Session 1: Annual SID Business Meeting  
Tuesday, May 14, 2019 / 8:00 – 8:20 am / Room 220A

Session 2: Opening Remarks / Keynote Addresses  
Tuesday, May 14, 2019 / 8:20 – 10:20 am / Room 220A  
Chair: Rashmi Rao, Harman/Samsung, Novi, MI, US  
2.1: Keynote Address 1: Shaping the Future with Information Displays, Jinoh Kwag, Executive Vice President, Head of Display Research Center, Samsung Display Corporation  
2.2: Keynote Address 2: Bringing Together the Best of Hardware, Software, and AI to Create Amazing User Experiences, Rick Osterloh, Senior Vice President, Devices & Services, Google LLC  
2.3: Keynote Address 3: Technical Innovation Empowers a Win-Win Future, Gao Wenbao, CEO, BOE Display and Sensor Business Group

Tuesday, May 14, 2019 / 11:10 AM - 12:40 PM / Room 220B  
Chair: Sakuichi Ohitsu, Kagoshima University  
Co-Chair: James Larimer, ImageMetrics LLC  
3.1: Psychophysical Evaluation of Persistence- and Frequency-Limited Displays for Virtual and Augmented Reality  
T. Scott Murdison, Facebook Reality Labs, Redmond, WA, US  
3.2: Importance of Object Contour Retention in 3D Space Based on “The Law of Inertia” Hypothesis in Human Perception: Through Analysis of 2D- and 3D- Footsteps Illusion  
Sakuichi Ohitsu, Kagoshima University, Kagoshima, Japan  
3.3: The Effect of Larger Field-of-View on Visual Search Times for World-Locked Augmented Reality Objects  
John Gaspar, Google, Mountain View, CA, US  
3.4: Stereoscopic Image Quality Assessment  
Domenic Au, York University, Toronto, ON, Canada  
3.5: Late-News Paper: Visual Fatigue Reducing 3D Glasses by Extending Depth of Field of Eyes  
Yasuhiro Takaki, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan

Session 4: MicroLED and Color Converting Technology (Emissive, MicroLED, and Quantum-Dot Displays)  
Tuesday, May 14, 2019 / 11:10 AM - 12:50 PM / Room 220C  
Chair: Qun Yan, Fuzhou University  
Co-Chair: Ioannis Kymissis, Columbia University  
4.1: Invited Paper: MicroLED Displays: Can the Monolithic Approach Produce Full-Color?  
Kei May Lau, Hong Kong University of Science and Technology, Hong Kong, Hong Kong  
4.2: Distinguished Student Paper: High Efficiency Color-Converted MicroLED Displays  
Fangwang Gou, University of Central Florida, Orlando, FL, US  
4.3: Distinguished Paper: 10 um Pixel, Quantum-dots Color Conversion Layer for High Resolution and Full Color Active Matrix MicroLED Display  
Jin Jang, Kyung Hee University, Seoul, South Korea  
4.4: Flexible Quantum Dot Color Converter Film for MicroLED Applications  
Xue Bai, Southern University of Science and Technology, Shenzhen, China  
4.5: Quantum Dot Design Criteria for Color Conversion in MicroLED Displays  
Julian Osinski, Opticalogic Advisors, Woodside, CA, US

Session 5: OLED Devices I (OLEDs)  
Tuesday, May 14, 2019 / 11:10 AM - 12:40 PM / Room LL21CD  
Chair: Yasunori Kijima, Huawei Technologies Co Ltd.  
Co-Chair: Sven Zimmermann, Novaled GmbH  
5.1: Multi-Mode Top-Emitting Organic Light Emitting Diodes with No Viewing Angle Dependent Color Shift and Enhanced Efficiency  
Franky So, North Carolina State University, Raleigh, NC, US  
5.2: Fluorescent OLED Achieving External Quantum Efficiency over 20% and Longer Lifetime than Phosphorescent OLED
Session 6: 8K LC Technologies (Liquid-Crystal Technology)
Tuesday, May 14, 2019 / 11:10 AM - 12:10 PM / Room LL21EF
Chair: Koichi Miyachi, JSR Corporation
Co-Chair: Jenn Jia Su, AU Optronics Corporation
Sven Laut, Merck KGaA, Darmstadt, Germany
6.2: Novel Liquid Crystal Display Mode “UV2AII” with Photo Alignment Technology for a Large-Screen 8K Display
Shinichi Terashita, Sharp Corporation, Nara, Japan
6.3: Distinguished Paper: Alignment Control of Liquid Crystal in 1-μm-Pitch Spatial Light Modulator by Lattice-Shaped Dielectric Wall Structure
Yoshitomo Isomae, Tohoku University, Sendai, Japan

Session 7: Advances in Automotive UX and Displays (Automotive/Vehicular Displays and HMI Technologies)
Tuesday, May 14, 2019 / 11:10 AM - 12:10 PM / Room LL20BC
Chair: Philippe Coni, THALES Avionics
Co-Chair: Toshihisa Sato, National Institute of Advanced Industrial Science and Technology
7.2: WITHDRAWN
7.3: Invited Paper: Automotive Grade Qualification for Quantum Dot Enhanced Liquid Crystal Displays
Rashmi Rao, Harman/Samsung Inc, Novi, MI, US
7.4: Late-News Paper: Holographic Head-Up Display with Adaptive Brightness of Ambient Light
Yueda Liu, Shanghai Jiao Tong University, Shanghai, China

Session 8: Display Artifacts Compensation (Display Electronics)
Tuesday, May 14, 2019 / 11:10 AM - 2:30 PM / Room LL20A
Chair: Wei Yao, Apple Inc
Co-Chair: Paul Oh, LG Display
8.1: The Method to Compensate IR-Drop of AMOLED Display
Jongwoong Park, Samsung Display Co., Ltd., Yongin, South Korea
8.2: Training Multi-scale Networks for Compression Artifacts Reduction
Yufan Deng, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
8.3: A Novel Degradation Compensation Method for AMOLED Panel Based on CTP Model
Haining Xu, Shenzhen Tungnenggu Technology Co. Ltd., Beijing, China
8.4: An Improved Image Data Compensation Method for Circular Display
Jiang Zhu, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China

Session 9: Novel Applications (Active-Matrix Devices)
Tuesday, May 14, 2019 / 11:10 AM - 2:30 PM / Room LL20D
Chair: Roger Stewart, Sourland Mountain Associates
Co-Chair: Takashi Nakamura, Japan Display Inc.
9.1: Invited Paper: Metal-Oxide Readout Electronics Based on Indium-Gallium-Zinc-Oxide and Indium-Tin-Zinc-Oxide for In-Panel Fingerprint Detection Application
Nikolaos Papadopoulos, imec, Heverlee, Belgium
Kaniharu Takei, Osaka Prefecture University, Osaka, Japan
9.3: Blue-Laser-Annealed TFT MicroLED Display with Integrated Digital Driving
Jun Jang, Kyung Hee University, Seoul, South Korea
Hyeon Jae Kim, Yonsei University, Seoul, South Korea

Tuesday, May 14, 2019 / 2:00 PM - 3:00 PM / Room 220B
Chair: William Cummings, Microsoft
Co-Chair: Bradley Bowden, Corning Research and Development Corporation
Session 11: MicroLED Displays (Emissive, MicroLED, and Quantum-Dot Displays)
Tuesday, May 14, 2019 / 2:00 PM - 3:30 PM / Room 220C
Chair: Kevin Gahagan, Corning Incorporated
Co-Chair: Jean-Jacques Drolet, Osram Opto Semiconductors
11.1: Invited Paper: Technologies for the Crystal LED Display System
Goshi Biwa, Sony Corporation, Kanagawa, Japan
11.2: Micro LEDs Efficiency Targets for Displays
Khaled Ahmed, Intel Corporation, Santa Clara, CA, US
11.3: Overlooked Technical Challenges for microLED Displays
Eric Virey, Yole Developpement, Portland, OR, US
11.4: Improvement of Ambient Contrast of MicroLED Devices with High Reliability
Ke Zhang, Hong Kong University of Science and Technology, Hong Kong, China
11.5: Late-News Paper: High PPI Micro LED Display for Small and Medium Size
Sho Nakamitsu, Kyocera Corporation, Shiga, Japan

Session 12: OLED Devices II (OLEDs)
Tuesday, May 14, 2019 / 2:00 PM - 3:30 PM / Room LL21CD
Chair: Nicholas Thompson, Universal Display Corporation
Co-Chair: Yifan Zhang, Apple, Inc.
12.1: Analysis of Key factors Affecting the Lifetime of Blue Phosphorescent OLED Using CN Modified Blue Host Materials
Chang Yoon Yang, Sungkyunkwan University, Suwon, South Korea
12.2: 3D Pixel Configurations for Optical Out-Coupling of OLED Displays – Part II: Experimental Validation
Young-Sam Park, Electronics and Telecommunications Research Institute (ETRI), Daejeon, South Korea
12.4: Blue OLEDs Fabricated by Close-Space Sublimation
Bryan Shu Ting Tam, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong
12.5: Late-News Paper: Study on Characteristics of OLED Devices with Different Position of EML Dopant
Heemin Park, Process Research Team, SDC, Yongin-City, South Korea

Session 13: Fast-Switching LC Technology (Liquid-Crystal Technology)
Tuesday, May 14, 2019 / 2:00 PM - 3:20 PM / Room LL21EF
Chair: Takahiro Ishinabe, Tohoku University
Co-Chair: Jian Gang Lu, Shanghai Jiao Tong University
13.1: Invited Paper: Optimized AH-IPS Liquid Crystal Display for Gaming Applications
Dong-Jin Lee, LG Display, Paju, South Korea
13.2: Novel Pixel Design In-Plane Super-Fast Response LCD for Smart Phone and PC Monitor
Kazutaka Hanaoka, Sharp Corporation, Nara, Japan
13.3: Development of High-Performance TFT-LCDs Using Optically-Isotropic Nano-Size Encapsulated Liquid Crystals
Kyeong-Jin Kim, LG Display, Seoul, South Korea
13.4: Passively Addressed Helix Free Ferroelectric Liquid Crystal for Fast Response Bi-stable Display
Zhibo Sun, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

Session 14: In-Vehicle User Experience & Safety (Automotive/Vehicular Displays and HMI Technologies)
Tuesday, May 14, 2019 / 2:00 PM - 3:20 PM / Room LL20BC
Chair: Toshihisa Sato, National Institute of Advanced Industrial Science and Technology
Co-Chair: Haruhiko Okamura, Toshiba Corporation
14.1: Invited Paper: Advances in Automotive Interior Lighting
Kartheinz Blankenbach, Pforzheim University, Pforzheim, Germany
14.2: Dynamic Peripheral Communication for Advanced Automotive Applications
Kimberly Peiler, OSRAM Opto Semiconductors, Inc., Novi, MI, US
14.3: Invited Paper: Investigation of visual characteristics and the driving skill of senior drivers
Hirofumi Aoki, Nagoya University, Nagoya, Japan
14.4: Effect of Anti-Glare Coating on Driver Monitoring Camera Optical Transfer Function
Pawel Murzyn, Visteon Corporation, Chelmsford, United Kingdom
Session 15: Driver Electronics (Display Electronics)
Tuesday, May 14, 2019 / 2:00 PM - 3:20 PM / Room LL20A
Chair: Prof. Hyoungsik Nam, Kyung Hee University
Co-Chair: Jae-Hoon Lee, Samsung Display Co

15.1: PWM Pixel Circuit with LTPS TFTs for MicroLED Displays
Jin-Ho Kim, Samsung Electronics Co., Ltd., Suwon, South Korea

15.2: Distinguished Paper: Integrated Gate Driver Circuit Technology with IGZO TFT for sensing operation
In-June Kim, LG Display Co., Seoul, South Korea

15.3: A High Image Quality OLED Display with Integrated Gate Driver using MPRT Enhancement Technology for Large Size Premium TVs
Hong-Jae Shin, LG Display, Paju, South Korea

15.4: Multi-Output Oxide TFT Shift Register Circuit without Bootstrapping Degradation
Young In Kim, Kyung Hee University, Seoul, South Korea

Session 16: Flexible TFTs (Active-Matrix Devices / E-Paper and Flexible Displays)
Tuesday, May 14, 2019 / 2:00 PM - 3:20 PM / Room LL20D
Chair: Hsing-Hung Hsieh, HP International Pte. Ltd.
Co-Chair: Paul Drzaic, Apple, Inc.

