



# ADVANCE PROGRAM

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# AM-FPD 13

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THE TWENTIETH INTERNATIONAL WORKSHOP ON  
**ACTIVE-MATRIX  
FLATPANEL DISPLAYS AND DEVICES**

-TFT TECHNOLOGIES AND FPD MATERIALS-

JULY 2-5, 2013  
Ryukoku University Avanti Kyoto Hall  
Kyoto, Japan

**Sponsorship:**

The Japan Society of Applied Physics

**Technical Sponsorship:**

The Electrochemical Society - Electronics and Photonics Division -  
The Electrochemical Society - Japan Section -  
IEEE Electron Devices Society

**Cosponsorship:**

The Institute of Electronics, Information and  
Communication Engineers  
The Institute of Image Information and Television Engineers  
The Institute of Electrical Engineers of Japan  
The Chemical Society of Japan  
Japanese Liquid Crystal Society  
Thin Film Materials & Devices Meeting

***20th Anniversary***



# GENERAL INFORMATION

The Twentieth International Workshop on Active-Matrix Flatpanel Displays and Devices (AM-FPD '13) will be held at Ryukoku University Avanti Kyoto Hall, Kyoto, Japan from July 2 (Tuesday) to 5 (Friday), 2013. This international workshop was established in 1994 to present the latest research and development in Active Matrix Liquid Crystal Display technologies and their applications. AM-FPD '13 is positioned as the 20th anniversary workshop.

The scope has been widened to novel flat panel displays including AMLCDs, materials for displays, related physical phenomena and novel electronics systems such as thin-film transistors (TFT), photovoltaics (PV) technologies, and thin-film materials and devices (TFMD). We hope that you will attend our 20th anniversary workshop.

## **SITE**

Ryukoku University Avanti Kyoto Hall (Avanti 9th Floor)  
31 Higashikujyo-nishisannoucho, Minami-ku, Kyoto 601-8003,  
Japan (see the map on page 22, 23)

AM-FPD '13 Secretariat Tel: +81-475-23-1150

## **SYMPOSIUM / SPECIAL SESSION**

In addition to the regular sessions, symposia, “*Breakthrough for Future Applications of Thin-Film Transistor*”, “*Flexible/Printed Photovoltaics*” and “*Current Status and Development Trends in Graphene Devices*” are scheduled. And also, the special session, “*Printing/Flexible Display Panels for Large Area, Thin and Lightweight Applications*” is planned. Invited speakers will talk about the latest topics from the viewpoint of functional materials, device structures, fabrication processes driving scheme, circuit technologies, etc.

## **PRESENTATION TIMES FOR SPEAKERS**

	Total	Presentation	Discussion
Keynote	30 min.	25 min.	5 min.
Invited	25 min.	20 min.	5 min.
Symposium	30 min.	25 min.	5 min.
Oral	20 min.	15 min.	5 min.
Poster	15:35-17:35, July 4		
Late News	15 min.	12 min.	3 min.

## **THE PROCEEDINGS OF AM-FPD '13**

The Proceedings of AM-FPD '13 will be distributed from July 2 at the Registration Desk.

## **LANGUAGE**

The official language of the workshop is English.

## **REGISTRATION**

The Registration Desk will be open in front of Ryukoku University Avanti Kyoto Hall from Tuesday to Friday.

The registration hours are as follows:

Tuesday, July 2	17:30-19:00
Wednesday, July 3	8:30-17:00
Thursday, July 4	8:30-17:00
Friday, July 5	8:30-14:30

For Advance Registration, access our online registration page (<http://www.amfpd.jp>) and enroll your information and complete payment by June 7(JPT). Registration and other fees should be paid in Japanese yen via bank transfer\*<sup>1</sup> or credit cards. VISA, Master, DC, UFJ, UC, AMEX, Diners, Nicos and JCB are acceptable. No personal checks are acceptable. After your payment has been confirmed, confirmation will be sent by NTA (Nippon Travel Agency Co., Ltd.) (see page 3) by the end of June.

