

IDW '18 - The 25th International Display Workshops

December 12-14, 2018
 Nagoya Congress Center, Nagoya, Japan
 Sponsored by
 The Institute of Image Information and Television Engineers
 The Society for Information Display
<http://www.idw.or.jp/>



FEATURES

IDW consists of workshops technically categorized into specialized fields playing important roles in information display technologies. This year one workshop will be held as a topical session. Each workshop organizes its own sessions which consist of oral presentations by invited/contributing speakers and poster presentations where detailed and fruitful discussions on each specialized R&D update are provided. Some workshops also come together to form the common sessions called "Special Topics of Interest". The workshops should be of interest not only to researchers and engineers, but also to those who manage companies and institutions in the information display community.

CONFERENCE SITE

The city of Nagoya is located in the center of Honshu, the main island of Japan, and has good access to Tokyo, Kyoto, Osaka and all other areas. Central Japan International Airport (Centrair) is the gateway of Central Japan to the sky, and is only about 30 minutes away from Nagoya station by rail. Nagoya is famous for the birthplace of three notable feudal lords, Oda Nobunaga, Toyotomi Hideyoshi, and Tokugawa Ieyasu, who were active figures in the 16th century. The city has a great heritage including Nagoya castle, Atsuta shrine, Tokugawaen, and so on. In Nagoya, traditional industries like ceramics and textiles, and today's key industries such as automobiles, aviation and machine tools have developed. Nagoya is a city playing an important role not only in Japan's industrial society but also its history, culture, and more. The Nagoya Congress Center, with a design motif of a swan poised for flight, is located about 6 km from Nagoya station, and is accessible from Nagoya station in about 20 minutes by subway and a further 5 minutes on foot.

Please see the following websites for more information.
<http://www.nagoya-info.jp/en/>
<http://www.nagoya-congress-center.jp/en/>

DEADLINES AND KEY DATES

Submission of Technical Summary----- June 20, 2018
Acceptance Notification/Author's Kit available on the website
 ----- July 19, 2018
Presenter's Registration ----- September 11, 2018
Submission of Camera-Ready Manuscript & Abstract
 ----- September 11, 2018
Submission of Late-News Paper ----- October 1, 2018
Acceptance Notification of Late-News Paper ----- October 17, 2018
Late-News Presenter's Registration ----- October 25, 2018

LANGUAGE

The official language is English.

Topical Session

- *User Experience and Cognitive Engineering*

Keynote Addresses

- *Human Visual Processing in Driving*
Katsunori Okajima (Yokohama Nat. Univ.)
- *OLED, Change Your Lifestyle*
SooYoung Yoon (LG Display)
- *Touching with Feeling:*
Integrating Haptics with Touch Display
Ed Colgate (Northwestern Univ.)

Additional plenary talks could be added.
 Please see our website for the detailed information.

The titles are tentative.

Special Topics of Interest

- *Oxide-Semiconductor TFT*
- *Quantum Dot Technologies*
- *AR/VR and Hyper Reality*
- *Automotive Displays*
- *Wide Color Gamut and Color Reproduction*
- *Haptics Technologies*

Paper submissions are eagerly recommended to these special topics.

SHORT PRESENTATION

"Short Presentation Session" for poster presenters to be introduced as part of e-Paper, projection and large area displays, and user experience and cognitive engineering sessions!

The latest information is available on <http://www.idw.or.jp/>

The Advance Program will be available in September 2018, including REGISTRATION and HOTEL INFORMATION.

IDW SCOPE AND OUTLINES

International Display Workshops (IDW) includes a variety of topics and aspects of display technologies, systems, processes and applications. In particular, this year's IDW will feature the following 6 special topics and 1 topical session, which are extremely timely, as well as 14 general topics. The special topics are these recent hot topics: Oxide-Semiconductor TFT, AR/VR and Hyper Reality, Quantum Dot Technologies, Automotive Displays, Wide Color Gamut and Color Reproduction and Haptics Technologies. The topical session is topic for new technology: User Experience and Cognitive Engineering. The IDW Scope includes a variety of topics of display materials and components, display devices, electronic system, quality evaluation, interactive technologies, manufacturing processes and equipment, and applications listed below. We encourage the submission of original papers on all aspects of research, technical development, measurement systems, driving methods, data management and applications of information displays, and related technologies. We particularly encourage submissions on topics of emerging interest in the research and development communities.