16.1: The Role of Hydrogen and Surface Potential in the Performance and Stability of Poly-Si TFTs on Plastic Substrates
Jaeseob Lee, Samsung Display Co., Ltd., Yongin, South Korea

16.2: Remarkable Improvement of Electro-Mechanical Stabilities in Flexible Oxide TFTs under Bulk-Accumulation Operation
Mohammad Billah, Kyung Hee University, Dongdaemun-Gu, Seoul, South Korea

16.3: Investigation of Mechanical Stress and Gate Bias Stress on Flexible Dual-gate a-IGZO Thin Film Transistors
Qun Zhang, Fudan University, Shanghai, China

Tszung-Ching Huang, Hewlett Packard Labs, Palo Alto, CA, US

Tuesday, May 14, 2019 / 3:40 PM – 4:40 PM / Room 220B
Chair: Frederic Kahn, Kahn International, Inc.
Co-Chair: Grace Lee, Google

17.1: Invited Paper: Objective Requirements for Displays in Near-to-Eye Headsets
Joshua Freeney, IMMY Inc., Troy, MI, US

17.2: Invited Paper: Laser Safety in Beam Scanned, Light Field Displays
Zhangyi Zhong, Dreamworld USA Inc., Millbrae, CA, US

17.3: Low-Power High-Definition Wireless Near-Eye Displays Based on Prism Optics
Luke Pillans, Intevac Photonics, Santa Clara, CA, US

Session 18: MicroLED-Transfer (Emissive, MicroLED, and Quantum-Dot Displays / Display Manufacturing)
Tuesday, May 14, 2019 / 3:40 PM - 5:00 PM / Room 220C
Chair: Francois Templier, CEA-LETI
Co-Chair: Yajie Dong, University of Central Florida

Francois Henley, Tesoro Scientific, Inc., Saratoga, CA, US

18.2: Ultra-Fine High Efficiency MicroLEDs with Testability and Transferability using Layer-Transfer Technology
Dong Lee, QMAT Inc., Santa Clara, CA, US

18.3: A New Approach for Fabricating High-Performance MicroLED Displays
Francois Templier, CEA-LETI, Grenoble, France

18.4: MicroLED Displays based on Transfer with Microtube Interconnections
Jeanett Bernard, CEA-LETI, Grenoble, France

Session 19: OLED Physics and Mechanisms (OLEDs)
Tuesday, May 14, 2019 / 3:40 PM - 5:10 PM / Room LL21CD
Chair: Denis Kondakov, DuPont
Co-Chair: Nicholas Thompson, Universal Display Corporation

19.1: Invited Paper: Atom Probe Tomography for Understanding OLED Morphology
Jeramy Zimmerman, Colorado School of Mines, Golden, CO, US

19.2: Impact of Chemical Degradation at HTL/EML Interface on Device Performance of Blue OLEDs
Shou-Cheng Dong, Hong Kong University of Science and Technology, Kowloon, Hong Kong

19.3: Examination in Application of TOF-SIMS with MS/MS to a Degradation Analysis of OLED
Daichi Shirakura, Toray Research Center, Inc., Shiga, Japan

19.4: Boosting OLED Development with ab-Initio Computation of Roll-Off and Quenching Processes.
Tobias Neumann, Nanomatch GmbH, Eggenstein-Leopoldshafen, Germany
Session 20: Low-Power Liquid-Crystal Displays (Liquid-Crystal Technology)
Tuesday, May 14, 2019 / 3:40 PM - 5:00 PM / Room LL21EF
Chair: Xiao-Yang Huang, Ebulent Technologies Corp
Co-Chair: Linghui Rao, Microsoft
20.1: Fast Switching Twisted-Vertically Aligned Mode Reflective LCD using Mortar-shaped Pixel Structure
Takahiro Ishinabe, Tohoku University, Sendai, Japan
20.2: Novel LCD Frame Frequency Switching Method with Minimized Flicker
Mitsuru Chida, Sharp Corporation, Nara, Japan
20.3: High Efficiency Wire Grid Polarizer for QDCF LCD
Yujie Liu, BOE Technology Group Co., Ltd., Beijing, China
20.4: High Performance and Low-Power Full Color Reflective LCD for New Applications
Hiroyuki Hakoi, SHARP, Nara, Japan

Session 21: Emerging Automotive Applications (Automotive/Vehicular Displays and HMI Technologies / Interactive Displays and Systems)
Tuesday, May 14, 2019 / 3:40 PM - 5:00 PM / Room LL20BC
Chair: Karlheinz Blankenbach, Pforzheim University
Co-Chair: David Barat, PSA Groupe
21.1: Active Circular Polarizer OLED E-Mirror
Paul Weindorf, Visteon Corporation, Van Buren Township, MI, US
21.2: Free-form Incell-Touch TFT-LCD Vehicle Displays Based on LTPS
Wei Wu, Xiamen Tianma Microelectronics Co., Ltd., Xiamen, China
21.3: Touchscreen for Eyes-Free Interaction Utilizing Electrostatic Force, Lateral Motion and a Force sensor
Hiroshi Haga, Tianma Japan, Ltd., Kawasaki, Japan
21.4: Plasmonic Nanostructure Array with Correlated Disorder for Augmented Reality
Beatrice Dagens, CNRS, Palaiseau, France

Session 22: Image Quality Enhancement (Display Electronics)
Tuesday, May 14, 2019 / 3:40 PM - 4:40 PM / Room LL20A
Chair: Taesung Kim, Google LLC
Co-Chair: Bong-Hyun You, Samsung Display Co.
22.1: Image Enhancement with Visual Saturation Preserving on Adaptive Histogram Model
Chaochao Shi, Shenzhen China Star Optoelectronics Technology Co., Shenzhen, China
22.2: HDR Dynamic Tone Mapping with Enhanced Rendering Control
Ike Ikizyan, Qualcomm Technologies, Inc., San Diego, CA, US
22.3: 2400 Nits Edge-Lit LCD and Adaptive EOTF for HDR and Brilliant Images
Michael Grüning, Saarland University, Saarbrücken, Germany

Session 23: Ultra-High Resolution (Active-Matrix Devices)
Tuesday, May 14, 2019 / 3:40 PM - 5:00 PM / Room LL20D
Chair: Norbert Fruehauf, University of Stuttgart
Co-Chair: James Chang, Apple, Inc.
23.1: 5291-ppi OLED Display With C-Axis Crystalline Oxide Semiconductor
Shuichi Katsui, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
23.2: 2351-ppi OLED Display with Stacked OS-FETs with L = 0.36 um
Hideaki Shishido, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
23.3: The New Route for Realization of 1µm-Pixel-Pitch High Resolution Displays
Ji Hun Choi, ETRI, Daejeon, South Korea
23.4: Channel Dimension Scalable Oxide Thin-Film Transistor for High Resolution Pixel and Integrated Gate Driver
Hiroshi Hayashi, JOLED Inc., Kyoto, Japan

Session 24: AR/MR Display Electronics (Augmented, Virtual and Mixed Reality / Display Electronics)
Wednesday, May 15, 2019 / 9:00 AM - 10:00 AM / Room 220B
Chair: Dr. Achin Bhowmik, Starkey Hearing Technologies
Co-Chair: Won Jun Choe, Samsung Display
24.1: Mira Display Processor for VR/AR Systems
Damian Modrzyk, Arm Limited, Katowice, Poland
24.2: Latency Compensation for Optical See-Through Head-Mounted with Scanned Display
Hiroki Aka, Sony Corporation, Tokyo, Japan
24.3: 10Gbps Low Power Transceiver PHY for Next Generation Display Interface
Session 25: MicroLED Manufacturing Development (Display Manufacturing / Emissive, MicroLED, and Quantum-Dot Displays)
Wednesday, May 15, 2019 / 9:00 AM - 10:30 AM / Room 220C
Chair: Ion Bita, Google LLC
Co-Chair: Zhaojun Liu, Southern University of Science and Technology
25.1: Invited Paper: Achieving High Uniformity and Yield of 200 mm GaN-On-Si LED Epitaxial Wafers for Micro LED Applications with Precise Strain-Engineering
Burkhard Slischka, ALLOS Semiconductors GmbH, Dresden, Germany
25.2: Enabling MOCVD Technology for Micro LED High Volume Manufacturing
Adam Boyd, AIXTRON SE, Herzogenrath, Germany
25.3: Highly Efficient, All-Inkjet-Printed, Deep Red Quantum Dot Light Emitting Diodes from Positive Aging
Sharen Zhang, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
25.4: Late-News Paper: Xerographic MicroAssembly Printer for LEDs and Beyond
Eugene Chow, PARC, Palo Alto, CA US
25.5: Late-News Paper: 1,053 ppi Full-Color “Silicon Display” Based on Micro-LED Technology
Hiroaki Onuma, Sharp Corporation, Hiroshima, Japan

Session 26: OLED Materials I (OLEDs)
Wednesday, May 15, 2019 / 9:00 AM - 10:20 AM / Room LL21CD
Chair: Franky So, North Carolina State University
Co-Chair: Denis Kondakov, DuPont
Sebastian Reineke, Technische Universität Dresden, Dresden, Germany
26.2: Invited Paper: Hyperfluorescence™ and TADF-based OLEDs Development Update
Ping Kuen Daniel Tsang, Kyulux Inc., Fukuoka, Japan
26.3: Highly Efficient Boron Acceptor Based Blue Thermally Activated Delayed Fluorescent Emitter
Jee Hyun Maeng, Kyung Hee University, Seoul, South Korea
26.4: Late-News Paper: Development of Positive-type Photoresists based on Polysilsesquioxanes for the Pixel Defining Layer (PDL) in OLED Structures
Seunghyun Jang, IT & E materials R&D Center, Samyang Corporate, Daejeon, South Korea

Session 27: Polymer Stabilized LCDs (Liquid-Crystal Technology)
Wednesday, May 15, 2019 / 9:00 AM - 10:00 AM / Room LL21EF
Chair: Linghui Rao, Microsoft
Co-Chair: Hoi-Sing Kwok, Hong Kong University of Science & Technology
27.1: Study on the Effect of Controlling the Pretilt Angle using RM with Multipolymerizable Functional Group
Qian Li, Shenzhen China Star Optoelectronics Technology Co. Ltd., Shenzhen, China
27.2: Novel Pixel Design to Improve Color Shift of Multi-Domain Polymer Sustained Alignment LCD
Kan-Cheng Tien, AU Optronics, Hsinchu, Taiwan ROC
27.3: Heterogenous LC Alignment in a 8-domain sub-pixel with PSVA Curing Process
Xinyuan Che, Shenzhen China Star Optoelectronics Technology Co. Ltd., Shenzhen, China

Session 28: Backlight and Frontlight Systems (Display Systems)
Wednesday, May 15, 2019 / 9:00 AM - 10:20 AM / Room LL20BC
Chair: Masaru Suzuki, Kriya Materials
Co-Chair: Akihiro Tagaya, Tokyo Institute of Technology
Junichi Masuda, Sharp Corporation, Osaka, Japan
28.2: A Novel Local Dimming Algorithm with HDR for VR System Based on GPU
Zhihua Ji, BOE Technology Group Co., Ltd., Beijing, China
28.3: Mini-LED Backlight for HDR Compatible Mobile Displays
Takeshi Masuda, Sharp Corporation, Nara, Japan
28.4: Fabrication and Operation of an Energy-Harvesting Color Projector
Ichiro Fujieda, Ritsumeikan University, Shiga, Japan