\*<sup>1</sup> Bank transfer for AM-FPD

A/C No.: 3106887 Mizuho Corporate Bank, Ltd. Jugogou Branch

A/C Name: Nippon Travel Agency Co., Ltd.

Registrants living in Japan can make payment via bank transfer or credit cards. Registrants living overseas can make payment by credit cards only.

Category	Advance Registration By June 7, 2013 (JPT)	On-Site Registration
<b>WORKSHOP*<sup>2</sup></b>		
Member* <sup>3</sup>	¥43,000	¥48,000
Non-Member	¥45,000	¥50,000
Student* <sup>4</sup>	¥15,000	¥17,000
<b>TUTORIAL</b>		
Regular	¥5,000	¥5,000
Conference attendee & Student	¥3,000	¥3,000
<b>OPTIONS</b>		
Proceedings* <sup>5</sup> (Book format)	¥5,000	You cannot apply them on site.
Excursion	¥4,000	

\*<sup>2</sup>The registration fee of the workshop includes the admission to all sessions, banquet, and USB memory of the proceedings. The USB memory contains all papers from the first to 20th workshop, in celebration of the 20th anniversary.

\*<sup>3</sup>The member of the societies which sponsor and support AM-FPD '13 (see the front cover)

\*<sup>4</sup>Students are required to show their ID card.

\*<sup>5</sup>Additional JPY5,000 will be charged for those who prefer the proceedings of AM-FPD '13 in book format.

## **EXCURSION/ONE DAY TRIP TO NARA**

The excursion will be held on July 2, 2013, from 9:30 to 17:00, in celebration of the 20th anniversary. The participation fee is JPY4,000 including lunch. Reservation is necessary.

### <Itinerary>

Avanti Kyoto Hall Entrance[9:30 departure] --- Sharp Technology Innovation Museum [10:20-11:30] --- Izasa Todaiji Lunch [12:00-13:00] --- Todai-ji with a guide [13:10-14:00] --- Horyu-ji with a guide [14:40-15:30] --- Avanti Kyoto Hall Entrance [17:00 arrival]

\*Time will possibly be changed due to traffic jam.

## **BANQUET**

The Banquet will be held on July 3, 2013, from 18:00 to 20:00 at Mariage Grande “Takao” on the 8th floor of Avanti.

## **OFFICIAL TRAVEL AGENT**

Nippon Travel Agency Co., Ltd. (NTA) has been appointed as the official travel agent for the workshop and will handle all related travel arrangements, including hotel accommodations. Inquiries and applications concerning arrangements should be addressed to:

Nippon Travel Agency Co., Ltd.(NTA)

Chiba Branch

Chiba Center Square Bldg. 4F, 2-3-16, Chuo, Chuo-ku, Chiba  
260-0013, Japan

Fax: +81-43-225-2241 Tel: +81-43-227-2307

E-mail: am\_fpd13@nta.co.jp

For hotel accommodation, please access our Web site (<http://www.amfpd.jp>) and register on the hotel accommodation page by June 7 (JPT).

There will also be an on-site travel information desk during the workshop period to handle arrangements for transportation and tours.

## **VISAS**

Every foreign visitor entering Japan must have a valid passport.

Visitors from countries whose citizens must have visas should apply to a Japanese consular office or diplomatic mission in their own country.

## **CANCELLATION POLICY**

In case of cancellation, a written notification should be sent to NTA by e-mail (am\_fpd13@nta.co.jp) or by FAX (+81-43-225-2241) to avoid any trouble.

### Cancel Charge

From June 1 to 29-----JPY 3,000

After June 30---100% of the registration fee / NO REFUND

The Proceedings of the AM-FPD '13 (USB memory) will be sent to the attendees who have paid in 100% cancellation charge after the workshop.

