

IDW '15

December 9-11, 2015
Otsu Prince Hotel
Otsu, Japan

The 22nd International Display Workshops

SPECIAL ADDRESS

Lighting the Earth by LEDs



Nobel Laureate

Hiroshi Amano
Nagoya Univ., Japan

KEYNOTE ADDRESSES

Interactive Contents and Interface Technologies

Interactive **Yoshifumi Kitamura**
Tohoku Univ., Japan

Global Business for Mobile Device

Mobile **Juvenal Chu**
Huawei Device, China

INVITED ADDRESS

*Information Flow of Things:
A Framework for Distributed,
Scalable and Realtime Processing
of IoT Data Streams*

IoT **Keiichi Yasumoto**
NAIST, Japan

HIGHLIGHTS OF IDW '15

The 22nd International Display Workshops will be held as IDW '15 for encouraging aggressive research and development of display technologies throughout the world and especially in the Asian region. IDW '15 focuses on the following four special topics, which are extremely timely, as well as fourteen active workshops.

The three-day conference will feature 365 papers, including 2 Keynote addresses, 1 Invited address, 101 invited papers and 121 oral presentations, and 140 poster presentations. Following plenary session of Keynote and Invited addresses in the Wednesday morning, presentations will begin and continue in 7 parallel oral sessions through Friday. Poster sessions and author interviews and demonstrations will enable participants to discuss topics in detail. IDW '15 will also present "IDW Best Paper Award" and "IDW Outstanding Poster Paper Award" based on originality and technical significance to information displays. This year, special address will be given by Nobel Laureate, Prof. Hiroshi Amano of Nagoya University, in the Wednesday evening. Exhibits by universities and display industry-related businesses will also be featured from Wednesday to Friday in parallel with workshops.

IDW '15 should be of interest to not only researchers and engineers, but also managers of companies and institutions in the display community.

365

Papers

Late-news papers will be arranged.

Special Topics

"Oxide-Semiconductor TFT"

"Augmented Reality and Virtual Reality"

"Lighting Technologies"

"Printed Electronics"

Last Year's IDW

Date: December 3-5, 2014
Site: Toki Messe Niigata
Convention Center, Niigata, Japan
Number of Attendees: 1188
from 18 countries and regions
Number of Papers: 480



Conference Site

LATE-NEWS PAPERS

**Submission Deadline
September 24**

Registration Fee

Early-Bird Discount until Oct. 30

ITE/SID/ASO Member ¥40,000

Non Member ¥50,000

Student ¥13,000

Registrations received on and after October 31 will be charged an additional ¥10,000 for Member and Non-Member registrants and ¥2,000 for Student registrants.

Sponsors

The Institute of Image Information and Television Engineers
The Society for Information Display

IDW '15 Secretariat

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**Advance Program, Online Registration and Hotel Information
are available from the official web site.**

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



Program Highlights

Special Topics of Interest: Oxide-Semiconductor TFT

Oxide TFTs are not only one of the most promising technologies in electronic displays but also could become key devices in all general electronics. In this IDW, you can hear many presentations on brand-new technologies, such as material, device structure, fabrication processes, transistor performance, reliability, and applications, from domestic and international university, institute, and companies. No OXT, no success! However, you will be lucky because you will get all the useful information you need once you attend IDW.

Special Topics of Interest: Augmented Reality and Virtual Reality

In recent years, augmented reality (AR) and virtual reality (VR) applications have made substantial progress, benefiting from high-performance display devices, sensors, cameras with tracking capabilities, and computer graphics technologies. The FMC-WS session will present recent trends in 3D display, e.g., holographic display and retro-reflective imaging. The INP-WS session will cover new topics such as Real-world oriented UI (for making everything interactive) and interactive technologies (for designing everything in the world). The DES-WS session will introduce display techniques for the visualization of AR and VR. The talks cover various fields and thus can provide you different perspectives on display techniques. The PRJ-WS session focuses on wearable applications in AR and VR, typified by head-mounted displays. The two-session 3D-WS will highlight 3D and hyper-realistic display systems and floating and omnidirectional display systems. The 3D-WS and VHF-WS have co-organized the session, Autostereoscopic and Head-Mounted Displays, that focuses on 3D display-related topics as well as vision and human factors.

