



IDW '14 - The 21st International Display Workshops

December 3-5, 2014

TOKI MESSE Niigata Convention Center, Niigata, Japan

Sponsored by

The Institute of Image Information and Television Engineers

The Society for Information Display

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

IDW '14 FEATURES

IDW '14 will integrate fifteen technical topics in specialized fields playing important roles in information display activities. Each technical topic will consist of oral presentations by invited/contributed speakers and poster presentations. Detailed and fruitful discussions on each specialized R&D update will be provided. Four special topics of interest, Oxide-Semiconductor TFT, Augmented Reality and Virtual Reality, Lighting Technologies and Printed Electronics are specially highlighted this year. The workshops should be of interest not only to researchers and engineers, but also to those who manage companies and institutions in the display community.

CONFERENCE SITE

Niigata City is the capital of Niigata prefecture located in the center of Honshu, Japan's largest island, and is 250 km north of Tokyo. The city currently has a population of more than 800,000 people, and is the largest city on the Sea of Japan coast. Niigata area is famous for the finest Japanese rice, tasty sake (rice wine) and many kinds of fresh seafood.

Niigata City can be easily accessed from Tokyo by the JR Joetsu Shinkansen (100 min.), which arrives approximately every 30 min. Niigata Airport has direct flights from Nagoya Chubu Centrair, and Osaka International Airport, and is also an international gateway with regular flights from Harbin, Incheon, Shanghai, Taipei and other international cities. It takes 25 min. by bus from Niigata Airport to JR Niigata Station. IDW '14 will take place at Toki Messe the same site as 2008 and 2004. The facility integrates an exhibition hall, 13 large-sized and medium-sized conference rooms, and a hotel, which is the landmark in Niigata City.

Access to Conference Site:

Toki Messe Niigata Convention Center is located 20 min. on foot, 10 min. by bus from JR Niigata Station. Please see the following websites for further information.

Toki Messe Niigata Convention Center: <http://www.tokimesse.com/english/>
Niigata Visitors and Convention Bureau: <http://www.nvcb.or.jp/en/>

DEADLINES AND KEY DATES

Submission of Technical Summary----- June 27, 2014

Acceptance Notification/Author's Kit available on the website

----- July 18, 2014

Submission of Camera-Ready Manuscript & Abstract

----- September 4, 2014

Submission of Late-News Paper ----- September 25, 2014

Early Bird Registration Discount ----- October 31, 2014

LANGUAGE

The official language is English.

Keynote and Invited Addresses

- *Recent Progress on 8K Super Hi-Vision*
Toru Kuroda (NHK)
- *Display Technologies in Mobile Applications*
John Hong (Qualcomm)
- *Ultraflexible Electronics Using Organic Devices*
Takao Someya (The Univ. of Tokyo)

In addition, further Keynote or Invited Address will be presented.

Please see our website for the detailed information.

The titles are tentative.

Special Topics of Interest

- *Oxide-Semiconductor TFT*
- *Augmented Reality and Virtual Reality*
- *Lighting Technologies*
- *Printed Electronics*

Paper submissions are eagerly recommended to these special topics.

For All Oral and Poster Presenters: New Demonstration Session

Opportunity for an interdisciplinary technical demonstration/discussion in a larger space, more preparation and demonstration time than in the Author Interviews and Demonstrations.

You can present impressive and innovative display experiences to all participants.

EXHIBITION

The IDW '14 Exhibition covers materials, components, manufacturing and measuring equipment, software systems and other related products for display devices.

To make an exhibition, please contact the IDW '14 Secretariat.

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

The Advance Program will be available in September 2014, including REGISTRATION and HOTEL INFORMATION.

