

FIRST CALL FOR PAPERS Display Week 2018

**Society for Information Display
*INTERNATIONAL SYMPOSIUM,
SEMINAR & EXHIBITION***

May 20 – 25, 2018

**LOS ANGELES CONVENTION CENTER
LOS ANGELES, CALIFORNIA, USA**



www.displayweek.org

Special Topics for 2018

The Display Week 2018 Technical Symposium will be placing special emphasis on four Special Topics of Interest to address the rapid growth of the field of information display in the following areas: **Augmented Reality, Virtual Reality, and Artificial Intelligence; Quantum Dots and Micro-LEDs; and Wearable Displays, Sensors, and Devices.** Submissions relating to these special topics are highly encouraged.

1. AUGMENTED REALITY, VIRTUAL REALITY, AND ARTIFICIAL INTELLIGENCE (AR, VR, AND AI)

This special topic will cover the technologies and applications in the emerging areas of augmented reality (AR), virtual reality (VR), and artificial intelligence (AI). These sessions will bring together scientists, engineers, business professionals, market analysts, and industry leaders involved in AR, VR, and AI technologies, products, applications, advanced developments, and emerging trends. The topical areas of interest will include:

- **AR and VR Systems and Applications**
- **Display Technologies for AR and VR Systems**
- **3D-Sensing and Imaging Technologies**
- **Spatial Tracking, Localization, Mapping, and Navigation Techniques**
- **Computation, Graphics, and Display Processing**
- **Immersive Audio Technologies**
- **End-to-End System Integration and Latencies**
- **Inputs, Interfaces, and Interactions**
- **Human Factors and User-Experience Considerations**
- **Mapping and Rendering of Virtual Objects onto the Physical World**
- **Object, Human, and Scene Capture, Reconstruction, Recognition, and Understanding**
- **Biometrics and User Authentication**

2. QUANTUM DOTS AND MICRO-LEDs

This technology track will focus on inorganic-semiconductor-based materials and device innovations for display applications. Papers are solicited in the following areas:

- **Nanomaterials** – Semiconductor quantum particle (dots, rods, etc.) synthesis and development of nanocomposite formulations. Optimizing process ability and integration, optoelectronic properties, and reliability.
- **Electroluminescence and Applications** – Using quantum nanomaterials in emissive displays. Technology innovations related to nanomaterial electroluminescence (color purity, lifetime, efficiency), RGB pixel patterning and hetero-structure integration, and device innovations related to implementation in top- and bottom-emitting structures.

- **Photoluminescence and Applications** – Using quantum nanomaterials for color-conversion applications in display components and in pixel-integrated configurations. Optimizing performance and stability for integration on-chip (inside LED package) and in remote phosphor configurations for backlight units.
- **Micro Inorganic LEDs and Applications** – Emerging technologies based on scaling down inorganic LEDs for use as arrayed emitters in display applications, with opportunities from large video displays down to high resolution microdisplays. Science and technology of micro LED devices, materials, and processes for the fabrication and integration with electronic drive back-planes. Color generation, performance, and stability. Packaging and module assembly solutions for emerging applications.

3. WEARABLE DISPLAYS, SENSORS, AND DEVICES

This special track will cover all aspects of wearable displays including product and process design, user applications, wearable system integration, and display technologies. As the next step in the mobile computing revolution, wearables have emerged as one of the most active fields in the technological world. Being the most mobile and personal form of technology to the users, wearable devices present many possibilities, and at the same time many uncertainties. This special track will provide a platform for researchers, designers, engineers, and anyone involved in wearable displays to share recent advancement and challenges. The topics covered include, but not limited to, the following:

- **Wearable Product Design and Concepts**
- **Wearable Applications**
- **Wearable Display Requirements including Readability and Durability in Extreme Environments**
- **Advanced Displays for Wearable Applications including Low Power, Flexible, Stretchable, Textile, and Others**
- **Wearable-Display Processes**
- **Directive-View Wearable Displays**
- **Microdisplay Design Suitable for Wearable Applications Like Head-Mounted Displays**
- **Fashion and Wearable Displays**
- **Wearable Sensors Integrated with Displays**
- **Wearable Devices with IoT and Health Applications**