Session 29: Application Technologies for e-Paper (E-Paper and Flexible Displays)
Wednesday, May 15, 2019 / 9:00 AM - 10:20 AM / Room LL20A
Chair: Jang Lin Chen, DTC/ITRI
Co-Chair: Keisuke Hashimoto, E Ink Holdings
Tatsumi Takahashi, Electronic Paper Consortium JBMIA, Tokyo, Japan
Session 30: Oxide TFTs I (Active-Matrix Devices)
Wednesday, May 15, 2019 / 9:00 AM - 10:00 AM / Room LL20D
Chair: Yusin Lin, Applied Materials, Inc.
Co-Chair: Tse Nga Tina Ng, University of California San Diego
30.1: Invited Paper: Solution-Processing of Cul Thin-film for Transparent p-Type Electronics
Myung-Gil Kim, Chung-Ang University, Seoul, South Korea
30.2: Top-Gate Self-Aligned InGaZnO TFTs with High Reliability with a H-Incorporation Process
Yun Long Jiang, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Guangdong, China
30.3: High-Performance All-Solution-Processed Oxide TFTs via Photo-induced Semiconductor-to-Conductor a-InZnO Transformation
Juan Paolo Bermundo, Nara Institute of Science and Technology, Nara, Japan

Session 31: Characterization of Near-to-Eye Displays I (Augmented, Virtual and Mixed Reality / Display Measurement)
Wednesday, May 15, 2019 / 10:40 AM - 12:00 PM / Room 220B
Chair: Chuck Yin, FACEBOOK INC
Co-Chair: Marja Salmimaa, Nokia Bell Labs
David Hoffman, Google, Mountain View, CA, US
31.2: Measuring Intercocular Geometric Distortion of Near-To-Eye Displays
John Pencezek, University of Colorado, Boulder, CO, US
31.3: Eyebox Evaluation in AR/VR Near-To-Eye Display Testing
Kan Li, Rokid Inc., San Carlos, CA, US
31.4: Invited Paper: 3D Eyebox in Augmented and Virtual Reality Optics
Ozan Cakmakci, Google, Mountain View, CA, US

Session 32: High Dynamic Range MicroLED Displays (Liquid-Crystal Technology / Emissive, MicroLED, and Quantum-Dot Displays)
Wednesday, May 15, 2019 / 10:40 AM - 12:10 PM / Room 220C
Chair: Gang Xu, Huawei
Co-Chair: Khaled Ahmed, Intel Corporation
32.1: Invited Paper: Review of MicroLED Technology for Microdisplay Applications
Taeh Jung, LG Display Co., Ltd., Seoul, South Korea
32.2: Surface Ligands Optimization of Semiconductor CdSe/CdS Nanorods Aligned in Liquid Crystal Polymer Matrix
Wanlong Zhang, Hong Kong University of Science and Technology, Hong Kong, Hong Kong
Norio Sugiuira, AU Optronics Corporation, Hsinchu, Taiwan ROC
32.4: High Transparent Active Matrix Mini-LCD Full Color Display with IGZO TFT Backplane
Jack Fan, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd., Shenzhen, China

Session 33: OLED Materials II (OLEDs)
Wednesday, May 15, 2019 / 10:40 AM - 12:00 PM / Room LL21CD
Chair: Chihaya Adachi, Kyushu University
33.1: Invited Paper: TADF Based OLED Devices
Joong-Hwan Yang, LG Display, Seoul, South Korea
33.2: Invited Paper: Lifetime Improvement of Thermally Activated Delayed Fluorescent Organic Light-Emitting Diodes
Jun Yeob Lee, Sungkyunkwan University, Suwon, South Korea
33.3: TADF Emitter Selection for Deep-Blue Hyper-Fluorescent OLEDs
Thomas Baumann, cynora GmbH, Bruchsal, Germany
33.4: Invited Paper: A Chemical Structure Approach Enhancing Light Outcoupling of Dopant OLEDs and Internal Quantum Efficiency of Non-Dopant OLEDs Having Bluish TADF Emitters
Chin-Ti Chen, Academia Sinica, Taipei, Taiwan ROC

Session 34: Self-Aligned LCDs (Liquid-Crystal Technology)
Wednesday, May 15, 2019 / 10:40 AM - 11:40 AM / Room LL21EF
Chair: Hoi-Sing Kwok, Hong Kong University of Science & Technology
Co-Chair: Koichi Miyachi, JSR Corporation
34.1: A Novel Reactive Monomer for Self-Vertical-Alignment Liquid Crystal Displays
Yuichi Inoue, DIC Corporation, Saitama, Japan
34.2: PI-less IPS/FFS Liquid Crystal Displays Utilizing Reactive LC with Diphenylacetylene Moiety
Myong-Hoon Lee, Chonbuk National University, Jeonju, South Korea
34.3: Development of Self-Alignment Advanced Super Dimensional Switching Technology and Prototype
Ruizhi Yang, Beijing BOE Display Technology Co., Ltd., Beijing, China

Session 35: 3D and Holographic (Display Systems)
Wednesday, May 15, 2019 / 10:40 AM - 11:40 AM / Room LL20BC
Chair: Shinichi Üehara, AGC Inc.
Co-Chair: Brian Schowengerdt, University Of Washington
35.1: WITHDRAWN
35.2: 3D/2D Switchable Display System Based on Integral Imaging
Qiong-Hua Wang, Beihang University, Beijing, China
35.3: Polarization Dependent Switchable Micro-Lenticular Lens Arrays Using Optically Isotropic Liquid Crystals
Seung Hee Lee, Chonbuk National University, Jeonju, South Korea
35.4: Color Holographic Display Using Quantum-dot Doped Liquid Crystal
Yunfeng Wang, Shanghai Jiao Tong University, Shanghai, China

Session 36: Display Technologies for e-Paper (E-Paper and Flexible Displays)
Wednesday, May 15, 2019 / 10:40 AM - 12:00 PM / Room LL20A
Chair: Makoto Ōmodāni, Tokai University
Co-Chair: Northisa Kobayashi, Chiba University, Department of Image and Materials Science
36.1: Variable-Transmission Electrophoretic Films
Michael McCready, E Ink Corporation, Billerica, MA, US
36.2: Magnetically Written Electrophoretic Display
Michael McCready, E Ink Corporation, Billerica, MA, US
36.3: Tablet-Size eTIR Display for Low-Power ePaper Applications with Color Video Capability
Peter Kazlas, CLEARink Displays, Fremont, CA, US
36.4: Full Color Active Matrix Video E-paper
Alex Henzen, South China Normal University, Guangzhou, China

Session 37: Oxide TFTs II (Active-Matrix Devices)
Wednesday, May 15, 2019 / 10:40 AM - 11:40 AM / Room LL20D
Chair: Sang Hee Park, KAIST
Co-Chair: Mike Hack, Universal Display Corporation
37.1: Liquid Crystal Display Panel with a Pixel Including Oxide Semiconductor Field-effect Transistor Memory (Pixel AI)
Koji Kasunoki, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
37.2: Development of High Mobility Top-Gate IGZO-TFT for OLED Displays
Yagiro Takeda, Sharp Corporation, Nara, Japan
37.3: Late-News Paper: Achieving High Field-Effect Mobility Exceeding 60 cm2/Vs in IZTO Transistor via Metal-Assisted Crystallization
Nari On, Hanyang University, Seoul, South Korea

Session 38: Characterization of Near-to-Eye Displays II (Augmented, Virtual and Mixed Reality / Display Measurement)
Wednesday, May 15, 2019 / 3:30 PM - 4:50 PM / Room 220B
Chair: Dr. Michael Becker, Display-Messtechnik&Systeme
Co-Chair: Thomas Fiske, Microsoft
38.1: Transverse Chromatic Aberrations in Virtual Reality Devices
Aldo Badano, OSEL/CDRH/FDA, Silver Spring, MD, US
38.2: Single-Shot Scan-less Method for Virtual Image Distance Measurement for Near-To-Eye Display Systems
Kaikai Guo, Rokid Inc., San Carlos, CA, US
38.3: Evaluating Augmented Reality (AR) Eyewear Display Under Ambient Environment
Xi Mou, Hangzhou SANT Technology Co., Ltd., Zhejiang, China
38.4: Ambient Color Volume Measurements for Augmented Reality Displays
Shao-Tang Hung, Industrial Technology Research Institute, Hsinchu, Taiwan ROC

Session 39: Low-Power AMDs (Active-Matrix Devices)
Wednesday, May 15, 2019 / 3:30 PM - 4:30 PM / Room 220C
Chair: Hyun Jae Kim, Yonsei University
Co-Chair: Kwon-Shik Park, LG Display
39.1: A Low-Power Reflective LCD based on a-Si:H TFT Process  
Lei Wang, Tianma Micro-Electronics Group, Shanghai, China

39.2: Development of Advanced LTPS TFT Technology for Low Power Consumption and Narrow Border LCDs  
Hajime Watakeba, Japan Display Inc., Chiba, Japan

39.3: Invited Paper: LTPO TFT Technology for AM-OLEDs  
Ting-Kuo Chang, Apple Inc., Cupertino, CA, US

Session 40: OLED Materials III (OLEDs)  
Wednesday, May 15, 2019 / 3:30 PM - 4:00 PM / Room LL21CD  
Chair: Hitoshi Kuma, Idemitsu Kosan Co., Ltd.  
Co-Chair: Yasunori Kijima, Huawei Technologies Co Ltd.

40.1: Invited Paper: Blue Emitting Square Planar Metal Complexes for Displays and Lighting Applications  
Jian Li, Arizona State University, Tempe, AZ, US

40.2: Invited Paper: Polymer-Diluted Small Molecule Organic Semiconductors with Extreme Thermal Stability  
Noel Giebink, Penn State University, University Park, PA, US

40.3: Highly Stable Deep-Blue OLED Achieved by Hole-Transport Material with Deep HOMO Level  
Takumi Okuyama, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

40.4: High-Temperature Operational Stability of Deep-Red Phosphorescent OLED with Exciplex-Forming Host Material and Guest Material  
Tomoya Yamaguchi, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Session 41: MiniLED Displays (Liquid-Crystal Technology / Display Systems)  
Wednesday, May 15, 2019 / 3:30 PM - 4:30 PM / Room LL21EF  
Chair: Shin-Tson Wu, University of Central Florida

41.1: Invited Paper: Active Matrix, Mini-LED, 130.000 Nit Backlights for 1000PPI VR LCD  
Yang-En Wu, AU Optronics Corporation, Hsinchu, Taiwan ROC

41.2: Invited Paper: An Advanced High Dynamic Range LCD for Smartphone  
Binyi Zheng, Xiamen Tianma Microelectronics Co., Ltd., Xiamen, China

41.3: Mini-LED Enhanced LCD for High Dynamic Range Displays  
Yuge Huang, University of Central Florida, Orlando, FL, US

Session 42: Projection and Projection Screens (Display Systems)  
Wednesday, May 15, 2019 / 3:30 PM - 4:50 PM / Room LL20BC  
Chair: David Eccles, Rockwell Collins  
Co-Chair: Sergei Yakovenko, Apple

42.1: Invited Paper: Bit-Depth Constrained Black Level for High Dynamic Range Displays  
Roman Boitard, Barco - MTT Innovation, Vancouver, BC, Canada

42.2: The Evaluation for Visibility of a Back Image on a Transparent Screen  
Yukihiro Tao, AGC Inc., Yokohama, Japan

42.3: Novel Transparent Screen Combined with Light Guide System  
Shusuke Arita, FUJIFILM Corporation, Minamiashigara, Japan

42.4: 360-Degree Top-View 3D Screen System Using Linear Blending of Viewing Zones and Spatially Imaged Iris Plane  
Motohiro Makiguchi, NTT Corporation, Yokosuka, Japan

Session 43: Flexible Liquid-Crystal Displays (E-Paper and Flexible Displays / Liquid-Crystal Technology / Bendable, Foldable and Rollable Displays)  
Wednesday, May 15, 2019 / 3:30 PM - 4:30 PM / Room LL20A  
Chair: Bo-Ru Yang, Sun Yat-Sen University  
Co-Chair: Jian Gang Lu, Shanghai Jiao Tong University