IDW SCOPE AND OUTLINES

International Display Workshops (IDW) includes a variety of topics and aspects of display technology, system, process and applications. In particular, this year's IDW will feature fifteen general Topics of Scope and four developing fields for advanced technologies on Special Topics of Interest (STI). The special topics are these recent hot topics: Oxide-Semiconductor TFT, Augmented Reality and Virtual Reality, Lighting Technologies, and Printed Electronics. The IDW Scope includes a variety of topics of display materials and components, display devices, electronic system, quality evaluation, interactive technologies, manufacturing process, 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

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

Recently, research and development on amorphous oxide-semiconductors such as In-Ga-Zn-O (a-IGZO) and similar materials have been carried out worldwide. Studies on other materials and polycrystalline oxide-semiconductor TFTs have also been activated. 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) Oxide semiconductor materials and fundamental mechanisms
- 2) Device physics, fabrication processes and equipment
- 3) Oxide-TFT display circuits and embedded systems
- 4) Issues: illumination instability, degradation, etc.
- 5) Oxide-TFT backplane for LCD, OLED display, e-Paper
- 6) Flexible devices, transparent electronics, sensors, and other applications

Augmented Reality and Virtual Reality

*Organizer Workshops: FMC, 3D, VHF, PRJ, DES and INP
Facilitator: Koji Makita (AIST)*

This topic will cover all aspects of technologies, systems, applications and human factors for information display using a fusion of real and virtual. Demonstration sessions will be held to give impressive AR and VR experiences to all participants.

Scopes

- 1) Augmented reality (AR), mixed reality (MR) and virtual reality (VR) technologies
- 2) Projection mapping technology on real objects
- 3) Displays for AR, MR and VR (Video and Optical See-through type displays including HMD and HUD)
- 4) Input and interactive technologies for AR, MR and VR
- 5) Image processing for AR, MR and VR

Lighting Technologies

*Organizer Workshops: FMC, PH and OLED
Facilitator: Yasunori Kijima (Sony)*

This topic will cover all aspects of science and technologies of lightings, ranging from LED lighting, OLED lighting, flexible lighting, manufacturing of lightings, materials and device structures for lightings and internal or external efficiency enhancement technologies.

Scopes

- 1) Solid-state lighting: LED and OLED
- 2) Fluorescent light sources: CCFL and HCFL
- 3) Flexible lighting including backlight unit for LCD
- 4) Manufacturing of lightings and their applications
- 5) Materials and device structures for lightings
- 6) Technologies about the internal or external efficiency enhancement
- 7) Theories, simulations and measurements for lightings
- 8) Energy consumption and environmental issues
- 9) Miscellaneous topics related with lightings

Printed Electronics

*Organizer Workshops: AMD, DES, FLX, FMC, LCT and OLED
Facilitator: Hajime Hirata (Toray Eng.)*

Printing technologies are opening up a new era of electronic devices with their advantages of high productivity, low cost, large scale and low environmental-burden fabrication. In this topic, we will cover all aspects concerning printed electronics from scientific and technological viewpoints.

Scopes

- 1) Devices, sensors, circuits, displays and systems fabricated with printing technologies.
- 2) Printing technologies for fabricating electronic devices.
- 3) Electronic material suitable for printing.
- 4) Fabricating process and equipment for printed electronics.
- 5) Self-assembling and controlling alignment for printed electronics.
- 6) Evaluating and inspecting technologies for printed devices.

WORKSHOPS AND CHAIRS

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

LCT	LC Science and Technologies	: Takahiro Ishinabe (Tohoku Univ.)
AMD	Active Matrix Displays	: Yoshihide Fujisaki (NHK)
FMC	FPD Manufacturing, Materials and Components	: Tetsuya Miyashita (Tohoku Inst. of Tech.)
PH	EL Displays and Phosphors	: Yoichiro Nakanishi (Shizuoka Univ.)
FED	Field Emission Displays, CRTs and Plasma Displays	: Hidenori Mimura (Shizuoka Univ.)
OLED	OLED Displays and Related Technologies	: Takeo Wakimoto (Merck)
3D	3D/Hyper-Realistic Displays and Systems	: Sumio Yano (Shimane Univ.)
VHF	Applied Vision and Human Factors	: Taiichiro Kurita (NHK)
PRJ	Projection and Large-Area Displays and Their Components	: Satoshi Ouchi (Hitachi)
EP	Electronic Paper	: Hiroshi Arisawa (Fuji Xerox)
MEET	MEMS and Emerging Technologies for Future Displays and Devices	: Masayuki Nakamoto (Shizuoka Univ.)
DES	Display Electronic Systems	: Haruhiko Okumura (Toshiba)
FLX	Flexible Electronics	: Hideo Fujikake (Tohoku Univ.)
INP	Touch Panels and Input Technologies	: Nobuyuki Hashimoto (Citizen Holdings)