Symposium Topics

As growing and multi-faceted fields, work relating to the special topics can fit under a number of different symposium topics, including Active-Matrix Displays, Applied Vision/Human Factors, Display Electronics, Display Manufacturing, Display Measurement, Display Systems, Emerging Applications, Emissive Displays, e-Paper and Flexible Displays, Lighting, Liquid-Crystal and Other Non-Emissive Displays, OLEDs, Touch and Interactivity, and Vehicular Displays and HMI Technologies. While the special topical sessions will be arranged in a unified program for the benefit of attendees, authors should indicate the appropriate symposium topic for their abstract in addition to the special-topic designation (if appropriate).

The Society for Information Display (SID) encourages the submission of original papers on all aspects of the research, engineering, application, evaluation, and utilization of displays. Display Week 2018 will feature special topical sessions that focus specifically on selected issues or key developments. Paper submissions are welcome for any of the general symposium topics or any of the specific topical sessions.

(1) ACTIVE-MATRIX DEVICES: Papers on advances in the implementation of active-matrix electronics into displays and other related systems as well as on all aspects of TFTs, including devices with new structures/processing, reliability, circuit design, and novel applications, are solicited

- LTPS, Oxide, and Other Semiconductor TFTs
- High-Performance Active-Matrix Devices
- Ultra-Low-Power Active-Matrix Displays
- New AMOLED Pixels and Backplanes
- Novel TFT Circuits and Driving Techniques
- Sensor Integrated Active-Matrix Devices
- Emerging Active-Matrix Displays and Devices

(2) APPLIED VISION/HUMAN FACTORS: New display technology has driven displays to have more pixels, greater contrast, higher brightness, and richer color volume, thus enabling a wide range of new visual experiences. Submissions are encouraged that discuss the benefits and tradeoffs of how these new display technologies as well as novel uses of traditional

display technology can have a measurable impact on the visual experience. Topics in the following areas are particularly in demand: mitigating the challenges by presenting comfortable and engaging 3D imagery (including autostereoscopic, AR, and VR form factors), effective use of a wider color volume to create a more immersive and compelling experience, and approaches to take advantage of limitations of the visual system to process or transmit display data more efficiently. Papers that discuss novel methods of user interaction and HMI with display systems are also welcomed.

- Wide Color Gamut and High-Dynamic-Range Imaging
- Visual Comfort of 3D Images in Wearable Displays
- Immersive Interaction
- Image Quality and Display Perception
- Human-Machine Interfaces
- Human Factors in Emerging Displays
- Human Factors of Projection Systems and Applications

(3) DISPLAY ELECTRONICS: All aspects of circuits (integrated or otherwise) for displays, electronic components for displays and imaging devices, and image- and video-processing algorithms.

- Electronics and Image Processing for Wearable Displays
- Driving Electronics for UHD (4K x 2K) and Beyond
- Driving and Compensation Circuits for Curved Displays
- Electronics for Touch and Interactive Displays
- OLED Driving Techniques
- Display Drivers, TCONs, and New Driving Schemes
- Driving Circuits Integrated on Glass
- High-Speed Interfaces
- Low-Power and Low-Cost Driving Techniques
- Image/Video Capture and Processing Techniques
- 3D/Depth Imaging and Augmented/Virtual Reality
- High-Dynamic-Range Driving Electronics

(4) DISPLAY MANUFACTURING: Materials, process, and equipment advancements related to the manufacture of display panels, components, and module assemblies.