SPECIAL TOPICS OF INTEREST

Oxide-Semiconductor TFT

*Organizing Workshops: AMD, FMC and FLX
Facilitator: Mutsumi Kimura (Ryukoku Univ.)*

Recently, research and development on metal-oxide semiconductors have been carried out worldwide. Currently, a-IGZO TFTs have already been mass produced for use in AM-LCDs, and AM-OLEDs. This special topic will cover all aspects of science and technologies for oxide-semiconductor TFTs.

Scopes

- 1) Materials, device physics, illumination instability, degradation, fabrication processes, and production equipment
- 2) Display backplanes for LCD, OLED displays and e-Paper, circuits, and embedded systems
- 3) Flexible devices, transparent electronics, sensors, and other applications

Quantum Dot Technologies

*Organizing Workshops: LCT, FMC, PH, OLED and MEET
Facilitator: Toshiaki Ikuta (JNC)*

This topic will cover all aspects of science and technologies of Quantum Dot (QD) and Quantum Rod (QR), ranging from materials research, device structure and properties, to device applications, manufacturing and high color gamut displays using QD/QR.

Scopes

- 1) Materials and properties for display or lighting

- 2) Novel Device structure and properties (QDCF, QLED, etc.)
- 3) New Device applications (Lighting, BLU, Display, etc.)
- 4) Device manufacturing processes (Inkjet, Roll to Roll, Photolithography, etc.)
- 5) High color gamut technology using QD/QR

AR/VR and Hyper Reality

*Organizing Workshops: LCT, FMC, 3D, VHF, PRJ, DES, INP and UXC
Facilitator: Yuji Oyamada (Tottori Univ.)*

This topic will cover all aspects of technologies related to display applications closest to the end user such as virtual reality, augmented reality (mixture of VR and the real world), and hyper reality (hyper-realistic systems). Regarding recent development of VR devices, authors of all accepted papers are highly encouraged to present their demo in the 1-DEMO session.

Scopes

- 1) Hardware: sensors, circuits, and displays including light field camera, motion capture, holographic technology, and HMD/HUD
- 2) Software technique: image processing, computer vision, computer graphics, audio-visual processing, and human-computer interaction
- 3) Application: systems for industry, medical, and education
- 4) The human factor in AR, VR, and hyper-realistic systems

Automotive Displays

*Organizing Workshops: LCT, FMC, OLED, 3D, VHF, PRJ, DES, FLX, INP and UXC
Facilitator: Kazumoto Morita (Chuo Univ.)*

The significance of visual interface has been increasing in automobiles. This topic will cover all aspects of display technologies used in- or outside of automobiles, including the following scopes.

Scopes

- 1) OLED/LCD display and projection-display technologies for car interior use

- 2) Head-up displays, augmented reality, and intelligent cockpit for automobiles
- 3) Image and information processing for automotive displays
- 4) Materials/components/device structures suited to automobiles
- 5) Adaptive headlight system, and projection type signals for other road users
- 6) Vision and human factors for automobiles and other transport systems

Wide Color Gamut and Color Reproduction

*Organizing Workshops: FMC, 3D, VHF, MEET and DES
Facilitator: Kenichi Takatori (Huawei Techs. Japan)*

Wide color gamut (WCG) is a fundamental desire. Recent progress in materials, components, displays and systems help create truly colorful lives. The WCG-related standardizations and evaluations are progressing after BT.2020 color space and CIE2015 color-matching function. In addition, quantum dot (QD) related technologies are covered in "Quantum Dot Technologies".

Scopes

- 1) Materials and components for WCG
- 2) WCG displays/projectors and systems
- 3) Color gamut expansion/conversion technology and its evaluation
- 4) High-fidelity color reproduction/calibration technology and its evaluation
- 5) Relative color reproduction technology and its evaluation
- 6) WCG-related standardization and its trends

Haptics Technologies

*Organizing Workshops: VHF, DES, INP and UXC
Facilitator: Haruhiko Okumura (Toshiba)*

This topic will cover all aspects of technologies related to Haptics technologies, including the following scopes.

Scopes

- 1) Haptic interface design & control
- 2) Tactile displays haptics technologies

- 3) Haptic sensors and actuators
- 4) Human-computer interaction involving haptics
- 5) Multi-modal systems involving haptics
- 6) Tele-operation and virtual environments
- 7) Haptic rendering and modeling
- 8) Human haptic perception
- 9) Neuroscience of touch

TOPICAL SESSION

User Experience and Cognitive Engineering

Session Chair: Mikihiko Mori (Hosei Univ.)