43.1: Invited Paper: Flexible Nano-Phase-Separated LCDs for Future Sheet-Type Display Applications  
Takahiro Ishinabe, Tohoku University, Sendai, Japan

43.2: Optical Characteristics of Curved Flexible Light Sources (FLSs) with Small Radius and Metrology Issues  
K Käläntär, CEREBA, Tsukuba, Japan

43.3: 14 inch Flexible LCD Display with Colorless Polyimide  
Yu Shi, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd, Shenzhen, China

Session 44: Interactive Displays (Interactive Displays and Systems)  
Wednesday, May 15, 2019 / 3:30 PM - 4:50 PM / Room LL20D  
Chair: Steven Bathiche, Microsoft  
Co-Chair: Jeff Han, Consultant

44.1: Photo Sensors Embedded within TFT-LCD with Three Primary Colors Touch Function  
Chia-Wei Kuo, AU Optronics Corporation, Hsinchu, Taiwan ROC

44.2: Distinguished Paper: A Full Integration of Electromagnetic Resonance Sensor and Capacitive Touch Sensor into LCD  
Satoshi Uchino, Japan Display Inc., Ebina City, Japan
44.3: 3-layer Capacitive Touch + Piezo-electric Force Sensor Utilizing Shared Electrodes and Transparent P(VDF-TrFE) Film
Jean de Dieu Mugiraneza, Sharp Corporation, Nara, Japan
44.4: In-Cell Capacitive Hover Touch Development for a Non-Contact Application
Naoki Takada, Japan Display Inc., Ebina, Japan

Session 45: Advanced Technologies for Near-to-Eye Displays (Augmented, Virtual and Mixed Reality / Display Systems)
Thursday, May 16, 2019 / 9:00 AM - 10:00 AM / Room 220B
Chair: Brian Schowengerdt, University Of Washington
Co-Chair: David Eccles, Rockwell Collins
45.1: WITHDRAWN
45.2: Achromatic Test of Pancharatnam Phase lens for VR/AR Applications
Comrun Yousefzadeh, Kent State University, Kent, OH, US
45.3: A Four Depth Plane Near-Eye Display Without Sacrificing Frame Rate
Jianghao Xiong, University of Central Florida, Orlando, FL, US
45.4: Near-Eye Foveated Display for Achieving Human Visual Acuity
Guanjun Fan, University of Central Florida, Orlando, FL, US

Session 46: Foldable AMOLEDs (Bendable, Foldable and Rollable Displays / E-Paper and Flexible Displays)
Thursday, May 16, 2019 / 9:00 AM - 10:20 AM / Room 220C
Chair: Kyung Cheol Choi, KAIST
Co-Chair: Jennifer Lin, AU Optronics
46.1: Invited Paper: High Impact Resistance Out-Fold Touch AMOLED Display Module
Glory Chen, Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan ROC
46.2: Invited Paper: A Flexible OLED Display with Robustness and Bendability
Shingo Eguchi, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
46.3: 5.5-inch Full HD Foldable AMOLED Display Based on Neutral-Plane Splitting Concept
Masumi Nishimura, Japan Display Inc., Mobara, Japan
46.4: WITHDRAWN

Session 47: QDEL I (Emissive, MicroLED, and Quantum-Dot Displays)
Thursday, May 16, 2019 / 9:00 AM - 10:20 AM / Room LL21CD
Chair: Ruqiing Ma, Nanosys
Co-Chair: Poopathy Kathirgamanathan, Brunel University
47.1: Invited Paper: Lifetime: The Key to the Bright Future of QLED Displays
Chaoyu Xiang, TCL Corporate Research, Shenzhen, China
47.2: A Calibrated Simulation of Electroluminescent QLEDs
Tim Smeeton, Sharp Laboratories of Europe Ltd., Oxford, United Kingdom
47.3: AMQLED Display with Highly Efficient Oxide N-P Charge Generation Junction
Ju Jang, Kyung Hee University, Seoul, South Korea
47.4: Aging Behaviors of QLED with Different Structures
Zinan Chen, Southern University of Science and Technology, Shenzhen, China

Session 48: Display Substrates and Materials (Display Manufacturing)
Thursday, May 16, 2019 / 9:00 AM - 10:20 AM / Room LL21EF
Chair: Dr. Andriy Romanyuk, Glas Troesch AG
Co-Chair: Yukio Endo, AGC Inc.
48.1: Impact of Carrier Glass Substrate Characteristics on Flexible OLED Display Production
Kazutaka Hayashi, AGC Inc., Yokohama, Japan
48.2: MOVED TO P.216
48.3: Edge Strength Measurement of Ultra-Thin LCD Panels
Bosun Jang, Corning Incorporated, Corning, NY, US
48.4: Analysis of Fracture Mechanism in Sand Paper Drop Test for Cover Glass
Akio Koike, AGC Inc., Yokohama, Japan

Session 49: Augmented Reality HUD I (Automotive/Vehicular Displays and HMI Technologies / Display Systems)
Thursday, May 16, 2019 / 9:00 AM - 10:20 AM / Room LL20BC
Chair: David Hermann, Volvo Car Corporation AB
Co-Chair: Hidekazu Hatanaka, Ushio Inc.
49.1: Invited Paper: Analog LCOS SLM Devices for Display Applications
Kuan-Hsu Fan-Chiang, Himax Display Inc., Tainan, Taiwan ROC
49.2: Distinguished Student Paper: High-Efficiency Switchable Optical Elements for Advanced Head-Up Displays
Session 50: Temporal Measurement: Flicker & Image Retention (Display Measurement)
Thursday, May 16, 2019 / 9:00 AM - 10:20 AM / Room LL20A
Chair: Stephen Atwood, Eaton Corporation
Co-Chair: Jürgen Neumeier, Instrument Systems GmbH
50.1: Flicker from Electronic Displays - Reconsidering the Confusion
Michael Becker, Instrument Systems GmbH, München, Germany
50.2: Towards Modern Burn-in Assessment Method for HDR Displays
Jae Sung Park, Samsung Electronics, Suwon, South Korea
50.3: Aspects of Image Sticking Evaluations Using Imaging Luminance Measurement Devices
Ingo Rotzoch, TechnoTeam Bildverarbeitung GmbH, Ilmenau, Germany
50.4: A Novel Evaluation Method for Short-Residual Image of AMOLED Display
Jintao Peng, BOE Technology Group Co., Ltd., Beijing, China

Session 51: 8K AMLCDs (Active-Matrix Devices / Liquid-Crystal Technology)
Thursday, May 16, 2019 / 9:00 AM - 10:00 AM / Room LL20D
Chair: Man Wong, Hong Kong University of Science & Technology
Co-Chair: Shui Chih Lien, CSOT
51.1: Novel Pixel Structure for 8K QUHD LCD Panel with the Enhanced Optical Performances
Kwang Soo Bae, Samsung Display, Yongin, South Korea
51.2: Pixel Design Solutions for Transmittance Improvement in 8k VA LCD
Yinfeng Zhang, Shenzhen China Star Optoelectronics Technology Co., Ltd., Shenzhen, China
51.3: New ADS Pixel Design with Black Post Spacer for 8k Application
Hong-run Wang, BOE Technology Group Co., Ltd., Beijing, China

Session 52: OLED AR/VR Applications (Augmented, Virtual and Mixed Reality / OLEDs)
Thursday, May 16, 2019 / 10:40 AM - 12:00 PM / Room 220B
Chair: Chang-Wook Han, LG Display Co., Ltd
Co-Chair: Tariq Ali, EMagin Corporation
52.1: Invited Paper: Microdisplays for Wearable Augmented Reality – OLED vs LED based systems
Gunther Haas, MICROOLED S.A.S., Grenoble, France
52.2: Invited Paper: A New 0.64” 720p OLED Microdisplay for Application in Industrial See-Through AR HMD
Uwe Vogel, Fraunhofer Institute for Organic Electronics, Dresden, Germany
52.3: Distinguished Paper: High-Efficiency OLED Microdisplay with Microlens Array
Yosuke Motoyama, Sony Semiconductor Solutions Corporation, Kanagawa, Japan
52.4: Highest PPI Micro-OLED Display Sustain for Near-Eye Application
Pengcheng Lu, BOE Technology Group Co., Ltd., Kunming, China

Session 53: Foldable Display Components (E-Paper and Flexible Displays / Bendable, Foldable and Rollable Displays)
Thursday, May 16, 2019 / 10:40 AM - 12:00 PM / Room 220C
Chair: Paul Drzaic, Apple, Inc.
Co-Chair: Simon Kang, Apple
53.1: Invited Paper: Advanced Materials for Flexible Displays
Daniel LeCloux, DuPont Electronics & Imaging, Wilmington, DE, US
53.2: Highly Self-Healable Coating Materials with Improved Mechanical Surface Properties for Flexible Electronic Displays
Sung Woo Hong, Korea Institute of Industrial Technology, Cheonan, South Korea
Byeong-Soo Bae, Korea Advanced Institute of Science and Technology, Daejeon, South Korea
53.4: Rigid/Soft/Rigid type cover window for foldable display
Yong-Chel Jeong, KITECH, Ansan, South Korea

Session 54: QDEL II (Emissive, MicroLED, and Quantum-Dot Displays)
Thursday, May 16, 2019 / 10:40 AM - 12:20 PM / Room LL21CD
Chair: Masayuki Nakamoto, Shizuoka University
Co-Chair: Tajie Dong, University of Central Florida
54.1: Invited Paper: Development of Electroluminescent QLED Displays
Young Joon Han, Korea Institute of Industrial Technology (KITECH), Ansan, South Korea

54.3: Bright Quantum Dots LEDs Enabled by Imprinted Random Nanostructures
Hao Chen, University of Central Florida, Orlando, FL, US

54.4: Intense Pulsed Light Annealed ZnO for the Production of High Efficiency Inverted QLEDs
Poopathy Kathirgamanathan, Brunel University, London, United Kingdom

54.5: New Technologies for Colouring in Displays
Armin Wedel, Fraunhofer Institute for Applied Polymer Research, Geiselbergstrasse, Germany

Session 55: Enabling High-Resolution TFTs (Display Manufacturing)
Thursday, May 16, 2019 / 10:40 AM - 12:00 PM / Room LL21EF
Chair: Dr. Chi Woo Kim, Seoul National University
Co-Chair: Joerg Winkler, Plansee SE

55.1: Roadmapping Strategies for Rapidly Diversifying FPD Applications and Manufacturing Technologies
Charles Annis, IHS Markit, Tokyo, Japan

55.2: Essential Mask Quality for High-End Resolution Displays
Myung Yong Kim, PKL Ltd./Photronics, Cheonan, South Korea

55.3: Distinguished Paper: Development of G6 Exposure Tool for 1.2 µm Resolution
Kouhei Nagano, Canon Inc., Utsunomiya, Japan

55.4: XTPL Approach to Print Conductive Structures in Micron-scale for Next Generation Displays
Aneta Wiatrowska, XTPL S.A., Wroclaw, Poland

Session 56: Augmented Reality HUD II (Automotive/Vehicular Displays and HMI Technologies / Display Systems)
Thursday, May 16, 2019 / 10:40 AM - 12:10 PM / Room LL20BC
Chair: Satoshi Ouchi, Hitachi, Ltd
Co-Chair: Haruhiko Okamura, Toshiba Corporation

56.1: A Multiplane Holographic HUD Using Light Selectivity of Bragg Grating
Philippe Coni, Thales Avionics, Merignac, France

56.2: Triple Viewing Zone Tabletop Holographic 3D Display
Wen Qiao, Soochow University, Suzhou, China

56.3: A Novel Emissive Projection Display (EPD) on Fully-Transparent Phosphor Screen
Ted Sun, Sun Innovations Inc., Fremont, CA, US