Special Topics of Interest: Lighting Technologies

The Lighting Technologies of STI will cover all aspects of science and technologies of lighting including LED lighting, OLED lighting, flexible lighting, manufacturing of lighting, lighting materials, device structures for lighting and internal or external efficiency enhancement technologies. A highlight for IDW '15 will be the presentations on innovative high directional LED lighting devices combined with the holographic technology, development of a red phosphor with a narrow line spectra for general lighting and LCD backlights with high brightness and color quality (PH-WS), and OLED lighting technologies with high color rendering, light-outcoupling and color conversion methods (OLED-WS).

Special Topics of Interest: Printed Electronics

Printing technologies are opening up a new era of electronic devices with their high productivity, low cost, large scale and low environmental-burden fabrication advantages. Printed Electronics, a Special Topics of Interest from the last year, will cover all aspects concerning printed electronics from scientific and technological viewpoints. This year, three Work Shops (AMD, OLED, FLX) will hold oral sessions including solution-processed organic and oxide TFTs (AMD), the printed layer structure with white emission using an all phosphorescent system, soluble emitting material and film formation technologies (OLED), solution-processed superlattice transistors and fluorinated polymer for printed electronics (FLX).

LC Science and Technologies (LCT)

The LCT workshop covers topics from fundamental studies to recent developments in LCD technologies and LC materials. The special notes of this year are the five invited presentations related to high resolution LCD technologies, photo alignment technologies, new LC materials for FFS-mode LCDs and new autostereoscopic 3D displays. Moreover, new LC technologies, such as LC lenses, and flexible displays will be presented.

Active Matrix Displays (AMD)

The AMD workshop covers Si-TFT, oxide TFT, organic TFT, OLED, and sensors. Recent paper presentations tend to focus on oxide TFT, which may be expected to play a role in applications for higher definition LC and OLED displays than 8k4k or 800 ppi. We highlight the oxide TFT as a special topic of interest (STI) with five dedicated sessions covering a wide area from materials, physics, devices, and processes to applications. Furthermore, we have prepared one session on printed electronics STI. We look forward to your participation!

FPD Manufacturing, Materials and Components (FMC)

The FMC workshop covers recent developments and achievements in the fields of flat panel display technologies that include materials, components, display panel manufacturing and measurement. The oral presentations contain more than 16 papers of which 8 are invited papers. In addition, more than 16 posters will be presented. Since display optics is a field with large number of innovations, a session is devoted to the issues and the developments in this field. Furthermore papers related to visible light communication, materials for visible light sources, materials for 3D holograms, medical display issues and innovations, optical film innovations, liquid crystal for high performance organic field effect transistors, and viewing angle control film will be presented. The FMC WS is supporting the AR/VR session devoted to special topics of interests, in which the recent trends in 3D will be presented.

EL Displays and Phosphors (PH)

This workshop presents the latest achievements in devices and phosphors for emissive displays, general lighting and liquid-crystal backlighting. Invited talks will present emerging technologies such as high-efficiency phosphors, quantum dots, lighting source and backlights.

Field Emission Displays, CRTs and Plasma Displays (FED)

This workshop thoroughly covers the fields of FED, CRT and PDP technologies. Recent progress in imaging devices and displays with field emitter arrays will be discussed. The invited talk will present a new promising electron source, a single-atom electron emission source for applications to electron microscopes. Additionally, fabrication processes, field emission characteristics and mechanisms, and applications to imaging devices under extreme conditions will be discussed. Since the invention of plasma displays in 1964, there has been much progress. Now, the PDP display technologies have stepped up to explore medical and biological applications. The characteristics of a flexible light source using PDP technologies will be presented.

OLED Displays and Related Technologies (OLED)

The OLED workshop covers all aspects of the science and technologies of OLED and other organic devices, ranging from material research, basic device physics to display including backplane technologies and other applications. The oral and poster sessions will cover OLED device technologies including Printed Electronics (PE) as STI, OLED lighting technologies (LIT), OLED evaluation technologies and materials. Recent progress such as R to R process technology, high performance OLED lighting, molecular orientation and thermally activated delayed fluorescent (TADF), and materials etc. will be reported.

3D/Hyper-Realistic Displays and Systems (3D)

This workshop focuses on recent progress in image capturing, processing and display technologies, high-quality image coding and transmission technologies, AR/VR technologies, and visual evaluation for 3D and hyper-realistic display systems. It covers dual/multiview stereoscopic image, autostereoscopic display, 2D/3D image conversion, holography and holographic elements, integral photography, light field processing and analysis, volumetric image, floating images, omnidirectional images, immersive visualization systems, depth and shape estimation, 3D scanners and printers, multi-/hyperspectral imaging, multiprimary and hyperspectral displays, crosstalk evaluation, visual depth and material perception, image coding and transmission, standardization, new optical components, and more for 3D/hyper-reality technologies. This year, some novel technologies will be presented as invited papers, such as 240 fps videos, super-multiview displays, floating displays and holograms. This workshop is intended to provide the audience with a good opportunity to understand the latest trends in these fields. We will also highlight AR/VR technology as a special topic of interest.

