

IDW '14

December 3-5, 2014
TOKI MESSE Niigata Convention Center
Niigata, Japan

The 21st International Display Workshops

KEYNOTE ADDRESSES

Recent Progress on 8K Super Hi-Vision

*Toru Kuroda
NHK, Japan*

Display Technologies in Mobile Applications

*John Hong
Qualcomm, USA*

INVITED ADDRESSES

Research and Development of Oxide TFTs

*Sang-Hee Ko Park
KAIST, Korea*

Ultraflexible Electronics Using Organic Devices

*Takao Someya
The Univ. of Tokyo, Japan*

HIGHLIGHTS OF IDW '14

The 21st International Display Workshops will be held as IDW '14 for encouraging aggressive research and development of display technologies throughout the world and especially in the Asian region. IDW '14 focuses on the following four special topics, which are extremely timely, as well as fourteen active workshops.

The three-day conference will feature 386 papers, including 2 keynote addresses, 2 invited addresses, 97 invited papers and 131 oral presentations, and 154 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. This year, IDW introduces "Innovative Demonstration Session", where you can see, feel and experience the originality and high innovativeness of new technologies in the accepted papers. Exhibits by universities and display industry-related businesses will also be featured from Wednesday to Friday in parallel with workshops.

IDW '14 should be of interest to not only researchers and engineers, but also managers of companies and institutions in the display community.

386

Papers

*Late-news papers will be
arranged.*

Special Topics

**"Oxide-
Semiconductor TFT"**

**"Augmented Reality
and Virtual Reality"**

**"Lighting
Technologies"**

"Printed Electronics"



Niigata City and TOKI MESSE

Registration Fee

Early-Bird Discount until Oct. 31

ITE/SID/ASO Member ¥35,000

Non Member ¥45,000

Student ¥8,000

Registrations received on and after November 1 will be charged an additional ¥10,000 for Member and Non-Member registrants and ¥2,000 for Student registrants.

LATE-NEWS PAPERS
Submission Deadline
September 25

Last Year's IDW

Date: December 4-6, 2013
Site: Sapporo Convention
Center, Sapporo, Japan
Number of Attendees: 1160
from 22 countries and regions
Number of Papers: 482

Sponsors

The Institute of Image Information
and Television Engineers

The Society for Information Display

IDW '14 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 have a long history going back for almost a half century, but they have been intensively investigated only since the first demonstration of amorphous oxide semiconductor TFTs in 2004, and have now become one of the hottest topics in backplane technologies for active-matrix FPDs. Although we were glad to see and touch the first commercial LCD products using the oxide TFTs in 2012 and the subsequent OLED televisions last year, there still remain many technical issues for further evolution toward better performance, high resolution, robust reliability, low fabrication temperature, and broader applications. In IDW '14, the latest achievements involved in the brand-new challenges of these issues will be found. Neither should you miss the brilliant invited talks given by world-leading researchers in oxide TFTs nor the contributed presentations with outstanding results.

Special Topics of Interest: Augmented Reality and Virtual Reality

In recent years, augmented reality (AR) and virtual reality (VR) applications have been making substantial progress with high-performance display devices and sensors including cameras with tracking capabilities and computer graphics technologies. In the 3D-WS sessions, interactive display technologies using high-speed image processing and applications using wide-field imaging will be presented. Presentations in the DES-WS sessions will include AR with a variety of display techniques such as wide-field head mounted display, fog display, head-up display, projection AR, and Diminished Reality (DR). In the DES/VHF-WS, effects of AR/VR will be presented with AR vehicles, 3D display, and monocular AR. In the INP-WS sessions, system design considerations for personal light field displays and MR visual stimulation on tactile sensation will be presented. In the PRJ-WS sessions, see-through glasses and light field display for AR/VR will be presented. In the FMC-WS sessions, floating image displays to represent 3D images of objects, and wide field of view optical combiner for AR head-up displays will be presented.

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 '14 will be the presentations on novel speckle reduction technology using phase-randomizing deformable mirror applied to direct view LED-BLU with blue laser stimulation of the quantum dots (FMC-WS), high efficient backlight with a nanorod-based optical film and EL sheet driven by wireless power (PH-WS), and flexible white lighting device and tunable lighting device (OLED-WS).

Special Topics of Interest: Printed Electronics

Printing technologies are opening a new era of electronic devices for their high productivity, low cost, large scale and low environmental-burden fabrication advantages. Printed Electronics, a new Special Topics of Interest, will cover all aspects concerning printed electronics from science and technology viewpoints. This year, five oral sessions will be held including devices and displays fabricated with printing technologies, materials suitable for printing and fabricating process.

LC Science and Technologies (LCT)

This workshop covers topics from fundamental studies to recent developments in LCD technologies and LC materials. Of special note this year is the six invited presentations related to fast switching technologies, photo alignment technologies, and LC materials technologies. Moreover, new LCD technologies, such as polymer-stabilized LCDs, 3D-LCDs, IPS-LCDs and ferroelectric LCs are discussed.

Active Matrix Displays (AMD)

The AMD workshop covers Si-TFT, oxide TFT, organic TFT, OLED, and integrated 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. We highlight the oxide TFT as a special topic of interest (STI) with four devoted sessions covering a wide

area from materials, physics, devices, and processes to applications. We also have prepared one session on printed electronics STI.