56.4: High-Heat-Resistant Nano/Micro-Structured Optical Elements Fabricated by Sol-Gel Imprinting
Ayano Takeshita, JXTG Nippon Oil & Energy Corp., Yokohama, Japan

56.5: Late-News Paper: Table Top Visually Equivalent Light Field 3D Display Using 15.6-inch 4K LCD Panel
Munekazu Date, NTT Media Intelligence Laboratories, Nippon Telegraph and Telephone Corporation, Kanagawa, Japan

Session 57: Novel & Emerging Technologies (Emerging Technologies and Applications)
Thursday, May 16, 2019 / 10:40 AM - 12:20 PM / Room LL20A
Chair: Gary Jones, Nanoquantum Corporation
Co-Chair: Fang-Cheng Lin, Apple Inc

57.1: Invited Paper: AirTouch System: Hand Skeleton Modelling for Augmented HMI Interactions
Marc Pastré, Advanced Silicon SA, Lausanne, Switzerland

57.2: Distinguished Paper: Laser-Addressed Full-Color Photo-Quality Rewritable Sheets Based on Thermochromic Systems with Leuco Dyes
Yuuko Kaino, Sony Corporation, Atsugi, Japan

57.3: Distinguished Student Paper: EEG Analysis of Mixed Reality Music Rehabilitation System for Post-Stroke Lower Limb Therapy
Li-Wei Ko, National Chiao Tung University, Hsinchu, Taiwan ROC

57.4: Solid State Reflective Display (SRD®) with LTPS Diode Backplane
Ben Broughton, Bodle Technologies Ltd, Oxford, United Kingdom

57.5: An Enhancement of Sound Quality by Using the Single Exciter in OLED Panel
Sungae Lee, LG Display, Paju, South Korea

Session 58: Narrow Bezel (Active-Matrix Devices)
Thursday, May 16, 2019 / 10:40 AM - 11:40 AM / Room LL20D
Chair: Dr. Kalluri Sarma, Honeywell, Inc
Co-Chair: Junho Song, Korea University

58.1: Bezel Free Design of Organic Light Emitting Diodes via a-InGaZnO Gate Driver Circuit Integration within Active Array
Kyung Min Kim, LG Display, Seoul, South Korea

58.2: Low Power and Narrow Border 8K Notebook Display with SmartView
Hui Zhang, BOE Technology Group Co., Ltd., Beijing, China

58.3: Development of 4 side Narrow Border UHD Display with TopGate IGZO-TFT and DeMUX Technology
Tetsuo Kikuchi, Sharp Corporation, Kameyama, Japan
Session 59: Diffractive LC Technologies for AR/VR (Augmented, Virtual and Mixed Reality / Liquid-Crystal Technology)
Thursday, May 16, 2019 / 1:30 PM - 2:50 PM / Room 220B
Chair: Philip Bos, Kent State University
Co-Chair: Michael Witte, Merck KGaA
59.1: Invited Paper: Liquid-Crystal Technology for Solving Key Optics Challenges in Virtual and Augmented Reality
Lu Lu, Facebook Reality Labs, Redmond, WA, US
59.2: Distinguished Student Paper: Stretchable, Flexible and Adherable Polarization Volume Grating Film for Waveguide-Based AR Displays
Kun Yin, University of Central Florida, Orlando, FL, US
59.3: Active Refractive and Diffractive Liquid-Crystal Microlens Arrays Enabled by Two-Photon Polymerization
Ziqian He, University of Central Florida, Orlando, FL, US
59.4: Fast-Response Polarization Volume Gratings for AR/VR Displays
Ran Chen, University of Central Florida, Orlando, FL, US

Session 60: OLED Displays I (OLEDs)
Thursday, May 16, 2019 / 1:30 PM - 3:00 PM / Room 220C
Chair: Yifan Zhang, Apple, Inc.
Co-Chair: Jang Hyuk Kwon, Kyung Hee University
60.1: Invited Paper: Highly Transparent AMOLED Display with Interactive System
Kuan-Ting Chen, Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan ROC
60.2: Panel Design Technology for a 31-inch GOA Driven AMOLED Display with BYYB OLED Structure and Slim Border
Yan Xue, Peking University, Shenzhen, China
60.3: Study on the Efficiency Improvement of OLED TVs with High Transmittance Technology of the Polarizer
Seong Han Hwang, LG Display, Seoul, South Korea
60.4: WITHDRAWN
60.5: Late-News Paper: 17-inch Transparent AMOLED Display With Self-Assembled Auxiliary Electrode
Zhibin Wang, OTI Lumionics Inc., Toronto, ON Canada

Session 61: Color (Applied Vision)
Thursday, May 16, 2019 / 1:30 PM - 2:50 PM / Room LL21CD
Chair: Jennifer Gille, Oculus
Co-Chair: Youngshin Kwak, Ulsan National Institute of Science and Technology
61.1: Invited Paper: Enhanced Viewing Experience Considering Chromatic Adaptation
Jiaying Wu, Apple Inc., Cupertino, CA, US
61.2: Color Gamut of Multi-Chromatic Displays
Kenichiro Masaoka, NIH Science & Technology Research Laboratories, Tokyo, Japan
61.3: Invited Paper: CIE Activities on Wide Color Gamut and High Dynamic Range Imaging
Po-Chieh Hung, Apple Inc., Cupertino, CA, US
61.4: LER Constrained Primary Color Optimization for an Ultra-Wide Gamut Display
Hongya Song, Zhejiang University, Hangzhou, China

Session 62: Oxide TFT Manufacturing (Display Manufacturing / Active-Matrix Devices)
Thursday, May 16, 2019 / 1:30 PM - 2:50 PM / Room LL21EF
Chair: Dr. Chi Woo Kim, Seoul National University
Co-Chair: Kenichi Takatori, Huawei Technologies Japan K.K.
62.1: Invited Paper: Highly Stable Self-Aligned Coplanar InGaZnO Thin-Film Transistors and Investigation on Effective Channel Length
Jung Bae Kim, Applied Materials, Santa Clara, CA, US
62.2: Highly Reliable Shift Register with Coplanar a-IGZO TFTs by Splitting Top Gate into Dual Gates
Jin Jang, Kyung Hee University, Seoul, South Korea
62.3: A 120Hz 8-Domain 8k4k LCD with Oxide TFT
BoLiang Yeh, AU Optronics Corporation, Hsinchu, Taiwan ROC
62.4: Late-News Paper: Evaluation of Polycrystalline Silicon after Eximer Laser Annealing by Retardation Measurement Method
Nakcho Choi, OLED Panel Development Team, Samsung Display Co., Ltd., Yongin-City, South Korea

Session 63: Novel Auto Materials & Shapes (Automotive/Vehicular Displays and HMI Technologies)
Thursday, May 16, 2019 / 1:30 PM - 2:50 PM / Room LL20BC
Chair: Rashmi Rao, Harman/Samsung Inc
Co-Chair: David Hermann, Volvo Car Corporation AB
63.1: High Brightness Bendable Backlight Including a Glass Light Guide
Xiang-Dong Mi, Corning Research & Development Corporation, Corning, NY, US
63.2: Room Temperature Curable Liquid Optical Clear Adhesive for Automotive Display
Brandon Swatowski, Dow Chemical, Midland, MI, US
63.3: Advances In Driving Technology For Free-Form LCDs
Cheng-Kuang Wang, AU Optronics Corporation, Hsinchu, Taiwan ROC
63.4: Invited Paper: New Technology for Improving Automotive Head-Up Displays (HUDs)
John VanDerlofske, 3M, St. Paul, MN, US

Session 64: Novel Imaging Applications (Emerging Technologies and Applications)
Thursday, May 16, 2019 / 1:30 PM - 2:30 PM / Room LL20A
Chair: Timothy Large, Microsoft Corp
Co-Chair: Vincent Gu, Apple, Inc.
64.1: Lensless Microscope Using High-Resolution Display
Yuake Negoro, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
64.2: Movable Electrowetting Optofluidic Lens for Imaging System
Qiong-Hua Wang, Beihang University, Beijing, China
64.3: An Intelligent System for Vision Screening and Training
Xiaoke Li, Sun Yat-sen University, Guangzhou, China
64.4: WITHDRAWN

Session 65: Advanced Materials for Lighting (Lighting)
Thursday, May 16, 2019 / 1:30 PM - 2:50 PM / Room LL20D
Chair: Marina Kondakova, OLEDWorks
Co-Chair: Larry Sadwick, INNOSYS
65.1: Invited Paper: Narrow Spectrum Deep Red Emitters for OLED Lighting and Display
Eric Margulies, UDC, Inc., Ewing, NJ, US
65.2: Invited Paper: Enabling Technology for MicroLED Display Based on Quantum Dot Color Converter
Jung Han, Yale University, New Haven, CT, US
65.3: Light Diffusing, Down-Converting Perovskite-on-Polymer Microspheres
Caiqian Zhang, University of Central Florida, Orlando, FL, US
65.4: Perovskite Downconverters for Optimized Solid-State Lighting
Zhiquan He, University of Central Florida, Orlando, FL, US

Session 66: Fast-Response LC for AR/VR (Augmented, Virtual and Mixed Reality / Liquid-Crystal Technology)
Thursday, May 16, 2019 / 3:10 PM - 4:30 PM / Room 220B
Chair: Dr. Philip Chen, National Chiao Tung University
Co-Chair: Dr Akihiro Mochizuki, I-CORE Technology, LLC
66.1: Invited Paper: Fast-Response IPS-LCDs Used in VR Applications
Toshiharu Matsushima, Japan Display Inc., Mobara, Japan
66.2: High Transmittance and Fast Response FFS LCD for AR and VR Displays
Javed Talukder, University of Central Florida, Orlando, FL, US
66.3: Submillisecond-Response 10-Megapixel 4K2K LCoS for Microdisplay and Spatial Light Modulator
Jhoo Pu Yang, National Chiao Tung University, Hsinchu, Taiwan ROC
66.4: Late-News Paper: Fast Dichroic-Dye-Doped Cholesteric Liquid Crystals Light Shutter
Philip Bos, Kent State University, Kent, OH US

Session 67: OLED Displays II (OLEDs)
Thursday, May 16, 2019 / 3:10 PM - 4:30 PM / Room 220C
Chair: DZ Peng, Tianma
Co-Chair: Neetu Chopra, Kateeva
67.1: Invited Paper: Design of an Advanced Bottom-Emission AMOLED Display for TVs with High Ppi and Large Size
Yuan-Chun Wu, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd., Shenzhen, China
67.2: 5.5-inch Full Screen Flexible High-resolution OLED display Fabricated by Ink Jet Printing Method
Dejiang Zhao, BOE Technology Group Co., Ltd., Beijing, China
67.3: Unique Belt Plane Source Evaporation Techniques for the mass production of 2250ppi AMOLED and 77
Changhun Hwang, OLEDON, Yongin, South Korea
67.4: Electrical and Optical Modeling for Cross-Talk between adjacent pixels in Organic Light-Emitting Diode Displays
Daniele Braga, Fluxim AG, Winterthur, Switzerland

Session 68: Machine Learning and Image Quality (Applied Vision / Display Electronics)
Thursday, May 16, 2019 / 3:10 PM - 4:30 PM / Room LL21CD
Chair: Yi Pai Huang, National Chiao Tung University
Co-Chair: Mainak Biswas, Google
68.1: A Machine Learning Based Approach to Objective Image Quality Evaluation
Gregory Cook, Samsung Display America Lab, San Jose, CA, US
Session 69: Processes for Cost-Down Manufacturing (Display Manufacturing)
Thursday, May 16, 2019 / 3:10 PM - 4:10 PM / Room LL21EF
Chair: Dr Robert Visser, Applied Materials
Co-Chair: Greg Gibson, nTact

69.1: Etch Properties of Silicon Nitride Films Using a New In-Line Equipment with Atmospheric Glow Plasma for The OLED Flexible Display
Jang Sick Park, APP Co., Ltd., Hwaseong, South Korea

69.2: Invited Paper: Improved ZnO Based Materials for To-Date Flat Panel Displays
Victor Belyaev, Moscow Region State University, Lobnya, Russian Fed.