TOPICS OF IDW SCOPE

Active-Matrix Displays

This topic will cover all aspects of active-matrix displays

Topic Areas

- 1) Active-matrix displays based on liquid crystals, organic light-emitting diodes, electrophoresis, electrochromism, field emission (FE), 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.), 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, 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, 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) Exploration of future standards such as post-HDTV
- 4) Video interface technologies including data transmission and storage
- 5) Novel display systems including mobile/auto applications
- 6) Cooperative operations of functional components
- 7) Circuit technologies including high speed and low power driving

Emissive Technologies

This topic will cover all aspects of science, technologies and applications of FEDs, CRTs, ELDs and PDPs, and will also deal with phosphor application, phosphor screens for FEDs, CRTs, ELDs and PDPs, lighting source and other emissive devices.

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 ELD (materials, process, devices, drive circuits, etc.)
- 6) LEDs (materials, devices, panels, lighting, etc.)
- 7) Phosphors for CRTs, PDPs, FEDs, VFDs, LEDs
- 8) Driving technologies and signal processing
- 9) Picture quality, reliability and lifetime
- 10) Applications of FEDs, CRTs, ELDs and PDPs

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, such as electrophoretic, electrochromic, electrowetting, liquid crystal, MEMS and twisting ball displays, 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-Newspapers, Digital papers, electronic shelf labels and signages
- 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, LC, electronic paper, etc.)
- 6) Tolerance evaluation for bending and stretching deformation
- 7) Revolutionary device applications (paper-like, bendable, foldable, roll-up screen, hanging, wearable, wrapping usages, etc.)

Image Quality and Human Factor

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

Topic Areas

- 1) Visual requirements for display characteristics: luminance, contrast, grayscale, color, resolution, frame rate, viewing angle, etc.
- 2) Display image format for better visual experience, such as UHDTV
- 3) Analysis and improvement of display image-quality, such as dynamic range, color reproduction or moving image artifacts
- 4) High quality color reproduction systems including high dynamic range and wide color gamut systems
- 5) High-fidelity systems such as professional use and master monitors
- 6) Display measurement methods relevant to human factors
- 7) New display applications, such as virtual/augmented reality systems
- 8) Display ergonomics, such as legibility/usability of displays, or actions/behaviors related to visually displayed information
- 9) Visual fatigue or eye strain relevant to displays, such as 3D or LED backlights

Liquid-Crystal 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
- 10) LC semiconductors and organic electronics
- 11) LC photonic crystals and lasers

Manufacturing, Process and Equipment

This topic will cover technology trends and all flat panel displays from the perspective of manufacturing, application systems and fabrication processes including flexible and printing techniques.

Topic Areas

- 1) Equipment and materials for production
- 2) Measurement and evaluation equipment
- 3) Fabrication methods, including printing techniques, soft lithography, roll-to-roll process and transfer techniques for high precision, large area and high productivity

Materials and Components

This topic will cover technology trends and flat panel displays from the perspective of materials, components and systems.