# JAPANESE JOURNAL OF APPLIED PHYSICS

## SPECIAL ISSUE

The authors of the superior papers will be recommended by the committee to submit their papers for publication in the JJAP (Japanese Journal of Applied Physics) special issue of "Active-Matrix Flatpanel Displays and Devices -TFT Technologies and FPD Materials-" (Vol. 53, No. 3, 2014). The manuscript should contain some novel, original and significant parts in addition to your presentation in AM-FPD '13.

Any paper submitted to a special issue should not have text identical to a paper distributed in the associated conference (meeting etc.). The content of the paper must be original with well-developed discussions on the obtained results. The submission must be made through the below online submission no later than July 12, 2013.

Submission & Information:

JJAP Website: <http://jjap.ipap.jp/>

The review schedule is as follows:

- July 12 2013: Submission
- December, 2013: Final decision
- March, 2014: Publication

## TUTORIAL IN JAPANESE

These classes are widely aimed at many people from beginners to researchers who hope to review their knowledge. Presentations and documents will be in Japanese.

Documents will be distributed to the attendees who have registered in advance. The attendees who make an entry on-site will be admitted into these classes, but no documents might be handed. These classes are available for an additional fee (see page 2.)

**Tuesday, July 2** (18 : 00 ~ 20 : 00)

**Chairperson :** A. Heya, *Univ. of Hyogo, Japan*

18:00 (T-1)           Oxide Thin-Film Transistors -Process and Device Technologies-  
Mamoru Furuta, *Kochi Univ. of Technol., Japan*

19:00 (T-2)           Reliability of Photovoltaic Modules  
Atsushi Masuda, *Nat'l Inst. of Advanced Industrial Sci. and Technol. (AIST), Japan*

## AWARD

Papers presented at this workshop will be considered for “AM-FPD Paper Awards” and “AMFPD-ECS Japan Section Young Researcher Award”. These winners will be presented at the award ceremony in AM-FPD '14 workshop.

### AM-FPD Paper Awards

“Best Paper Award”, “Poster Award” and “Student Paper Award” will be presented. The winners of them are selected by AMFPD '13 award committee chaired by Professor Yukiharu Uraoka (NAIST).

### AMFPD-ECS Japan Section Young Researcher Award

ECS Japan Section and AM-FPD Organizing Committee have jointly established “AMFPD-ECS Japan Section Young Researcher Award”. This award will be given to the author under the age of 35 that belongs to the university or the research institute in Japan.

## AM-FPD '12 PAPER AWARD

### Best Paper Award

Jin Zhang, *Delft Univ. of Technol., the Netherlands*

- (5-3) Reliability of Single-Grain Silicon TFTs Fabricated from Spin-Coated Liquid-Silicon

Hiroshi Hayashi, *Panasonic, Japan*

- (6-2) Double Crystalline Silicon Channel Thin Film Transistor by Continuous-Wave Green Laser for Large-Sized OLED Display

### Poster Award

Emi Machida, *NAIST, Japan*

- (P-9) Crystallization to Polycrystalline Silicon Films by Underwater Laser Annealing and Its Application to Thin Film Transistors

Shinnosuke Iwamatsu, *Yamagata Res. Inst. of Technol., Japan*

- (P-16) Depth Profiling Study on Amorphous InGaZnO<sub>4</sub> Thin-Film Transistors by X-ray Photoelectron Spectroscopy

### Student Paper Award

Moon-Kyu Song, *Seoul Nat'l Univ., Korea*

- (2-3) Oxygen Vacancy Diffusion in Amorphous In-Ga-Zn-Oxide Thin-Film-Transistors with Ti/Cu Source/Drain

Yumi Kawamura, *NAIST, Japan*

- (P-26) Effects of Gate Insulator on Thin Film Transistor with ZnO Channel Layer Deposited by Plasma Assisted Atomic Layer Deposition

Tatsuya Toda, *Kochi Univ. of Technol., Japan*

- (P-29) Fabrication and Characterization of Thin-Film Transistor Using Dielectrophoretic Assembly of Single-Walled Carbon Nanotube