69.3: Distinguished Paper: Large-Area Spatial Atomic Layer Deposition of Amorphous Oxide Semiconductors at Atmospheric Pressure
Ilias Katsouras, TNO / Holst Centre, Eindhoven, Netherlands

Session 70: Active Contact Lenses (Emerging Technologies and Applications)
Thursday, May 16, 2019 / 3:10 PM - 4:30 PM / Room LL20BC
Chair: Ian Underwood, University of Edinburgh
Co-Chair: Abhishek Srivastava, Hong Kong University of Science & Technology

70.1: Invited Paper: Design of Active Liquid Crystal Based Contact Lenses
Dieter Cuypers, imec and Ghent University, Ghent, Belgium

70.2: Invited Paper: Developments in Electroactive Lens Technology for Vision Correction

70.3: Invited Paper: Polarisation Independent Liquid Crystal Lenses using Embossed Reactive Mesogens
J. Cliff Jones, University of Leeds, Leeds, United Kingdom

70.4: Late-News Paper: Electronic Contact Lens for Senses Beyond Sight
Matthew Donora, University of Edinburgh, School of Engineering, Edinburgh, United Kingdom

Session 71: Optical Fingerprint Sensing Displays (Interactive Displays and Systems)
Thursday, May 16, 2019 / 3:10 PM - 4:30 PM / Room LL20A
Chair: Patrick Worfolk, Synaptics
Co-Chair: Hong-Jye Hong, AU Optronics

71.1: Large-Area Optical Fingerprint Sensors for Next Generation Smartphones
Hylike Akkerman, TNO / Holst Centre, Eindhoven, Netherlands

71.2: Novel Optical Photo Sensor Array using LTPS-TFT Backplane Technology as Fingerprint Recognition
Bozi Liu, XiaMen Tianma Microelectronics, Xiamen, China

71.3: Organic Photolithography for Displays with Integrated Fingerprint Scanner
Paweł Malinowski, imec, Leuven, Belgium

71.4: Distinguished Paper: OLED Display Incorporating Organic Image Sensor
Taissuke Kamada, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Session 72: Advanced Solid-State Lighting Systems (Lighting)
Thursday, May 16, 2019 / 3:10 PM - 4:50 PM / Room LL20D
Chair: Eric Margulies, Universal Display Corporation
Co-Chair: Jay Liu, ShineOn (Beijing) Technology Co., Ltd.

72.1: Invited Paper: Critical Components in Solid-State Lighting
Larry Sadwick, InnoSys, Inc., Salt Lake City, UT, US

72.2: Invited Paper: Prospect for the Integration of Illumination and Display Technologies
Robert Karlcek, Rensselaer Polytechnic Institute, Troy, NY, US

72.3: Invited Paper: Dynamic Color Control in Multiprimary Tunable LED Lighting Systems
Michael Murdoch, Rochester Institute of Technology, Rochester, NY, US

72.4: Design of Diffractive Optical Element for Laser Phosphor Lighting with Uniform Illumination without Zero-Order Effect
Min-Chian Wu, National Taiwan University, Taipei, Taiwan ROC

72.5: Effect of LED Tunable White Light with Different Blue-components on Visual Fatigue
Yan Tu, Southeast University, Nanjing, China

Session 73: Light-Field and Holographic Waveguide AR Displays (Augmented, Virtual and Mixed Reality / Display Systems)
Friday, May 17, 2019 / 9:00 AM - 10:30 AM / Room 220B  
Chair: W. Hendrick, Rockwell Collins Optronics  
Co-Chair: K Käläntär, Global Optical Solutions

73.1: Direct See-Through AR HMD Based on Light Field Technology with LC MLA  
Yu-Ting Chen, National Chiao Tung University, Hsinchu, Taiwan ROC

73.2: Wearable Display System Combined Directional Scattering Holographic Waveguide with Goggle  
Juan Liu, Beijing Engineering Research Center for Mixed Reality and Advanced Display, Beijing, China

73.3: High Refractive Index Photopolymer Fabricated Holographic Grating used for RGB Waveguide-Type Display  
Yuning Zhang, Southeast University, Nanjing, China

73.4: Distinguished Paper: Image Formation Modeling and Analysis of Near-Eye Light Field Displays  
Zong Qin, National Chiao Tung University, Hsinchu, Taiwan ROC

73.5: Late-News Paper: Simplified Implementation of Super Multi-View Head-Mounted Display  
Yasuhiro Takaki, Tokyo University of Agriculture and Technology, Koganei, Tokyo, Japan

Session 74: Bendable OLEDs (OLEDs)  
Friday, May 17, 2019 / 9:00 AM - 10:00 AM / Room 220C  
Chair: JJ Lih, CPT Technology Group  
Co-Chair: DZ Peng, Tianma

74.1: A New Flexible Thin Film Encapsulation Structure with High Reliability and Better Optical Performance  
Tian Fu Guo, Wuhan China Star Optoelectronics Semiconductor Display Technology Co. Ltd., Wuhan, China

74.2: A Highly Bending Performance Polymer Film for The Foldable AMOLED Displays  
Gu Peng Hao, BOE Technology Group Co., Ltd., Beijing, China

74.3: Study on Mechanical Behavior and Effect of Adhesive Layers in Foldable AMOLED Display by Finite Element Analysis  
Aries Cheng, Tianma Microelectronics Group, Shanghai, China

Session 75: Quantum-Dot LCDs (Emissive, MicroLED, and Quantum-Dot Displays / Liquid-Crystal Technology)  
Friday, May 17, 2019 / 9:00 AM - 10:20 AM / Room LL21CD  
Chair: John Van Derlofske, 3M  
Co-Chair: Seth Coe-Sullivan, Luminit, LLC

75.1: Invited Paper: Hybrid Backlight System based on Blue, Red LEDs and Perovskite Quantum Dots for Liquid Crystal Display Application  
Honglei Ji, University of Chinese Academy of Sciences, Ningbo, China

75.2: Quantum Dots on Color Filter LCD Design Study  
Songfeng Han, Corning Research & Development Corporation, Erwin, NY, US

75.3: Ultrawide Color Gamut LCD Display with CdSe Nanoplatelets  
Xiao Wei Sun, Southern University of Science and Technology, Shenzhen, China

75.4: Inkjet-Printed Quantum Dot Display with Blue OLEDs for Next Generation Display  
Zhiping Hu, Peking University, Shenzhen, China

Session 76: OLED Manufacturing (Display Manufacturing)  
Friday, May 17, 2019 / 9:00 AM - 10:30 AM / Room LL21EF  
Chair: Toshiaki Arai, JOLED Inc  
Co-Chair: Wei Lung Liu, AU Optronics Corp.

76.1: Invited Paper: FMM Material and Manufacturing Process for UHD Resolution AMOLED Displays  
Chiwoo Kim, APS Holdings, Hwaseong, South Korea

76.2: Fine Glass Masks (FGM) for OLED Manufacturing Made by Laser Induced Deep Etching (LIDE)  
Daniel Dunker, LPKF AG, Garbsen, Germany

76.3: Development of Novel Induction Heating Evaporator Technique for Fabrication of OLED  
Shin-ichiro Kobayashi, Fukuoka i3-Center for Organic Photonics and Electronics Research (i3-opera), Fukuoka, Japan

76.4: Development of Gas-Barrier-Property Evaluation System for High Sensitivity and Short Evaluation Time  
Shigeki Haru, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan

76.5: Late-News Paper: Enhanced Productivity Performance through Detecting Defects on Surface of AMOLED Display  
Yongseon Park, Mobile Display Inspection Technology Team, Samsung Display, A-sun, South Korea

Session 77: Display Enhancement Technologies (Emerging Technologies and Applications / Liquid-Crystal Technology)  
Friday, May 17, 2019 / 9:00 AM - 10:30 AM / Room LL20BC  
Chair: Adi Abileah, Adi - Displays Consulting LLC  
Co-Chair: Matthew Sousa, 3M

77.1: Invited Paper: Liquid Crystals Beyond Displays: Smart Antennas and Digital Optics  
Carsten Fritzsch, Merck KGaA, Darmstadt, Germany

77.2: Anisotropic Nano-Structure Light Control Film  
Pei-Hsun Wu, BenQ Materials, Taoyuan, Taiwan ROC
Session 78: Topics in Display Measurement I (Display Measurement)  
Friday, May 17, 2019 / 9:00 AM - 10:20 AM / Room LL20A  
Chair: Marja Salmimaa, Nokia Bell Labs  
Co-Chair: Michael Becker, Display-Messtechnik&Systeme  
78.1: Specular Reflection Measurements on Reflective E-paper Using a Variable Aperture Source  
Dirk Hertel, E Ink Corporation, Billerica, MA, US  
78.2: Measurement and Evaluation of Subpixel Luminance for Mura Reduction  
Xiaofan Feng, Jinge Electronic (USA), Camas, WA, US  
78.3: Optimized Condition for Display Sparkle Contrast Measurement of Anti-Glare Cover Glass  
Masanobu Ishiki, AGC Inc., Yokohama, Japan  
78.4: Evaluation of the Color Moving Picture Response Time for Motion Blur by Brightness and Color  
Seung-Won Jung, LG Display, Paju, South Korea

Session 79: Applications of High Resolution (Applied Vision)  
Friday, May 17, 2019 / 9:00 AM - 10:20 AM / Room LL20D  
Chair: Cheng Chen, Apple, Inc.  
Co-Chair: Kevin MacKenzie, Facebook  
79.1: Framework for Evaluating Display Resolution and Size in the Context of Video Compression and Visual Acuity  
Sean McCarthy, Dolby Laboratories, Inc., San Francisco, CA, US  
79.2: Hyperrealism in Full Ultra High-Definition 8K Display  
YungKyung Park, Ewha Womans University, Seoul, South Korea  
79.3: Display Resolution and Human Factors for Presence and Motion Sickness in HMD Experiences  
HyungSeok Kim, Konkuk University, Seoul, South Korea  
79.4: Low Resolution Light Field Display for Improving the Perceived Openness of Confined Spaces  
Robin Atkins, University of British Columbia, San Jose, CA, US

Session 80: Readable OLEDS (OLEDs)  
Friday, May 17, 2019 / 10:40 AM - 11:40 AM / Room 220C  
Chair: Neetu Chopra, Kateeva  
Co-Chair: Chang-Wook Han, LG Display Co., Ltd  
80.1: Invited Paper: Recent Development of Soluble Hole Injection Material for OLED Display  
Kazuhiro Monzen, Nissan Chemical Corporation, Tokyo, Japan  
80.2: Invited Paper: Ink Jet Printed Film Formation and its Impact on OLED Device Performance  
Georg Bernatz, Merck KGaA, Darmstadt, Germany  
80.3: All Organic Layers Inkjet Printed OLEDs with a Printable Electronic Transport Layer  
Shipan Wang, Shenzhen China Star Optoelectronics Semiconductor Display Technology Co., Ltd., Shenzhen, China

Session 81: Cadmium-Free Materials & Devices (Emissive, MicroLED, and Quantum-Dot Displays)  
Friday, May 17, 2019 / 10:40 AM - 12:10 PM / Room LL21CD  
Chair: Chang Hee Lee, Samsung Display Corporation  
Co-Chair: Jonathan Steckel, Apple, Inc.  
81.1: Invited Paper: Quantum Dot Phosphors Containing None of Hazardous Element; ZnTe-Based Alloy Quantum Dots  
Takahisa Omata, IMRAM, Tohoku University, Sendai, Japan  
81.2: High Performance Red Cadmium-free Inverted Quantum Dot Light Emitting Diodes  
Jang Hyun Kwon, Kyung Hee University, Seoul, South Korea  
81.3: Distinguished Paper: Developing High Efficiency Heavy Metal Free QD-LEDs for Next Generation Displays  
Christian Ippen, Nanosys, Inc., Milpitas, CA, US  
81.4: Perovskites: Most Viable Material for Color Conversion Pixels  
Norman Lüchinger, Avantama AG, Stäfa, Switzerland  
81.5: Late-News Paper: Pb-Free Blue-Emitting 0D Cs3Cu2I5 with High PLQY of ~90%  
Taehwan Jun, Tokyo Institute of Technology, Yokohama, Japan