Topic Areas

- 1) Trends in materials, components and systems for flat panel displays
- 2) Technical trends in panel construction
- 3) Optical materials and systems
- 4) Color filter materials
- 5) Lighting materials, components and systems
- 6) Materials and components for flexible electronics
- 7) Materials and process for TFT devices
- 8) Materials, components and system for AR/VR

MEMS and Nanotechnologies

This topic will cover all aspects of science and technologies of MEMS, nanotechnologies and emerging technologies 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, nanotechnologies and emerging technologies
- 2) Nanotechnologies and nanomaterials such as quantum dot devices, quantum dot materials, graphene, CNT, fullerene, etc.
- 3) Optical MEMS such as optical scanners, optical switches, optical mirrors, optical space modulators, optical filters, etc.
- 4) Sensors and actuators for electromagnetic wave, infrared rays, ultraviolet rays, X-rays, visible rays, supersonic wave, hearing, touch, smell, taste, etc.
- 5) Materials, components and fabrication processes
- 6) Fundamental mechanisms and configurations
- 7) Miscellaneous topics related to future displays

New Technologies and Applications

This topic will cover the other new technologies and application for display related materials, devices, systems and measurements.

Topic Areas

- 1) Novel devices and systems
- 2) Emerging technologies for display applications
- 3) Advanced materials for display application

Organic Light-Emitting 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)
- 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) OLED for Lighting
- 10) Flexible organic devices

Projection and Large Area Displays

This topic will cover current topics concerning projection and large area displays and their components.

Topic Areas

- 1) Projectors (conventional, pico, embedded, LASER scanning, projection TV)
- 2) Intelligent Display (wearable, near-eye, AR&VR, applications)
- 3) Micro display (LCOS, MEMS, HTPS) technologies for projection
- 4) Optics and optical components (light sources, screens, lenses, mirrors, films, etc.) for projection
- 5) Algorithm and image processing for projection and large-area displays
- 6) Digital cinema, 3-D projection, signage and vehicle/Head-up display systems
- 7) Large-area display systems and tiled-display systems

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 and other 3D 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) New image capturing devices or 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

Touch and 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 workshop 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

SHORT PRESENTATION

“Short Presentation Session” for poster presenters to be introduced as part of e-Paper and Projection and Large Area Displays sessions!

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

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

- (1) **Paper title**
- (2) **Names of all authors with their affiliations:** The name of the presenting author should be underlined.
- (3) **Abstract:** 50 words or less, highlighting the focus of your paper.
- (4) **Presentation style:** Indicate if you wish to have your paper considered for oral or poster presentation.
- (5) **Preference of Topics of Interest:** Indicate the closest matching Topics of Interest.
- (6) **The body** of the Technical Summary must contain the following.
 - (a) **Background and objectives:** Introduce the state of the subject and describe the goal of your work.
 - (b) **Results:** Describe specific results. Illustrations to highlight your work are encouraged.
 - (c) **Originality:** Clearly describe what are new and/or emphasized points.
 - (d) **Impact:** Discuss the significance of your work and compare your findings with previously published works.
 - (e) **References:** List references covering projects in related areas.
 - (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.

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 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 preference.
Please understand that the title may be edited by the program committee.
An acceptance/reject 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 to either oral or poster presentation in the most suitable Topics of 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 questions and answers. The program committee will determine the duration of presentation.
- Oral presenters are strongly urged to attend the Author Interviews and Demonstrations after the presentation (a table and AC 100 V power will be made available).

(2) Poster presentations

- Poster presentation will conform to a 3-hour format in front of an individual poster in board.
- A table and AC 100 V power will be made available.
- "Short Presentation Session" to introduce poster presenters as part of several topics. All poster presenters in several topics are required to give a brief, 3-minute oral presentation with no discussion time.

ACCEPTANCE

You will be notified of the results of your Technical Summary review via e-mail. Upon acceptance of the Technical Summary, authors must prepare a camera-ready manuscript to be published in the conference proceedings. The author should use the manuscript template, which will soon be available on the conference website. It will be four pages in length and in a two column format. Acceptance is subject to following conditions:

- (1) Registration is required before the camera-ready submission for all presenters.
- (2) All company or government releases must be obtained.
- (3) The author must be the copyright holder or have written permission from the copyright holder for any material used in the paper.
- (4) Your submitted paper must not be published in any media including personal websites on the Internet before it is presented at the conference.
- (5) 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.