- Manufacturing-Related Advances Enabling Current and Emerging Display Applications including Flexible, Folding, Stretchable, Wearable Displays; 3D Displays; Multi-Functional Displays or Component Architectures; etc.)
- Manufacture of High-Resolution OLED and Other Emissive Display Panels, including Fine Metal Mask (FMM), OLED Evaporation or Patterning Systems, and Thin-Film Encapsulation (TFE) Processes
- Manufacture of AMLCD and Other LCD Panels
- Manufacture of e-Paper and Other Reflective Displays

- Manufacturing Equipment and Processes for TFT Device Manufacture, including Very Large Substrate Sizes (Gen 10.5 and Above)
- Display-Component Manufacturing (e.g., Optical Films, LEDs, Backlights, In-Cell and On-Cell Touch Panels, Finger-Print Sensors, Covers, etc. (including Topics Related to High Brightness and True Black HDR Displays and Quantum-Dot-Based Applications.
- Display-Module Manufacturing including Panel and Module Assembly for all Display Technologies (e.g., AMLCD, OLED, e-Paper, Projection, etc.)
- Materials including Substrates, Films, Adhesives, Photoresists, and Photo-Patternable Organic Materials (for Bank Layers or Polarization Layers, etc.), and Consumables
- Manufacturing Equipment for Front- and Back-End Processing including Packaging, Encapsulation, Interconnect, Assembly, and Roll-to-Roll Processing
- Inline Manufacturing Test, Repair, and Metrology
- Manufacturing Productivity and Cost Reduction of Various Displays
- Green Manufacturing – Reducing Energy Consumption and Waste, and Strategies for Product End-of-Life Recycling and Disposal, etc.

(5) DISPLAY MEASUREMENT: Characterization and measurements of displays and display components.

- Characterization of Perceptible Display Phenomena
- Optical Characterization of Display Materials and Components and Their Effects on System Optical Performance
- Optical Characterization and Measurement of High-Dynamic-Range and Wide-Gamut Displays
- Solid-State-Lighting Metrology and Characterization
- Advances in Display Measurements Standards
- Measurement Methods for Near-to-Eye Displays for AR, VR, and Other Applications
- Optical Characterization and Measurement of Light-Field and 3D Displays
- Calibration and Verification of Instrumentation

(6) DISPLAY SYSTEMS: Papers on the novel integration of displays into specialized devices as well as system-level aspects of electronic displays are solicited.

- Novel Displays
- Mobile Displays
- Ultra-Low-Power Displays
- Transparent Displays
- 3D, Autostereoscopic, Light Field, and Compressive, Displays
- Volumetric and Holographic Displays
- Ultra-High-Resolution Display Systems
- Digital 2D/3D Signage

- Frontlight Units
- Backlight/Frontlight Components
- Novel Projection Architectures
- Individual Projectors and Multi-Projector Arrays
- Emerging Applications for Projection Systems
- Novel Image Processing for Projectors
- Novel Components for Projectors
- Projection Systems: Opto-Mechanical Design, Components, Lifetimes, Thermal Properties, Acoustic Noise
- Projection Mapping
- Other Topics Related to the Design, Manufacture, or Application of Projection Systems, Subsystems, or Components

(7) EMERGING APPLICATIONS: Advances in the development, use, and characterization of display technologies, components, solid-state lighting, and of systems resulting in new capabilities, improved performance, or better user experience in (i) existing display implemented into novel applications (e.g., consumer, industrial, commercial, medical, and security) or (ii) novel or emerging uses of display and lighting-related applications.

- Mobile Displays (Smartphones, Tablets, e-Readers, etc.)
- Wearable Display Applications
- Virtual and Augmented Reality
- 3D, Stereoscopy, and Holography
- Touch and Distributed Displays
- Avionics, Military, Automotive, and Ruggedized Display Applications
- Kiosks, Signage, Transparent, and Tiled Displays
- Digital Cinema, Entertainment, Gaming, and TV
- Medical Displays
- Multi-Modal Display User Interfaces (e.g., Auditory Displays)
- Display Software Applications (e.g., Image Enhancement)
- Smart Lighting / Solid-State Lighting
- Environmentally Friendly (Green) Displays
- Ubiquitous Displays
- Novel and Emerging Applications

(8) EMISSIVE DISPLAYS: All aspects of emissive displays, including LEDs, EL and PL quantum-dot displays, inorganic EL displays, and field-emission lamps. Advances in materials and processing of such devices, including phosphors, quantum-dot materials, micro-LEDs and field emitters are also sought.