Session 82: Flexible Electronics Manufacturing (Display Manufacturing / E-Paper and Flexible Displays)  
Friday, May 17, 2019 / 10:40 AM - 12:20 PM / Room LL21EF  
Chair: Tian Xiao, NEXT Biometrics Inc.  
Co-Chair: Chao-Yuan Chen, Jiangsu Hecheng Display Technology  
82.1: Development of Full Roll to Roll Process for Flexible Display Backplane
Yunho Kook, LG Display, Seoul, South Korea

82.2: *Invited Paper*: Roll-to-Roll Processing of Polysilicon TFTs on Flexible Large Area Stainless Steel Substrates
Aditi Chandra, Thinfilm Electronics, San Jose, CA, US

82.3: *Late-News Paper*: Intense Pulsed Light-Induced Highly Flexible Transparent Electrodes and Their Applications
Kyoohoe Woo, Korea Institute of Machinery & Materials, Daejeon, South Korea

82.4: *Late-News Paper*: Characterization of Metal Thin Film-Wiring Materials for Foldable Devices
Chiharu Kura, Applied Physics Research Laboratory, Kobe Steel, Ltd., Hyogo, Japan

82.5: *Late-News Paper*: Three Dimensionally Stretchable AMOLED Display for Freeform Displays
Sangwoo Kim, Display Research Center, Samsung Display Co., Ltd., Yongin-si, Gyeonggi-do, South Korea

Session 83: Topics In Display Measurement II (Display Measurement)
Friday, May 17, 2019 / 10:40 AM - 12:00 PM / Room LL20A
Chair: Thomas Fiske, Microsoft
Co-Chair: Stephen Atwood, Eaton Corporation

83.1: OLED vs. LC Displays - The Race Toward Rec2020 and HDR1
Michael Becker, Instrument Systems GmbH, München, Germany

83.2: Recent Developments in IEC TC 110, Electronic Display
Kei Hyodo, Yuasa System, Okayama, Japan

83.3: Calibration of Colorimeters for RGBW Displays
Ben Bodner, LG Electronics, San Jose, CA, US

83.4: High Resolution Optical Characterization of NIR Light Sources for 3D Imaging
Pierre Boher, Eldim S.A., Hérouville-Saint-Clair, France

Poster Session
Thursday, May 16, 2019 / 5:00 PM - 8:00 PM / Room 220A

Active-Matrix Devices

P.1: Novel Oxide TFT Technology for Ultra-high Definition and Super-Narrow Border Notebook Displays
Wenda Zhao, Nanjing CEC Panda FPD Technology Co., Ltd., Nanjing, China

P.2: Effect of Buffer Layer on Performance and Reliability of Flexible a-IGZO TFTs Fabricated on Colorless Polyimide of G4.5
Huafei Xie, Peking University, Shenzhen, China

P.3: A Study on the Hot Carrier Effect in InGaZnO Thin Film Transistors
Hyo-woo Park, LG Display, Paju, South Korea

P.4: High-Mobility Back-Channel-Etched IGZTO-TFT and Application to Dual-Gate Structure
Mitsuru Nakata, NHK Science & Technology Research Laboratories, Tokyo, Japan

P.5: A New Optical Compensation Scheme for AMOLED Displays with a-IGZO TFT and a-Si:H PIN Diode
Ling Wang, BOE Technology Group Co. Ltd., Beijing, China

P.6: Development of 1Hz 17.3-inch Oxide UD HADS Display
Jin Xiang Zhu, Chongqing BOE Optoelectronics Technology Co., Ltd., Chongqing, China

P.7: Highly-Ordered Indium-Gallium-Zinc Oxide Thin Film Transistor via Atomic Layer Deposition Process.
Hyeonjo Seul, Hanyang University, Seoul, South Korea

P.8: A New Depletion-mode Compatible Gate Driver on Array for a-IGZO TFTs based AMOLED Displays
Yung Wang, Peking University, Shenzhen, China

P.9: Reduction and Mechanism of ESD Defect in IGZO-TFT Formation
Tianwen Liu, Hefei BOE Optoelectronics Technology Co., Ltd., Hefei, China

P.10: A 5.5-inch High Definition AMOLED Smartphone with IGZO Backplane
Chih-Tsu Su, Mantix Display Technology, Putian, Taiwan, ROC

P.11: Carrier Concentration Reduction by Fluorine Doping in P-type SnO Thin Film Transistors
Sisi Wang, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.12: High Performance Dual-Gate Dual-Layer Amorphous Oxide Semiconductors TFTs on PI Foil for Display Application
Manoj Nag, imec, Leuven, Belgium

P.13: High Performance a-IGZO Thin-Film Transistors Grown by Atomic Layer Deposition: Cation Combinatorial Approach
Min Hoe Cho, Hanyang University, Seoul, South Korea

P.14: Highly Robust Oxide TFT with Bulk Accumulation and Source/Drain/Active Layer Splitting
Jin Jang, Kyung Hee University, Seoul, South Korea

P.15: Gate-Bias-Stress-Induced Instability in Hybrid-Phase Microstructured ITO-Stabilized ZnO TFTs
Meng Zhang, Shenzhen University, Shenzhen, China

P.16: Stacked PECVD SiO2 Gate Insulators for Top-Gate Metal Oxide Thin-Film Transistors in Enhancement Operation Mode
Sunbin Deng, The Hong Kong University of Science and Technology, Hong Kong, Hong Kong

P.17: IGZO TFT Gate Driver with Independent Bootstrapping and Control Units for AMOLED Display
Jie Huang, Peking University, Shenzhen, China

P.18: Improving Switching Characteristics of p-type Copper Oxide Thin-Film Transistors by Germanium Oxide Passivation through Reactive Sputtering
Hyeon Jae Kim, Yonsei University, Seoul, South Korea

P.19: IGZO Thin-Film Transistors on Corrugated Substrate for High-Resolution Display
Yoonyoung Chung, POSTECH, Pohang, South Korea
P.20: The Voltage-Based Modulation Technique Using Potassium Superoxide for Amorphous Indium–Gallium–Zinc Oxide Thin-Film Transistors
Hyun Jae Kim, Yonsei University, Seoul, South Korea

Hyun Jae Kim, Yonsei University, Seoul, South Korea

P.22: The Pixel Circuit of Out-pixel Compensation for LTPS PMOS OLED Displays
Xin She Yin, BOE Technology Group Co., Ltd., Beijing, China

P.23: Enhancement in the Mobility and the Stability of Solution-Processed Zinc-Tin Oxide Thin-Film Transistors Using Alkali Metal Superoxide
Hyun Jae Kim, Yonsei University, Seoul, South Korea

P.24: Impact of Vss Signal Line Structures in Gate Driver-On-Array for Narrow Bezel AMOLED Displays
Hongwei Tian, BOE Technology Group Co., Ltd., Beijing, China

P.25: Phenomenon of Periodic Cross Striation for Common Electrode Voltage Distortion
Hongtao Lin, Fuzhou BOE Optoelectronics Technology Co., Ltd., Faqing, UNK China

P.26: A Multi-functional Scan Driver for High-Resolution AMOLED Display with LTPS TFTs
Di Geng, Chinese Academy of Sciences, Beijing, China

P.27: A Novel Pixel Circuit with Threshold Voltage Variation Compensation in Three-Dimensional AMOLED on Silicon Microdisplay
Min Zhang, Peking University, Shenzhen, China

P.28: Novel Asymmetric Source-Drain Thin Film Transistors Deposited by Atomic Layer Deposition
Yi Wang, Peking University, Beijing, China

P.29: Solution-Processed Single-Walled Carbon Nanotube Thin Film Transistors In-Situ Patterned by Inkjet-Printing of Surface Treatment Material
Yangtaek Hong, Seoul National University, Seoul, South Korea

P.30: Novel Driving Circuit Designs and Driving Methods for Organic Light Emitting Diode (OLED) Display
Jung Gu, Shenzhen Yunyinggu Technology Co., Ltd., Shenzhen, China

Takayuki Nishiyama, Sharp Corporation, Nara, Japan

Applied Vision

P.32: Investigation of the Color Mura Mechanism and Simulation Models
Xu Xiaona, BOE Technology Group, Beijing, China

P.33: Effects of Luminance, Contrast and Saturation of HDR QLED Display on Visual System Based on Eye Movement
Yan Tu, Southeast University, Nanjing, China

P.34: Ambient Picture Quality and Visual Performance Analysis for Reflected Glare Evaluation
Yu Hung Chen, AU Optronics Corp., Hsinchu, Taiwan ROC

P.35: Human Visual System Inspired Artifact Reduction in Projector Compensation
Vignesh Sankar, University of Waterloo, Waterloo, Ontario, Canada

P.36: Design of Simulation Tools for Light-field Near-eye Displays with a Pinhole Array
Wei Tao Song, NTU, Singapore, Singapore

P.37: MOVED TO 72.5

P.199: Late-News Poster: Color Mismatches Across Commercial Displays: Modeling the Effect of Observer Metamerism
Hao Xie, Munsell Color Science Laboratory, Rochester Institute of Technology, Rochester, NY US

Automotive/vehicular Displays and HMI Technologies

P.38: Improved Contrast Ratio of TFT-LCDs for Automotive Applications by Optimizing Retardation Films and Color Filters
Takuya Higashi, Mitsubishi Electric Corporation, Kumamoto, Japan

P.39: Development of High Performance LCD for Advanced 3D-HUD
Yu-Mochizuki, KYOCERA Corporation, Yasu, Japan

P.40: E-Mirror Automatic Dimming Reflectance Control
Paul Weindorf, Visteon Corporation, Van Buren Township, MI, US

P.41: Border Fade Pattern for a Segmented Active Polarizer Dimmable Lens
Paul Weindorf, Visteon Corporation, Van Buren Township, MI, US

P.42: Visibility Analysis in Vehicle Rear Mirror OLED using Fourier Optics
Ju-Un Park, LG Display, Seoul, South Korea

P.43: A Head-Up Display with Time-Division Multiplexing Parallax Barrier with Magnified Virtual Image Generation
Ayuki Hayashishita, University of Tsukuba, Tsukuba, Japan
P.44: Long Lifetime and High Performance OLED Display with Wide Temperature Range for Automotive Application
Masanobu Mizusaki, Sharp Corp., Nara, Japan

P.45: Position Correction against Vehicle Vibration for Augmented Reality on Head-Up Display
Takefumi Hasegawa, Mitsubishi Electric Corporation, Kanagawa, Japan

P.46: Multi-Plane Displays Based on Dynamic Phase-only Holography
Neil Collins, Envisics Ltd., Milton Keynes, United Kingdom

P.47: Improvement of Image Sticking for High Standard Automotive Application
Jiandong Wang, Tianma Microelectronics Co., Ltd., Shanghai, China

Display Electronics
P.48: A Novel “Always-on” Spread Spectrum Clock Technique for Reducing EMI in Display Electronics
Xiangye Wei, BOE Technology Group Co., Ltd., Beijing, China

P.49: TFT-LCD Advanced Adaptive De-Mura System
Wenqin Zhao, Chongqing HKC Optoelectronics Technology Co., Ltd., Chongqing, China

P.50: Principle and Improvement of Shaking Stripe
Hongtao Lin, BOE Technology Group Co., Ltd., Fuqing, UNK China

P.51: Design of Integrated Gate drivers with Low Temperature Poly-Silicon Thin Film Transistor
Can Zheng, BOE Technology Group Co., Ltd., Beijing, China

P.52: Novel LED Boost Architecture Enables Higher Efficiency and Thinner Display Panels
Jason Ngai, pSemi, San Diego, CA, US

P.53: A Slim Display System for OLED TV Using TCON Memory Merged IC
Byung-Jae Lee, LG Display Co., Ltd., Seoul, South Korea

P.54: An Oxide-Semiconductor-FET-Based Dynamic Logic Circuit for Wearable Systems
Toshiaki Hamada, Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

P.55: Quasi-Stereoscopic Perspective for Real-Time 2D-3D Video Conversion Without Image Content Analysis
Vasily Ezhov, Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russian Fed.

