang, Hong Kong University of Science and Technology, Hong Kong, China

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Kumar Mallem, The Hong Kong University of Science and Technology, Hong Kong, China

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Abhishek Srivastava, The Hong Kong University of Science and Technology, Hong Kong, China

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Xiao Wei Sun, Southern University of Science and Technology, Shenzhen, China

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Sin-Doo Lee, Seoul National University, Seoul, South Korea

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Min Chul Suh, Kyung Hee University, Seoul, South Korea

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Jongsu Kim, Pukyong National University, Busan, South Korea

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Yuhei Inata, Mitsubishi Chemical Corp., Odawara, Japan

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Yingteng Zhai, Tianma Microelectronics Co., Ltd., Shanghai, China

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Hooram Wang, BOE Display Technology Co., Ltd., Beijing, China

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Jaeyoung Yoon, Seoul National University, Seoul, South Korea

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Chuanxiang Xu, BOE, Beijing, China

P.118: Optimization of Folding Process for Flexible Electronic Device
Ko Chin Chung, AU Optronics Corp., Hsinchu, Taiwan ROC

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Ze Yuan, Royole Corporation, Fremont, CA US

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Chen Young Kim, Korea Advanced Institute of Science and Technology (KAIST), Daeyeon, South Korea

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Malory Mativenga, Kyung Hee University, Seoul, South Korea

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Jewel Saha, Kyung Hee University, Dongdaemoon, South Korea

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Semyon Konstein, Shorka Laboratory LLC, Yaroslavl, Russian Fed.

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