- Quantum-Dot Materials
- Quantum-Dot Applications
- Quantum-Dot Electroluminescence
- Perovskite Electronics
- Phosphors
- Plasma, Field-Emission, and Inorganic EL Displays
- Micro-LEDs

(9) e-PAPER AND FLEXIBLE DISPLAYS: All aspects of e-Paper, flexible, and wearable display technologies, including flexible, bendable, foldable, or rollable display devices (OLED, electrophoretic, MEMS, cholesteric LCD, electrowetting, and other novel emissive and reflective display devices) and system-level integration of such devices and printed electronics based on organic and inorganic materials. Advances in flexible-display materials (substrates, transparent conductors, TFTs, barrier layers, and adhesives), printing and novel deposition techniques, manufacturing methods (R2R, bonding and lift-off), electro-optical effects, sensor technologies, driving techniques, device performance and reliability, ergonomics, and applications for emerging paper-like, flexible, wearable, or stretchable display technologies are sought.

- Electronic Paper
- Flexible OLED and Other Emissive Materials, Displays and Devices
- EPD, MEMS, and Other Non-Emissive Flexible Displays and Devices
- System-Level Integration for Flexible, Wearable, or Stretchable Display Devices
- Flexible Sensors and Wearable Displays
- Flexible Display Materials Including Substrates, Films, Adhesives, and Barriers
- Organic and Other Solution-Based TFTs, Flexible Active-Matrix Backplanes
- Integration, Packaging, Testing, and Reliability of e-Paper and Flexible Displays
- Flexible-Display Manufacturing of and Equipment for Printed Electronics
- Applications and Ergonomics of Integrated Flexible Electronics
- Flexible and Stretchable Hybrid Electronics
- Materials and Devices for Novel Mechanical UI/UX Technique
- Materials and Devices for Textile/Fiber Displays and Electronics

(10) LIGHTING: All aspects of solid-state lighting with focus on advances in materials and devices, visual and non-visual effects of lighting, smart lighting and intelligent luminaires, implementation and application of dynamically color-tunable lighting. Trends and technologies for future lighting solutions and alternative light sources.

- Materials and Devices for Solid-State Lighting
 - Notable Developments in LED and OLED Lighting Sources
 - Critical Components in Solid-State Lighting: Substrates, Optics, Lighting Extraction, Thermal Management, and Color-Conversion Materials
- Manufacture of Lighting
 - The Manufacture of Flexible LED and OLED Lighting Systems and Their Applications
- Visual and Non-Visual Effects of Lighting
 - Quality of Light, Including Color Rendering, Flicker, and Glare, for Indoor and Outdoor Applications
- Biological and Psychological Impact of Light and Related Health Effects
 - Visual Neuroscience Behind Lighting or Display Design
 - Visualizing Lighting on Displays
 - Emerging Lighting Metrics for the Development of Lighting Products for Improved Well-Being
- Color-Changing and/or CCT-Tunable Luminaires
 - Control Systems, Strategies, and Algorithms for Color Changing or CCT Tuning
 - Application or Case Studies of These Luminaires

(11) LIQUID CRYSTAL DISPLAYS: Advances in the development of liquid-crystal, including electro-optical effects, materials, and devices.

- Flexible and Conformable LCDs
- Fast-Response-Time and Color-Sequential LCDs
- High-Dynamic-Range and High-Ambient-Contrast LCDs
- Wide-Color-Gamut and QD-Enhanced LCDs
- LC-Based Spatial Light Modulators and Optical Elements
- LC Alignment Technologies
- Use of LC Technologies for Health-Care Applications

(12) ORGANIC LIGHT-EMITTING DIODES: Papers are sought on materials, display designs, and performance of small-to-large-area panels. Papers that discuss the progress and challenges for OLED display performance and manufacturing issues are of particular interest. Furthermore, papers on OLED signage and OLED lighting solutions are welcome.