FPD Manufacturing, Materials and Components (FMC)

The FMC workshop covers recent developments and achievements in the field of flat panel display technologies that include panel manufacturing, materials, measurements and components. The oral presentations contain more than 15 papers of which 5 papers are invited papers. In addition, more than 25 posters will be presented. This also includes joint sessions with the FLX-WS. This year our workshops include the hot topics of laser processing, bonding and de-bonding technologies, light control by submicron structure and quantum dot lighting. The AR/VR session devoted to special topics of interests will present the recent trends in augmented and virtual reality. In the newly planned demonstration session, three papers from the oral session will be presented on December 5.

EL Displays and Phosphors (PH)

This workshop presents the latest achievements on devices and phosphors for emissive displays, general lighting and LCD backlighting. Invited talks will cover emerging technologies such as highly efficient backlight with a nanorod-based optical film, electron-beam excited UV light source and wavelength conversion nano phosphors synthesized by the microreaction method. Display and medical applications with novel phosphors using Cu-complex and EL sheet driven by wireless power will also be presented.

Field Emission Displays, CRTs and Plasma Displays (FED)

This workshop wholly covers the fields of FED, CRT and PDP technologies. Recent progress in image sensors and displays with field emitter arrays will be discussed. The invited talk will present an optical nano-imaging system with electron beam excitation for living cells. Additionally, fabrication processes, field emission characteristics and mechanism, and field emitter materials such as CNT and PrO, will be discussed. Since the invention of plasma displays in 1964, there has been much progress. The 50th anniversary talk discusses successes and declines in the PDP business. Also covered in the session are the latest PDP technologies and discharge applications for medical use and plant factories.

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. OLED technologies from micro display to large size TV applications and OLED lighting will be reported. Material and device structure for higher quantum efficiencies supporting these device technologies will also be presented. Soluble OLED materials, printed devices and process technologies focused on Printed Electronics (PE) as STI are special discussions this year.

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

This workshop focuses on recent progress in 3D, hyper-realistic display systems and related visual sciences. It covers acquisition, processing, 2D/3D conversion, dual-view display, multi-view display, holography, new optical components, crosstalk, measurement, perception, standardization and more for 3D/hyper-reality display technologies. This year, some novel technologies will be presented as invited papers, such as super high frame-rate videos, floating display and electronic holography. Some technologies for omnidirectional video are also introduced, which provided the audience a good opportunity to understand the trends in these fields.

Applied Vision and Human Factors (VHF)

The VHF workshop covers all topics on vision, human factors and image quality relating to information display. The oral and poster sessions include lively discussions on the latest topics ranging from fundamental theories to applications. This year, we have five VHF oral sessions on Optical Measurement, Color and OLEDs, Moving Image Quality, Display Legibility, and Mobile Human Factors and 'Kansei' Evaluation. We also have a joint session with the DES workshop on the theme of AR (Augmented Reality) and a joint session with the 3D workshop. Both of these promises groundbreaking interdisciplinary discussions, in addition to our VHF poster session which enables participants to quiz presenters in detail. Two distinguished

invited talks will be given in the oral sessions, concerning the latest topics in the FPD Mura Index under the IEC standard and visual effects of curved AMOLEDs.

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

The PRJ workshop covers wearable technologies, vehicle information displays, adaptive headlights, solid-state light sources, projection mapping, augmented reality, 3D measurement, advanced sensing and all the projection technologies. This time, our sessions will focus on miniature optical system technologies, laser and LED materials, projection devices, short throw optics, speckle mitigation, and a laser driving system. Recent studies of advanced technologies such as virtual imaging for wearable and vehicle displays, and an innovative theory of solid-state lighting devices will be presented. There will be 17 oral and four poster presentations, for a total 21 presentations, of which 5 papers are invited presentations.

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-Notebooks, electronic shelf labels, and signage. Various novel technologies such as electrophoretic, electro/thermo chromic, and twisting ball displays will be presented. There will also be reports on front lighting technology and challenging new approaches in e-Paper technologies. Systems, devices, materials, and applications in this field 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. This year will mark the 10th anniversary of the founding of the MEET workshop. Authorities from top research institutions around the world in this field have been invited. Invited speakers are from Univ. of Cambridge, MIT (QD Vision), École Polytechnique, CEA-LETI, Brunel Univ., Kyung Hee Univ., Seoul Nat. Univ., Sungkyunkwan Univ., Lumide, NanoPhotonica, Ostendo, Pacific Light Technologies, Ritsumeikan Univ. and Tohoku Univ. Together with contributed papers with high-quality content, this workshop invites 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, cooperative operations between display components such as cells and backlights and sensors. This year, we will have 27 papers including seven invited talks and 10 poster presentations (excluding late-news). Sessions related to the driving/low-power technologies for LCD/OLED and vehicle display technologies are planned. We will also highlight AR/VR technology as a STI including a joint session with VHF-WS.

Flexible Electronics (FLX)

Recently, there has been much attention on flexible display technologies which are spread over a wide range of fields from materials science to practical applications. The sessions cover all aspects of the hottest flexible device / wearable / material technologies including OLED, TFT fabrication, substrate, printing / roll-to-roll processes and evaluation.

Touch Panels and Input Technologies (INP)

Conventional 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: Illusion and its analysis which comes from difference of the movement states between real and virtual objects and a near eye display system using light-field technology. INP papers will open a new window in displays and interactive technologies.