This topic will cover all aspects of social studies, cognitive science, and human-computer interaction that aim to open new directions for displays.

Topic Areas

- 1) Ethnography and social studies
- 2) Survey and analysis of user needs

- 3) Cognitive experiments and design of displays
- 4) Novel interaction techniques and interactive applications
- 5) Computer-supported cooperative work (CSCW) using displays
- 6) Digital reading applications and educational software
- 7) Entertainment computing and media art

TOPICS OF IDW SCOPE

3D/Hyper-Realistic Displays

This topic will cover several current topics encompassing 3D/hyper-realistic displays, systems and other related technologies.

Topic Areas

- 1) Stereoscopic, autostereoscopic, holographic, volumetric, head-mounted and other 3D/hyper-realistic display technologies and systems
- 2) Immersive, interactive and VR display technologies and systems
- 3) 3D/hyper-realistic image interaction technologies and systems for Augmented Reality (AR)
- 4) Multiple cameras, light-field camera, depth camera, 3D scanner, and other detection systems for 3D, hyper reality and interaction
- 5) New output devices or systems for 3D, hyper reality and interaction
- 6) Digital archive systems for 3D or hyper reality
- 7) 3D/hyper-realistic image coding, 2D to 3D conversion, multi-viewpoint representation and other 3D/hyper-realistic image processing
- 8) Human factor and evaluation of 3D/hyper-realistic display techniques and systems

Active-Matrix Displays

This topic will cover all aspects of active matrix displays.

Topic Areas

- 1) Active-matrix displays based on liquid crystals, organic/inorganic light-emitting diodes, electrophoresis, electrochromism, field emission, micro-electro mechanical systems
- 2) Active devices including oxide TFTs, organic TFTs, silicon-based TFTs, CNT-FETs, Dirac-cone based devices (graphene, silicene, BN, MoS₂, etc.) and solution-processed devices
- 3) Issues in high-resolution/large-area active matrix display and devices including array and circuit design technologies, addressing schemes, systems, fundamentals, device physics, structures, processes, new materials, evaluation methods, reliability and mechanical testing
- 4) Novel emerging active-matrix displays and devices
- 5) Novel applications of active-matrix devices including touch, imaging, and any other sensors, flexible displays, curved/bendable displays, micro displays, wearable displays and digital signage

Display Electronic Systems

This topic will cover all aspects of electronic systems including hardware as well as software on all kinds of displays.

Topic Areas

- 1) Driving methods, circuits and systems for AMOLEDs and LCDs
- 2) Video processing including deinterlace, scaling and elimination of artifacts and blur
- 3) High quality color reproduction systems including high dynamic range and wide color gamut systems
- 4) High-fidelity systems such as professional use and master monitors
- 5) Exploration of future standards such as post-HDTV
- 6) Video interface technologies including data transmission and storage
- 7) Novel display systems including mobile/auto applications
- 8) Cooperative operations of functional components
- 9) Circuit technologies including high speed and low power driving
- 10) High image quality display systems

Emissive Technologies

This topic will cover all aspects of science, technologies, and applications of phosphor, such as phosphor screens for electronic displays, lighting source, and other emissive devices, and will also deal with those for FEDs, CRT, ELDs including micro-LED displays, and PDPs.

Topic Areas

- 1) Fundamental mechanisms and configurations
- 2) Modeling and simulation
- 3) Materials, components and fabrication processes
- 4) Field emission physics and characteristics
- 5) Inorganic ELDs including micro-LED displays (materials, process, devices, drive circuits, etc.)
- 6) LEDs including micro-LEDs (materials, devices, panels, lighting, etc.)
- 7) Quantum dots and other quantum-structured devices
- 8) Phosphors for CRTs, PDPs, FEDs, VFDs and LEDs
- 9) Driving technologies and signal processing
- 10) Picture quality, reliability and lifetime
- 11) Applications of CRTs, PDPs, FEDs and ELDs

e-Paper

This topic will cover all aspects of electronic paper ranging from materials science and devices to human factors and various applications for the future.