- New AMOLED Display Pixels and Backplanes
- OLED TV – Mobile and Large-Area Applications
- Novel OLED Materials and Architectures Enabling Emerging OLED Displays
- Active- and Passive-Matrix OLED Display Technology
- Emerging OLED Displays
- OLED Device and Materials Fundamentals
- Injection and Transport Mechanisms, Molecular Engineering, and Device Structure
- OLED Stability and Degradation Mechanisms
- OLED Applications for Lighting
- OLED Manufacturing
- OLED Systems Packaging, Integration, and Cost Reduction

(13) TOUCH AND INTERACTIVE DISPLAYS:

Advances in touch-screen technologies, applications, driving electronics, system integration, and human interactions. The advanced materials and process technologies associated with touch design and applications will also be covered.

- Touch Systems, Controllers, Sensor Design, and Signal-Processing Algorithms
- Novel Interactive Displays
- Materials and Process Technologies
- Human Factors and Touch Performance Evaluation Methodology and Standardization

(14) VEHICULAR DISPLAYS AND HMI TECHNOLOGIES :

Papers for this topic shall deal with all aspects of automotive displays and related HMI issues, including market aspects, display and lighting technologies, head-up displays, application issues with vehicular displays, and advanced technologies for displays, touch screens, and gestures in vehicles as well as the user experience. Contributions in the following areas are solicited:

Displays

- Display and Lighting Technologies Applicable to Automotive/Vehicular Applications
- Advanced Technologies for Displays and Touch Screens for Automotive Use

- Usage of and Trends in Automotive Displays, Interfaces, and Applications
- Displays for Driver Assistance Systems (Navigation, Collision Warning, etc.)
- Passenger Infotainment and Projection Displays
- Head-Up Displays (HUDs), including Holographic, Augmented Reality, Night-Vision Systems/Components
- Display Measurements for Automotive Displays
- Flexible, Curved, and High-Resolution (Low Power, Sunlight Readable) Displays
- Touch-Input Devices (In-Cell, Water Resistant, Chemical Resistant) for Automotive Displays
- Motorbike Displays and Applications
- Application Issues with Vehicular Displays and Lighting
- Optical Components for Automotive Applications
- Display Materials Optimized for Automotive Applications
- LEDs, OLEDs for Lighting, Signaling, etc.
- Display Legibility, Visual Performance, Driver Distraction, etc.
- Optical, Mechanical, Electrical, Thermal Performance
- Modeling and Simulation
- Avionic Displays and Applications (including HMD, HUD, and Interaction Means)
- Touch-Screen and Haptic Technologies for Automotive Displays
- Methods for Display Power Reduction

HMI Technologies

- Human to Machine Interface (HMI) System Solutions
- HMI and User Experience (UX) for Driver Assistance Systems and Automated Driving
- Multi-Modal Input and Output
- Driver/User Interfaces (User-Centric Design, Devices, Human Factors, etc.)
- Driver Interfaces and Interaction with More Than One Display
- Personalized User Interfaces
- Methods and Tools for Automotive User-Interfaces and Simulations
- Automotive User Experience (UX), Trends, Methods, Evaluation
- Application Issues with Automotive HMIs
- Customer Acceptance and Feedback on Different Technology Displays and Interfaces
- Regulation and Trends Related to In-Vehicle Interfaces

Abstract/Summary Format and Submission Requirements

Submissions must consist of two separate parts. The first is a 35–50 word abstract. The second is a 4-page technical summary. Please follow the following instructions for the preparation and submission of the abstract and technical summary.

Page Headers: Please place the first author's name and the title of the paper on the top of each page of the submission.

Abstract: Your submitted 35-50 word abstract, highlighting the key details of your paper, will be published in the Program if your paper is accepted. The abstracts will be edited to accommodate the program format.

Keywords: Include a minimum of three keywords.

Technical Summary: The summary must not exceed 4 pages in length. Material beyond four pages will not be considered in the evaluation of the paper.

(1) Include the names of all authors with their affiliations, addresses, telephone numbers, and e-mail addresses. Please underline the name of the presenter when there are two or more authors.