### AMFPD-ECS Japan Section Young Researcher Award

Aya Hino, *Kobe Steel, Japan*

- (2-4) Electronic Structures in Amorphous In-Ga-Zn-O Metal-Oxide-Semiconductor Diodes with Various Gate Insulators

## ORGANIZING COMMITTEE

**Chair:** Hiroki Hamada (*Kinki Univ.*)  
**Vice-Chair:** Hiroshi Tsutsu (*Japan Display*)  
**Members:** Hidetsugu Kawamori (*Sharp*)  
Junya Kiyota (*ULVAC*)  
Kazunori Komori (*Panasonic*)  
Yue Kuo (*Texas A&M Univ.*)  
Naoki Nakagawa (*Mitsubishi Electric*)  
Nobuo Sasaki (*Samsung Mobile Display*)  
Kenji Sera (*NLT Technologies*)

## STEERING COMMITTEE

**Chair:** Yukiharu Uraoka (*NAIST*)  
**Vice-Chair:** Hidehito Kitakado (*Sharp*)  
**Members:** Mamoru Furuta (*Kochi Univ. of Technol.*)  
Mutsuko Hatano (*Tokyo Inst. of Technol.*)  
Susumu Horita (*JAIST*)  
Toshio Kamiya (*Tokyo Inst. of Technol.*)  
Mutsumi Kimura (*Ryukoku Univ.*)  
Jun Koyama (*Semicond. Energy Lab.*)  
Atsushi Masuda (*AIST*)  
Naoto Matsuo (*Univ. of Hyogo*)  
Hiroshi Tanabe (*NLT Technologies*)  
Hajime Yamaguchi (*Toshiba*)



## PROGRAM COMMITTEE

- Chair:** Mamoru Furuta (*Kochi Univ. of Technol.*)  
**Vice-Chair:** Susumu Horita (*JAIST*)  
**Members:** Hajime Akimoto (*Japan Display*)  
Toshiaki Arai (*Sony*)  
Byung Seong Bae (*Hoseo Univ.*)  
Yvan Bonnassieux (*Ecole Polytechnique*)  
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Akira Heya (*Univ. of Hyogo*)  
Yongtaek Hong (*Seoul Nat'l Univ.*)  
Chi-Sun Hwang (*ETRI*)  
Masanobu Ikeda (*Japan Display*)  
Arichika Ishida (*Japan Display*)  
Ryoichi Ishihara (*Delft Univ. of Technol.*)  
Yasuaki Ishikawa (*NAIST*)  
Shinichi Ishizuka (*Pioneer*)  
Jin Jang (*Kyung Hee Univ.*)  
Takuo Kaito (*Japan Display*)  
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Masatoshi Kitamura (*Kobe Univ.*)  
Dietmar Knipp (*Jacobs Univ. Bremen*)  
Yuji Komatsu (*ECN Solar Energy*)  
Hornng-Show Koo (*Ming-Hsin Univ. of Sci. and Technol.*)  
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Atsushi Masuda (*AIST*)  
Tokiyoshi Matsuda (*Ryukoku Univ.*)  
Hiroyoshi Naito (*Osaka Prefecture Univ.*)  
Mitsuru Nakata (*NHK Sci. & Technol. Res. Labs.*)  
Hiroaki Nakamura (*Idemitsu Kosan*)  
Kensuke Nishioka (*Univ. of Miyazaki*)  
Takashi Noguchi (*Univ. of the Ryukyus*)  
Hiroyuki Okada (*Univ. of Toyama*)  
Taizoh Sadoh (*Kyushu Univ.*)  
Ruud E. I. Schropp (*Utrecht Univ.*)  
Takao Someya (*The Univ. of Tokyo*)  
Kazushige Takechi (*NLT Technologies*)  
Taishi Takenobu (*Waseda Univ.*)  
Yasuo Toko (*Stanley Electric*)  
Toshihiko Toyama (*Osaka Univ.*)  
Noriko Watanabe (*Sharp*)  
Hajime Yamaguchi (*Toshiba*)  
Yung-Hui Yeh (*ITRI*)  
Wenchang Yeh (*Shimane Univ.*)