Applied Vision and Human Factors (VHF)

The VHF workshop covers all topics on vision, human factors, and image quality relating to information displays. The oral and poster sessions include lively discussions on the latest topics ranging from fundamental theories to applications. We have five VHF oral sessions on Display Metrology, Display Image Quality, Human Factors, Color and Vision, and Color Rendering, in addition to a VHF poster session. We also have a joint session with a 3D workshop on the theme of AR (Augmented Reality), and promising groundbreaking interdisciplinary discussions. Four invited talks will be given in the oral sessions, concerning metric for relative display gamut size, aging of eye and display design, observer metamerism in displays,

and the color rendering index required for UHD TV production.

Projection and Large-Area Displays and Their Components (PRJ)

The PRJ workshop covers the latest wearable applications, vehicle display technologies, head light, solid-state light sources, holograms, short throw optics etc., projection mapping, Augmented Reality (virtual reality), 3D measurement (Sensing and ADAS: Advanced Driving Assistant Systems) and all the projection technologies. This year, our session will focus on head mounted displays, wearable-related technologies, laser light sources, projection devices, speckle reduction, and dressed photon technology. Recent studies of advanced technologies such as automotive solid state light, lighting (ADB: Adaptive Driving Beam), virtual imaging for wearable, medical applications and the latest coherent LIDAR systems will be featured. There will be 26 presentations, 22-oral and 4-poster, including 9 invited presentations in total.

Electronic Paper (EP)

This workshop focuses on current topics in electronic paper including rewritable paper and flexible displays. Newly developed e-Paper technologies are now eagerly sought for emerging applications such as e-Books, e-Notes, electronic shelf labels, signage, and smart window. Various novel technologies such as electrophoretic, electro/thermo/ photo/gasochromics will be presented. There will also be reports on promising applications for e-Paper in offices. Systems, devices, materials, applications, and usability of e-Paper are expected to be enthusiastically discussed.

MEMS and Emerging Technologies for Future Displays and Devices (MEET)

The MEET workshop is unique in covering all aspects of MEMS, nanotechnologies and emerging technologies concerning future displays, imaging devices, and emerging electron devices. It seeks to broaden the horizon of display and imaging technologies into cutting-edge technologies. Research areas such as materials, basic physics and fabrication processes are included. Among all the MEMS and display conferences in the world, this is the only opportunity for MEMS and cutting-edge technology researchers to gather and discuss such devices. Authorities from top research institutions around the world in this field have been invited. Invited speakers are from MIT (QD Vision), Ecole Polytechnique, CEA-LETI, Brunel University, Kyung Hee University, 3M, NanoPhotonica, Merck, Ritsumeikan University, Tohoku University and Keio University. Together with contributed papers with high-quality content, this workshop is aimed at participants who wish to open up new fields in displays, imaging devices and emerging devices.

Display Electronic Systems (DES)

This workshop covers all aspects of display electronics and systems in relation to video data processing, interface technologies, and cooperative operations between display components such as cells and backlights and sensors. This year, we will have 20 papers including 10 invited talks and five poster presentations (excluding late-news). Sessions related to the transparent display technologies, vehicle display technologies, and the driving/low-power technologies for LCD/OLED are planned. We will also highlight various visualization technologies related to AR/VR as a STI.

Flexible Electronics (FLX)

FLX-WS is focusing on advanced technologies for flexible electronics including displays, wearable sensors, and IoT technologies, which are composed of a wide range of fields from materials science to practical applications. The sessions cover all aspects of the hottest flexible devices and material technologies including TFT fabrication, substrates, encapsulation, printing processes and evaluation techniques.

Touch Panels and Input Technologies (INP)

Interface technologies such as touch panels and interactive technologies are the stars of the session. AR/Interactive systems such as haptics and AR are special topics of INP. Computer vision and natural interface technologies are still important research topics of INP. This year, new topics will be presented: Real-world oriented UI which makes everything interactive and interactive technologies to design everything in the real world are special topics. INP papers will open a new window in displays and interactive technologies, not only for devices but also for systems, making them essential viewing.