(2) Also Indicate whether the presenter is a student.

(3) **Objective and Background:** Briefly describe the goals and intent of your project and provide background factors that led to the new results.

(4) **Results:** Describe the specific results that will be presented at the 2018 Display Week Symposium. Please provide a technical description of how the results were achieved. Sufficient detail (quantitative and/or graphical data) should be included so the Program Committee can properly evaluate your submission.

(5) **Impact:** Discuss the significance of your work and compare your findings with previously published work.

(6) **References:** List a few main references covering projects in related areas.

(7) **Prior Publications:** Generally, Symposium papers must be original contributions. If your organization has published or presented material on similar work in English, please explain how the present material differs. The only exception to this rule is that papers submitted to the Emerging Applications subcommittee need not be original.

All authors are required to upload their Abstract/ Technical Summary to www.sheridanprinting.com/pcm/sid/sid.cfm. Please complete the Abstract/Summary submission form before submitting your abstract.

Online Abstract/Summary Submission Form

- (A) Enter the full title of the paper.
- (B) Enter the name of the contact author and e-mail.
- (C) List all the authors and include their contact information as requested on the form.
- (D) Place the abstract in the allotted space on the form.
- (E) Enter the keywords in the space provided.
- (F) Check the appropriate box for student travel grant requests.
- (G) Indicate whether your paper is invited.
- (H) Indicate if you wish to have your paper considered for oral or poster presentation, if you have a preference.
- (I) Indicate the closest matching symposium topic from the list included in this Call for Papers along with the appropriate special topic if appropriate
- (J) Attach a PDF of your technical summary.
- (K) Click on submit.

If you need further assistance, please contact either Bill Klein at wklein@pcm411.com or Jay Morreale at jmorreale@pcm411.com.

Author Timeline

The deadline for receipt of technical summaries/abstracts is December 1, 2017 (January 19, 2018 for Late-News Papers). Notification of acceptance will be e-mailed by February 6, 2018 (February 19 for Late-News papers). Authors of accepted papers will be directed to an on-line "Author's Kit" with instructions for the preparation of the paper to be published in the Symposium Digest. The paper shall consist of four pages, including all illustrations, and is due March 5, 2018 (March 19 for Late-News papers).

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Speaker Responsibilities

All costs associated with your participation at Display Week as a speaker or invited speaker will be at your own expense (including travel, housing, registration fee, etc).

Display Week 2018 Features

- Technical Symposium
- Special Focus Topics
- Poster Session
- Keynotes
- Invited Papers
- Distinguished Papers
- Author Interviews
- Short Courses
- Technical Seminars
- Awards Banquet
- Annual Awards Luncheon
- Best-in-Show Awards
- I-Zone
- Exhibition
- Vendor Forum
- Business Conference
- Investors Conference
- Market Focus Conferences
- Investors Conference
- Market Focus Conferences

Student Travel Grants

A limited number of student travel grants, up to \$1000 each, will be made available to student presenters of accepted papers. A student travel grant must be requested upon submission of abstracts by checking off the appropriate box on the online submission site. A questionnaire will automatically be generated. Please complete the questionnaire. Only students who submit the questionnaire will be eligible to receive a student travel grant. The deadline for the submission of abstracts is December 1, 2018; January 19, 2018 for late-news submissions.

Deadlines and Key Dates

Abstracts/Summaries	Dec. 1, 2017
Late-News Abstracts/Summaries	Jan. 19, 2018
Accept/Reject Letters	Feb. 9, 2018
Late-News Accept/Reject Letters	Feb. 16, 2018
Digest Paper Submission	Mar. 2, 2018
Late-News Digest Submission	Mar. 16, 2018
Display Week 2018	May 20–25, 2018
Sunday Short Courses	May 20, 2018
Monday Technical Seminars	May 21, 2018
Business Conference	May 21, 2018
Investors Conference	May 22, 2018
Market Focus Conferences	May 22 & 23, 2018
Exhibition	May 22–24, 2018
Vendor Forum	May 22–24, 2018
Symposium	May 22–25, 2018