# MEMO

# PROGRAM

Wednesday, July 3

**Opening Session** (9 : 00~9 : 15)

**Chairperson :** Y. Uraoka, *NAIST, Japan*

## **Welcome Address**

H. Hamada, *Kinki Univ., Japan*

## **Award Presentation**

**Session 1 : Anniversary Session** (9 : 15 ~ 11 : 15)

**Chairpersons :** Y. Uraoka, *NAIST, Japan*

M. Kimura, *Ryukoku Univ., Japan*

- 9:15 (1-1)            40 Years Research and Development on Liquid  
Crystal Displays (Invited)  
T. Uchida, *Sendai Nat'l College of Technol., Japan*
- 9:45 (1-2)            Progress of Thin Film Transistor Technology  
-Large-Area Mass Production and Beyond (Invited)  
Y. Kuo, *Texas A&M Univ., USA*
- 10:15 (1-3)           60 Years of Organic Semiconductor Research  
and Development in Japan (Invited)  
T. Tsutsui, *Kyushu Univ., Japan*
- 10:45 (1-4)           Past, Present and Future of Mobile Displays (Invited)  
H. Ohshima, *Japan Display, Japan*

— *Coffee Break* —

**Session 2 : Keynote Address** (11 : 35~12 : 35)

**Chairpersons :** M. Furuta, *Kochi Univ. of Technol., Japan*

T. Toyama, *Osaka Univ., Japan*

- 11:35 (2-1)           Past, Current and Future TFT Technologies  
for Display Manufacturing (Invited)  
J. Jang, *Kyung Hee Univ., Korea*
- 12:05 (2-2)           Current Status of Thin-Film Solar Cells and  
Future Prospects (Invited)  
M. Konagai, *Tokyo Inst. of Technol., Japan*

— *Lunch* —

## Special Session : Printing/Flexible Display Panels for Large Area, Thin and Lightweight Applications

(13 : 50 ~ 15 : 20)

**Chairpersons :** H. Okada, *Univ. of Toyama, Japan*  
M. Kimura, *Nagaoka Univ. of Technol., Japan*

- 13:50 (SP-1)      Advanced Printing Techniques for Flexible Device Fabrication (Invited)  
T. Kamata, *Nat'l Inst. of Advanced Industrial Sci. and Technol. (AIST), Japan*
- 14:15 (SP-2)      Flexible AMOLED Display Driven by Amorphous InGaZnO TFTs (Invited)  
K. Miura, T. Ueda, N. Saito, S. Nakano, T. Sakano, K. Sugi, H. Yamaguchi, I. Amemiya, *Toshiba, Japan*
- 14:40 (SP-3)      Bendable Display Device Using Polymer-Stabilized Blue Phase Liquid Crystal (Invited)  
M. Kimura<sup>1</sup>, N. Nagumo<sup>1</sup>, T. N. Oo<sup>1</sup>, H. Kikuchi<sup>2</sup>, T. Akahane<sup>1</sup>, <sup>1</sup>*Nagaoka Univ. of Technol., Japan*  
<sup>2</sup>*Kyushu Univ., Japan*
- 15:05 (L-1)      Unique Property of a-InGaZnO/Ag Interface on Thin-Film Transistor  
Y. Ueoka, Y. Ishikawa, J. P. Bermundo, H. Yamazaki, S. Urakawa, Y. Osada, M. Horita, Y. Uraoka, *Nara Inst. of Sci. and Technol. (NAIST), Japan*