Topic Areas

- 1) Advancement of various display technologies for e-Paper to enhance colors, brightness and contrast ratio
- 2) Novel functional materials and components
- 3) Driving method
- 4) Human interfaces suitable for e-Paper from paper-like displays to tablet PCs
- 5) Various applications of e-Paper such as e-Books, e-Document, and IoT
- 6) Discussion of the social impact of e-Paper
- 7) Evaluation method taking account of human factors

Flexible Electronics

This topic will cover all aspects of flexible electronics, including material science, device physics, fabrication processes, and application systems for next-generation technology.

Topic Areas

- 1) Novel flexible devices in display and non-display fields
- 2) Flexible/stretchable mechanism and strategy
- 3) Flexible substrate innovation (plastic film, metal foil, ultra-thin glass sheet, textile, paper, etc.) and encapsulation
- 4) Excellent transistors in flexible organic/inorganic electronics
- 5) High-performance display principles (OLED, LCD, electronic paper, etc.)
- 6) Fabrication methods especially for flexible devices (printing techniques, roll-to-roll process, transfer techniques, etc.)
- 7) Tolerance evaluation for bending and stretching deformation
- 8) Revolutionary device applications (bendable, foldable, roll-up screen, hanging, wearable, wrapping usages, etc.)

Interactive Technologies

Touch panel technology continues to evolve. Camera systems are often employed in auto-stereoscopic displays. Sensing and displaying 3D positions in space literally open a new dimension for a truly intuitive human interface. This topic covers all aspects of input technologies related to displays, ranging from materials, devices, application systems to discussions on how we interact with various systems.

Topic Areas

- 1) Out-cell, On-cell and In-cell touch panels
- 2) Touch panel materials, devices, production processes and systems
- 3) Image sensors
- 4) 2D, 3D imaging devices and systems
- 5) Adaptive and personalized interfaces
- 6) Input systems for augmented reality
- 7) Human-computer interaction and other emerging interactive technologies

Human Factor

This topic will cover all aspects of vision and human factors related to information displays, such as visual ergonomics and requirements, image quality, display measurements, as well as new display applications and ergonomics.

Topic Areas

- 1) Visual requirements for display performance: luminance, contrast, grayscale, color, resolution, frame rate, viewing angle, etc.
- 2) Display image format for better visual experience, such as UHD TV
- 3) Analysis and improvement of image quality on displays, such as HDR, high-quality color reproduction, wide gamut, or moving image artifacts
- 4) Evaluation of image quality, such as subjective evaluation of new displays, or quality-improvement methods
- 5) Display measurement methods relevant to human factors
- 6) Ergonomics of new display applications, such as AR/VR systems, automotive visual systems, 3D displays, LED backlights, etc.
- 7) Visual ergonomics, such as visual fatigue, eye strain, legibility/usability, or actions/behaviors related to visually displayed information

Liquid Crystal Science and Technologies

This topic will cover all aspects of liquid crystal (LC) science and technologies, including LC material science, device technology, fabrication processes, evaluation method, and new technologies for display, photonics, and sensing applications.

Topic Areas

- 1) Physicochemical studies of LC materials
- 2) Nano-structural LC alignment and devices including blue phase
- 3) Surface alignment processes and characterization techniques
- 4) Electro-optic effects, display modes, optical design and simulations including 3D technologies
- 5) Fabricating, manufacturing, measuring and evaluation techniques
- 6) High performance displays featuring excellent image quality
- 7) Color filter and rendering technologies
- 8) LC technologies for flexible displays and electronic papers
- 9) Optical functional devices for non-display applications including LC lens and sensor
- 10) LC semiconductors and organic electronics
- 11) LC photonic crystals and lasers
- 12) LC technologies for 3D/holographic display

Manufacturing, Process and Equipment

This topic will cover technology trends and aspects of electronic displays from the perspective of manufacturing and printing fabrication processes.

Topic Areas

- 1) Fabrication methods of displays
- 2) Manufacturing process; photolithography, coating and printing technologies, soft lithography, roll-to-roll process and transfer techniques for high precision, and large area
- 3) Measurement and evaluation equipment

Materials and Components

Displays are sustained by a wide spectrum of advanced materials and components. In this topic, new materials and components for display systems, modifications and improvements of the existing systems are treated.