P.56: What is the Best Way to Reduce Power Consumption at Low Frame Frequency on Still Image and Some Moving Image?
Haksu Kim, LG Display, Gumi, South Korea

P.57: New Gate Driver Circuit for High-Resolution and High-Frame-Rate AMOLED Displays with Simultaneous Emission Driving Method
Chih-Lung Lin, National Cheng Kung University, Tainan, Taiwan ROC

P.58: Efficiency Enhancement by Non-Overlapping Time Design and Adaptive Ratio Control for Charge Pump of Display Drivers
Min Zhang, Peking University, Shenzhen, China

P.59: Robust Visual Enhancement of Moving Contents in Projected Imagery
Xiaoqian Hu, University of Waterloo, Waterloo, ON, Canada

P.60: An 8Gbps Receiver for 8K Large-size Display
Yu-Hsiang Wang, Novatek Corporation, Hsinchu, Taiwan ROC

Display Manufacturing
P.61: Analytical Method of Small-Sized Module Stress Mura Based on the Finite-Element Simulation
Bingchuan Zhang, Wuhan China Star Optoelectronics Technology Co., Ltd., Wuhan, China

P.62: Study on the Mechanism of Block Mura in the ITO Developing Process via Utilizing CFD Simulation
Xiaobo Li, BOE Technology Group Co., Ltd., Hefei, China

P.63: TFT-LCD Auto Gamma Adjustment System
Fei Jin, Chongqing HKC Optoelectronics Technology Co., Ltd., Chongqing, China

P.64: Mechanism Analysis of Defects on the Organic Film Process
Xiaoxian Li, Beijing BOE Display Technology Co., Ltd., Beijing, China

P.65: Research on Misty Mura Defects of OGM Products
Yong Fei Li, HeFei XinSheng Optoelectronics Technology Co., Hefei, China

P.66: Low CTE Display Glass Minimizes Chip on Glass (COG) Light Leakage (LL) from Chip Warp
Raymond Greene, Corning Incorporated, Corning, NY, US

P.67: Printed Reflective Sloped Wall for Enhancing Luminance of Color-Conversion Light Source
Yongsae Hong, Seoul National University, Seoul, South Korea

P.68: Research of Metal Trace Adhesion on Organic Film for Touch Panel
Ting Zeng, HeFei XinSheng Optoelectronics Technology Co., Hefei, China

P.69: Light Absorbing Dye-Doped Siloxane Based Optical Filter Film for Image and IR Sensors
Seung-mo Kang, KAIST, Daejeon, South Korea

P.70: The Study of Bump on Copper Surface in GI Hole of TFT-LCDs
Yijun Wang, HeFei BOE Optoelectronics Technology Co., Ltd., Hefei, China

P.71: Low Voltage Operation Dual-Gate Organic TFTs Using Four-Mask Process
Jin Jang, Kyung Hee University, Seoul, South Korea

Kunskik An, Korea Institute of Technology (KITECH), Ansan, South Korea

P.73: High-Resolution Color Patternning of an OLED Device via Capillary-Induced Ink Filling and a Sublimation Transfer Process
Kwan-Hyon Cho, Korea Institute of Industrial Technology (KITECH), Ansan, South Korea

P.74: Study on the Influence Factors of TFT Glass Strength
Weici Tian, HeFei BOE Photovoltaic Technology Co., Ltd., Hefei, China

P.75: Novel Post Spacer Design Based on Dynamic Compensation Technology
Liwei Liu, BOE Technology Group Co., Ltd., Beijing, China
**Display Measurement**

P.76: Origin and Improvement of LCD Reflectivity  
Lixuan Chen, Peking University, Shenzhen, China

P.77: An RGB Laser Meter for Ultra Short Throw Laser Projectors and Televisions  
Keisuke Hieda, HIOKI E.E. Corporation, Nagano, Japan

P.78: How to Measure Uniformity of Virtual Display in VR Devices: Considering Lens Distortion and Aperture  
Hee Kyung Ahn, Korea Research Institute of Standards and Science (KRISS), Daejeon, South Korea

P.79: Evaluation of Diffraction Induced Background Image Quality Degradation Through Transparent OLED Display  
Chi Jui Cheng, National Taiwan University, Taipei, Taiwan ROC

P.80: An Evaluation of De-sense through analyzing Display module RF noise  
Sang Kook Kim, Samsung Display Co., Ltd., Yongin, South Korea

**Display Systems**

3D

P.81: The Full-color Computer-generated Hologram Based on Offset Algorithm and Tilted Mechanism  
Chih-Hao Chuang, National Taiwan University, Taipei City, Taiwan ROC

P.82: Viewing-Angle Enhanced 3D Display Based on Lens Array Holographic Optical Element  
Qiong-Hua Wang, Beihang University, Beijing, China

P.83: Wide Angle Light-Field Holographic Display System with Angular Multiplexing  
Chung-Feng Kuo, National Taiwan University of Science and Technology, Taipei, Taiwan ROC

P.84: A Method to Suppress the Speckle Noise of the Holographic Display Using Spatiotemporal Multiplexing Technology  
Yan-Nam Li, Sichuan University, Chengdu, China

P.85: Spatial-Resolution-Improved Light-Field Imaging System Using Virtual-Moving Microlens Array without Decrease of Angular Resolution  
Hak-Rin Kim, Kyungpook National University, Daegu, South Korea

P.86: Light Field Simulation for 3D Displays with Various Pixel Structures  
Hea In Jeong, Sookmyung Women’s University, Seoul, South Korea

P.87: Time-Multiplexing Parallax Barrier with Fracntional Time-Division  
Hideki Kakeya, University of Tsukuba, Tsukuba, Japan

P.200: Late-News Poster: Depth Guided and Blur Aware Optimization for Multi-Layer Light Field 3D Display  
Shizheng Wang, Nanyang Technological University, Jurong West, Singapore

**AR/VR/MR**

P.88: Optical Design to Eliminate Ghost Images in a Waveguide-Based Light Field AR System  
Yi-Chien Lo, Coretronic Corporation, Hsinchu, Taiwan ROC

P.89: Development of Waveguide Liquid Crystal Display for Transparent Display Applications  
Long Wang, BOE Technology Group Co., Ltd., Beijing, China

Che Yang Shen, National Chiao Tung University, Hsinchu, Taiwan ROC

P.91: Tunable Blue Phase Liquid Crystal Lens Array Using Composite Dielectric Layer  
Qiong-Hua Wang, Beihang University, Beijing, China

P.92: A Lens-Less Retinal Scanning Display for Augmented Reality  
Chao Ping Chen, Shanghai Jiao Tong University, Shanghai, China

P.201: Late-News Poster: Super Multi-View 3D Display Based on Polarization Multiplexing  
Xiang Li, Shanghai Jiao Tong University, Shanghai, China

**Backlight and Frontlight Systems**

P.93: MOVED TO 28.4

P.94: The Design of Front Light Guide System Based on R-LCD  
Fei Liang, Beijing BOE Opto-Electronics Technology Co. Ltd., Beijing, China

P.95: MOVED TO 28.2

P.96: Photoluminescence Quantum-dot Microstructure Array for LCD Backlights  
Enguo Chen, Fuzhou University, Fuzhou, China

P.97: Research on the Effect of Simplified Structure of mini-LED Backlight Module on Luminous Efficiency  
Zhang Bing, Hefei BOE Optoelectronics Technology Co., Ltd., Hefei, China

**Emerging Technologies and Applications**

P.98: Improved Cell Proliferation Effect on the Human Fibroblast by the Irradiation of Aging Processed PLEDs  
Hyunscheol Kim, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

P.99: Method to Reduce Ringing Artifact in Holographic Projection  
Qiong-Hua Wang, Beihang University, Beijing, China

P.100: Low-Temperature Fabrication of ZnO Nanorods films Using Chemical Bath Deposition Method for Sensing Application in Display
Emissive Displays, MicroLED, and Quantum-Dot Displays

P.110: Efficient Quantum Dot Light-Emitting Diodes (QLEDs) by Reducing Oxygen Vacancy of ZnO Nanoparticles with a Recycling Process
Ho Seung Lee, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

P.111: Self-Driven Light-Emitting Diodes Based on Formaminidinium Lead Halide Perovskite Nanocrystals
Xiaoli Zhang, Southern University of Science and Technology, Shenzhen, China

P.112: Fabrication of Quantum Dot-Polymer Nanocomposite using Amphiphilic Polymer-Encapsulation of Quantum Dots
Kangtaek Lee, Yonsei University, Seoul, South Korea

P.113: Ligand-Dependent Stabilities and Optical Properties of InP/GaP/ZnS Quantum Dots
Heeyeon Chae, Sungkyunkwan University, Suwon, South Korea

P.114: White and Top-Emitting Quantum-Dot Light-Emitting Diodes with Indium Tin-Oxide-Top Electrodes
Shuang Jin, Southern University of Science and Technology, Shenzhen, China

P.115: Microfabrication of Patternable Ultra-Thin Quantum Dot Conversion Films for Mini-LED Display Backlight
Ray-Kuang Chiang, Far East University, Tainan, Taiwan ROC

P.116: Blue Quantum Dot Light Emitting Diode with Optimized ZnO Electron Transport Layer
Fushan Li, Fuzhou University, Fuzhou, China

P.117: Simulation of Light Extraction from an Electroluminescent QLED
David Montgomery, Sharp Laboratories of Europe, Oxford, United Kingdom

P.118: Efficient Quantum Dots Light-Emitting Diodes with a Thiocyanate Hole Injection Layer
Hailong Hu, Fuzhou University, Fuzhou, China

P.119: Quantum Dot Light Emitting Diodes for Next-Generation Displays
Alexandre Titov, NanoPhotonica Inc., Gainesville, FL, US

P.120: Degradation Mechanism and Lifetime Improvement of Blue Quantum-Dot Light-Emitting Diode
Jian-Haw Lee, National Taiwan University, Taipei, Taiwan ROC

P.121: Persistent Luminescence of Ce3+/Cr3+ Co-Doped La3Al5-xGaxO12 Phosphors
Young Jin Kim, Kyungpook University, Daegu, South Korea

P.122: High Quantum Yield Green and Red CdSe/CdS Dot-in-Rods and Their Electroluminescent Light Emitting Diodes
Xiao Wei Sun, Southern University of Science and Technology, Shenzhen, China

P.123: Hybrid Full Color MicroLED Displays with Quantum Dots
Feng Wei, Southern University of Science and Technology, Shenzhen, China

P.124: Perovskite Quantum Dots Display: Challenges and Opportunities
Lutfan Sinatra, Quantum Solutions LLC, Thuwal, Saudi Arabia

P.125: High Quantum Yield InP/ZnMnS/ZnS Quantum Dots
Xiao Wei Sun, Southern University of Science and Technology, Shenzhen, China

P.126: Light Conversion and Scattering Properties of QD Films for Display Applications: Angle-Resolved Optical Spectroscopy and Numerical Simulation
Balthasar Blüelle, Fluxim AG, Winterthur, Switzerland

P.127: The Substrate Thickness Dependence on Micro LED Chip Arrays
Chien-Chung Lin, Industrial Technology Research Institute, Hsinchu County, Taiwan ROC

P.128: WITHDRAWN

P.129: Theoretical Analysis of Current Injection Behavior for QLEDs
Yong-Hee Shin, Hongik University, Songpa, South Korea

P.203: Late-News Poster: Integrated Full-Color RGB Superluminescent LED Module for Micro-Displays
Marcus Duelk, EXALOS AG, Schlieren, Switzerland

e-Paper and Flexible Displays

P.130: Analysis of Mechanical Stresses on Foldable Devices
Interactive Displays and Systems

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