LATE-NEWS PAPERS

A limited number of late-news papers reflecting important new findings or developments may be accepted. Authors are requested to submit a 2-page camera-ready manuscript on A4-sized pages accompanied by an abstract. Access the conference website: <http://www.idw.or.jp/authinfo.html>
Follow the submission instructions given on the website.

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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 and IDW Outstanding Poster Paper Award

The award committee of IDW will select the most outstanding papers from those presented at IDW '14. The winners will be announced on the IDW website and given a plaque after the conference.

Invited Talks

- **Fast Response LCDs by Doping Nanoparticles and Optical Compensation**
Shunsuke Kobayashi (Tokyo Univ. of Sci., Yamaguchi)
- **Azimuth Easy Axis and Anchoring Control by LC Mixture on Rubbed Polymers**
Rumiko Yamaguchi (Akita Univ.)
- **Dimerization Behaviour of New Photo-Alignment Materials Having Cinnamate Moiety**
Hiroshi Hasebe (DIC)
- **High-HTP Macrocyclized Phenyl Cinnamate Dimer Utilizable as Photo-Responsive Chiral Dopant for Nematic Liquid Crystals**
Junji Watanabe (Tokyo Inst. of Tech.)
- **Micro-Second Electro-Optic Modulation in Polymer/Liquid-Crystal Nanocomposite**
Masanori Ozaki (Osaka Univ.)
- **Ideal Alignment Technology for IPS-LCDs: Photoalignment IPS-NEO**
Noboru Kunimatsu (Japan Display)
- **Latest Status of Soluble-OLED Material Development**
Takeshi Yamada (Sumitomo Chem.)
- **Ink Jet Technologies for OLED Display**
Masahiro Uchida (Seiko Epson)
- **General FPD Mura Index under the IEC Measurement Standard**
Steve Hasegawa (Sony)
- **Wide Viewing LCDs with Microstructure Film**
Emi Yamamoto (Sharp)
- **Progress in Oxide TFTs**
Jin Jang (Kyung Hee Univ.)
- **High Performance Polymer Semiconductors**
Akira Ohno (Mitsubishi Chem. Group Sci. & Tech. Res. Ctr.)
- **Sensor Application Using Thin-Film Devices Derived from Display Technologies**
Mutsumi Kimura (Ryukoku Univ.)
- **R-V Dynamics Illusion: Psychophysical Influence on Sense of Weight by Mixed-Reality Visual Stimulation of Moving Objects**
Satoshi Hashiguchi (Ritsumeikan Univ.)
- **CMOS Image Sensor Technologies in Biomedical Applications**
Jun Ohta (Nara Inst. of S&T)
- **Holographic HMD with Wide Visual Field**
Yuji Sakamoto (Hokkaido Univ.)
- **Towards the ISO guideline for "Image Safety in Stereoscopic Viewing"**
Takehiko Bando (JST PRESTO)
- **Flexible Transparent Conductive Films Based on Metal Mesh Technology**
Zheng Cui (Chinese Ac. of Sci.)
- **Flexible Oxide TFTs**
Jae-Kyeong Jeong (Inha Univ.)
- **Flexible TFT Technologies**
Yukiharu Uraoka (Nara Inst. of S&T)
- **HMD Technologies for AR**
Kiyoshi Kiyokawa (Osaka Univ.)
- **Diminished Reality Based on Image Inpainting for Visually Removing Real Objects in Real Time**
Norihiko Kawai (Nara Inst. of S&T)

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

OVERSEAS ADVISORS

Brian H. Berkeley	(Samsung Display, USA)	Jean-Noël Perbet	(Thales Avionics, France)
Janglin Chen	(ITRI, Taiwan)	Kalluri R. Sarma	(Honeywell Int., USA)
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CHAIRS

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The 21st International Display Workshops
December 3-5, 2014

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