Topic Areas

- 1) Novel materials and components for display systems
- 2) Technology trends in panel structure and display systems
- 3) Manufacturing of optical components, devices or systems, and color filter technologies
- 4) Novel material and component technologies in automotive, avionics, shipboard, transparent, signage and simulator displays
- 5) LED/micro-LED/OLED/emissive source materials; quantum-dot/phosphor, lighting fixtures components, electro-optic devices and materials
- 6) Display lighting materials/components and fabrications, including light directing films
- 7) New developments in backlight unit (BLU) and frontlight unit (FLU) for transmissive, reflective, and transreflective displays
- 8) Innovative technologies on material and component for 3D (stereoscopic, volumetric, holographic, light field) displays, AR/VR, flexible electronics, ultra-high resolution, EPD and MEMS/MEOMS

SPECIAL EVENT

An exhibition focused on "Projection Mapping" technologies and related technical sessions will be held. Technology demonstrations by invited industry and academia participants will showcase the latest developments driving the next generation of interactive display systems. Come to IDW '18, where leading researchers and developers from around the world discuss, learn about, and share the latest developments.

EXHIBITION

The IDW '18 Exhibition covers display devices and all related matters. To make an exhibition, please contact the IDW '18 Secretariat.

OLED Displays and Organic Devices

This topic will cover all aspects of science and technologies of OLED, ranging from materials research and basic device physics to display including backplane technologies and other applications.

Topic Areas

- 1) Materials for organic devices (OLED, OTFT, OLET, QLED)
- 2) Device physics and related phenomena of organic devices
- 3) Backplane technologies for OLED applications
- 4) Fabrication processes for organic devices
- 5) Miscellaneous topics related with organic devices
- 6) Fundamental mechanisms and configurations of organic devices
- 7) OTFT for OLED displays
- 8) Organic light-emitting transistors (OLET)
- 9) Quantum-dot light-emitting devices (QLED)
- 10) OLED for lightings
- 11) Flexible organic materials and devices for OLED

Projection and Large Area Displays

This topic will cover all aspects of science, technologies and applications of projection, large area displays and the components.

Topic Areas

- 1) Projectors (conventional, pico, embedded, laser scanning, projection TV)
- 2) Intelligent display (wearable, near-eye, AR&VR, applications)
- 3) Microdisplay (LCOS, MEMS, HTPS) technologies for projection
- 4) Optics and optical components (light sources, screens, lenses, mirrors, films, etc.) for projection
- 5) Algorithms for image processing and artifact mitigation for projection and large area displays
- 6) Applications such as digital cinema, 3-D projection, 3-D measurement, signage, interior illumination, medical health care, and vehicle display systems including head up display, intelligent cockpit, and adaptive headlight
- 7) Large-area displays, tiled-displays, and projection mapping systems
- 8) Sensing applications (ToF, LIDAR, Machine Vision, etc.) in projection technology

MEMS

This topic will cover all aspects of science and technologies of MEMS for future displays, imaging devices, and related electron devices, ranging from materials research and basic device physics to display and other applications.

Topic Areas

- 1) Displays, imaging devices and other optical and electron devices using MEMS
- 2) Optical MEMS such as optical scanners, optical switches, optical mirrors, optical space modulators, optical filters, etc.
- 3) Sensors and actuators
- 4) Materials, components and fabrication processes
- 5) Fundamental mechanisms and configurations

I-DEMO (Innovative Demonstration Session) for all oral and poster presenters:

I-DEMO (Innovative Demonstration Session) offers an opportunity for an interdisciplinary technical demonstration/discussion in a larger space, and more preparation and demonstration time than in the Author Interviews.

You can present impressive and innovative display experiences to all participants aimed at deeper discussion. This year, we will introduce a pre-conference review system to decide the allotment of demonstration spaces due to the limited demo space available. Further details about I-DEMO including the review method will be announced on the following page soon.

<http://www.idw.or.jp/ideo.html>

PAPER SUBMISSION

INSTRUCTIONS FOR SUBMISSION OF TECHNICAL SUMMARY

Submit a Technical Summary in PDF format without any security option via the conference website:

<http://www.idw.or.jp/authinfo.html>

Follow the submission instructions given on the website and shown below. The Technical Summary will be used only for evaluation and will not be published. The title of the accepted papers, the authors and their affiliations will be published in the Advance Program.

I. Technical Summary Guidelines

The file must be formatted to A4 page size. Details of the format and guidelines are described in the sample file available on the website (<http://www.idw.or.jp/authinfo.html>).

The file must contain one or two pages of text in **one column**, with additional pages for figures/tables/photographs. The following items must be included:

- (1) **Paper title**
- (2) **Names of all authors with their affiliations:** The name of the presenting author must be underlined.
- (3) **Abstract:** 50 words or less, highlighting the focus of your paper.
- (4) **Presentation style preference:** Indicate if you wish to have your paper considered for oral or poster presentation.
- (5) **Preference of Topics of Scope/Special Topics of Interest:** Indicate the closest matching Topics.
- (6) **The body of the Technical Summary:** Include the following:
 - (a) **Background and objectives:** Introduce the subject and describe the goal of your work.
 - (b) **Results:** Describe specific results. Illustrations to highlight your work are encouraged.
 - (c) **Originality and novelty:** Clearly describe any new and/or emphasized points to illustrate the originality and novelty of your work.
 - (d) **Impact:** Discuss the significance of your work and compare your findings with previously published works.
 - (e) **References:** List references cited in the Technical Summary.
 - (f) **Prior publications:** The paper must be an original contribution. If you have published or presented material for similar work, explain how the present material differs from them.

II. Online Submission

Access <http://www.idw.or.jp/authinfo.html>

The submission procedure consists of three steps:

- (1) **Questions to authors:** Select the number of authors/affiliations and the maximum number of affiliations for one author.
- (2) **Paper title & author information:** Enter the paper title, the names of all authors, all affiliations, information about the presenting author, the Scope/Special Topics of Interest name and presentation style preference. Please understand that the title may be edited by the program committee.
An acceptance/project notification will be sent to you via the e-mail address that you provided on the website.
- (3) **Confirmation & submission:** Please take time to review the paper title and the author information carefully as mistakes cannot be rectified after the file is uploaded. Select a file name of the Technical Summary to submit to our server. When the file is successfully uploaded, a "FINISH" message will appear on the screen and you will also receive a submission confirmation e-mail.

FORMAT OF PRESENTATION

Accepted papers will be assigned for either oral or poster presentation in the most suitable topics among the IDW Scope/Special Topics of Interest, at the discretion of the program committee.

- (1) **Oral presentations**
 - Oral presentations will usually conform to the 20-minute format

including a question and answer period. The program committee will determine the duration of each presentation.

- Oral presenters are strongly urged to attend the Author Interviews after the presentation (a table and AC 100 V power will be made available).

- (2) **Poster presentations**

- Poster presentations will conform to the less than 3-hour format and will be given in front of an individual poster on a board.
- A table and AC 100 V power will be available for each poster.
- "Short Presentation Sessions" will be held for a part of the poster sessions to introduce the posters and the presenters. The poster presenters in the sessions can give a brief, (typically 1 minute) oral-presentation with no discussion time.

ACCEPTANCE

The author will be notified of the results of their Technical Summary review via e-mail. Upon acceptance of the paper based on the Technical Summary, the authors must prepare a camera-ready manuscript to be published in the conference proceedings. The author must use the manuscript template, which will soon be available on the conference website. Acceptance is subject to the following conditions:

- (1) Registration of the presenter's participation in IDW '18 is required before the camera-ready submission.
- (2) Each presentation requires a registration fee. Payment of registration fees must be completed by the camera-ready submission.
- (3) Contact the IDW secretariat if you will give multiple presentations for more than one paper.
- (4) All company or government releases must be obtained.
- (5) The author must be the copyright holder or have written permission from the copyright holder for any materials used in the paper.
- (6) The paper submitted to the conference proceedings must not be published in any media, including personal websites on the Internet, before it is presented at the conference.
- (7) One of the authors must give a presentation at the conference. For the poster session, at least one of the authors must stand by their posters during their core time, which will be set in the session.
- (8) Note that the acceptance may be withdrawn in the case of inferior camera-ready manuscripts.
- (9) The camera-ready manuscript must be three or four pages in length and in a two-column format.

LATE-NEWS PAPERS

A limited number of late-news papers on very important new findings or developments can be accepted. Authors are requested to submit a 2-4 page camera-ready manuscript on A4-sized paper accompanied by an abstract. Access the conference website (<http://www.idw.or.jp/authinfo.html>) and follow the submission instructions given there.

COPYRIGHT

The copyrights of your submitted camera-ready manuscript will be transferred to ITE and SID. The copyright terms and conditions are available on the conference website (<http://www.idw.or.jp/copyright.pdf>).

TRAVEL GRANTS

A limited number of travel grants will be available to full-time student presenters attending from outside Japan. Check the travel grant application box of the online submission mentioned above.

IDW Best Paper Award, IDW Outstanding Poster Paper Award and Demonstration Award

The award committee of IDW will select the most outstanding papers and demonstration from those presented at IDW '18. The winners will be announced on the IDW website.

Invited Talks

- **Advantage of 10,000 cd/m² with 8K HDR TV**
Toshiyuki Ogura (Sony Visual Products)
- **Human Factors in HDR TV and Color Gamut Volume**
Youngshin Kwak (Ulsan Nat. Inst. of S&T)
- **Ergonomic Requirements for Virtual Reality System and Content**
Takashi Kawai (Waseda Univ.)
- **Multimodal Neuroimaging to Visualize Brain Networks for 3-D Object Perception**
Sunao Iwaki (AIST)
- **Nanocolumns LED for Monolithic Micro-LED Display**
Katsumi Kishino (Sophia Univ.)
- **High Performance LCD Technology for 3D-HUD**
Yoshiki Tanaka (Kyocera Display)
- **3D Head-Up Display System**
Yasuhiro Takaki (Tokyo Univ. of A&T)
- **Structurally Simplified LC Millimeter-Wave Phase Shifter Based on Microstrip Line**
Toshiaki Nose (Akita Pref. Univ.)
- **Sunlight-Readable Low-Reflection FFS-LCD**
Yuichi Kawahira (Sharp)

The titles are tentative.
Additional invited talks are being arranged.

OVERSEAS ADVISORS

Brian H. Berkeley	(Highlight Display, USA)	Hoi-Sing Kwok	(Hong Kong Univ. of S&T, Hong Kong)
Janglin Chen	(ITRI, Taiwan)	Chung-Chun Lee	(BOE Tech. Group, China)
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Amal Ghosh	(eMagin, USA)	Kalluri R. Sarma	(Honeywell Int., USA)
Min-Koo Han	(Seoul Nat. Univ., Korea)	Han-Ping D. Shieh	(Nat. Chiao Tung Univ., Taiwan)
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Jin Jang	(Kyung Hee Univ., Korea)	Baoping Wang	(Southeast Univ., China)
Yong-Seog Kim	(Hongik Univ., Korea)	Larry F. Weber	(Consultant, USA)

CHAIRS

General Chair	Executive Chair	Program Chair
Akiyoshi Mikami (Kanazawa Inst. of Tech.) general-chair18@idw.or.jp	Yuzo Hisatake executive-chair18@idw.or.jp	Hideya Kumomi (Tokyo Tech) program-chair18@idw.or.jp

WORKSHOPS AND CHAIRS

All of the IDW topics will be organized by following workshops.

LCT LC Science and Technologies	: Shoichi Ishihara (Osaka Inst. of Tech.)
AMD Active Matrix Displays	: Masahide Inoue (Huawei Techns. Japan)
FMC FPD Manufacturing, Materials and Components	: Hirotsugu Yamamoto (Utsunomiya Univ.)
PH Inorganic Emissive Display and Phosphors	: Yoichiro Nakanishi (Shizuoka Univ.)
OLED OLED Displays and Related Technologies	: Takahiro Komatsu (JOLED)
3D 3D/Hyper-Realistic Displays and Systems	: Masaru Tsuchida (NTT)
VHF Applied Vision and Human Factors	: Shin-ichi Uehara (Asahi Glass)
PRJ Projection and Large-Area Displays and Their Components	: Satoshi Ouchi (Hitachi)
EP Electronic Paper	: Keisuke Hashimoto (E Ink Japan)
MEET MEMS and Emerging Technologies for Future Displays and Devices	: Masayuki Nakamoto (Shizuoka Univ.)
DES Display Electronic Systems	: Haruhiko Okumura (Toshiba)
FLX Flexible Electronics	: Toshihide Kamata (AIST)
INP Touch Panels and Input Technologies	: Nobuyuki Hashimoto (Citizen Watch)
UXC User Experience and Cognitive Engineering	: Mikihiko Mori (Hosei Univ.)



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Secretariat: c/o Bilingual Group Ltd.
3-3-6 Kudan Minami, Chiyoda-ku, Tokyo 102-0074, Japan
Phone: +81-3-3263-1345 Fax: +81-3-3263-1264 E-mail: idw@idw.or.jp
<http://www.idw.or.jp/>