— Coffee Break —

## Session 3 : Reliability of Oxide TFT (15 : 40 ~ 17 : 05)

**Chairpersons :** T. Kamiya, *Tokyo Inst. of Technol., Japan*  
T. Arai, *Sony, Japan*

- 15:40 (3-1)      Stability and Encapsulation of Metal-Oxide Based TFTs (Invited)  
M. Fakhri, P. Görm, T. Riedl, *Univ. of Wuppertal, Germany*
- 16:05 (3-2)      The Influence of Fluorinated SiNx Gate Insulator in a-InGaZnO Thin-Film Transistors  
H. Yamazaki<sup>1</sup>, Y. Ishikawa<sup>1</sup>, Y. Ueoka<sup>1</sup>, M. Fujiwara<sup>2</sup>, E. Takahashi<sup>2</sup>, Y. Andoh<sup>2</sup>, Y. Uraoka<sup>1</sup>, <sup>1</sup>*Nara Inst. of Sci. and Technol. (NAIST), Japan*,  
<sup>2</sup>*Nissin Electric, Japan*

- 16:25 (3-3) Effect of Drain Bias on Negative Gate Bias and Illumination Stress Induced Degradation in Amorphous InGaZnO Thin-Film Transistors  
D. Wang, M. P. Hung, J. Jiang, C. Li, M. Furuta  
*Kochi Univ. of Technol., Japan*
- 16:45 (3-4) Evaluation of Electronic Structures in Amorphous In-Ga-Zn-O Using Metal-Oxide-Semiconductor Diodes Fabricated with Various Process Conditions  
A. Hino, S. Kosaka, T. Kishi, H. Goto, K. Hayashi, T. Kugimiya, *Kobe Steel, Japan*

**Author Interviews** (17 : 05 ~ 17 : 35)

**Banquet** (18 : 00 ~ 20 : 00)

Thursday, July 4

**Symposium 1: Current Status and Development Trends in Graphene Devices** (9 : 00 ~ 10 : 30)

**Chairpersons :** T. Manaka, *Tokyo Inst. of Technol., Japan*  
H. Kajii, *Osaka Univ., Japan*

- 9:00 (S1-1) Epitaxial CVD Growth of Graphene: Growth Mechanism, Nanofabrication, and Properties (Invited)  
H. Ago, *Kyushu Univ., Japan*
- 9:30 (S1-2) Graphene FETs: Issues and Prospects (Invited)  
M. Suemitsu, *Tohoku Univ., Japan*
- 10:00 (S1-3) Advances in Graphene Device & Bio-Sensor Applications (Invited)  
K. Matsumoto, K. Maehashi, Y. Ohno, K. Inoue, *Osaka Univ., Japan*

— Coffee Break —

**Symposium 2: Breakthrough for Future Applications of Thin-Film Transistor** (10 : 45 ~ 12 : 15)

**Chairpersons :** Y. Uraoka, *NAIST, Japan*  
S. Horita, *JAIST, Japan*

- 10:45 (S2-1) Oxide Based Photosensor Thin-Film Transistor for Interactive Display (Invited)  
S. Ahn, I. Song, Y. Jeon, J. Ahn, S. Lee, J. Kim, H. Choi, U. Chung, *Samsung Electronics, Korea*
- 11:15 (S2-2) Low-Cost Embedded RRAM Technology for System-on-Plastic Integration Using a-IGZO TFTs (Invited)  
T. -H. Hou, S. -C. Wu, M. -J. Yu, P. -S. Liu, L. -J. Chi, *Nat'l Chiao Tung Univ., Taiwan*
- 11:45 (S2-3) Possibilities of Blue Laser-Diode Annealing as a New LTPS (Invited)  
T. Noguchi, T. Okada, *Univ. of the Ryukyus, Japan*

— Lunch —

**Symposium 3: Flexible/Printed Photovoltaics**(13 : 35 ~ 15 : 05)

**Chairpersons :** T. Toyama, *Osaka Univ., Japan*  
A. Masuda, *AIST, Japan*

- 13:35 (S3-1) High Efficiency Flexible Cu(In,Ga)Se<sub>2</sub> Solar Cells (Invited)  
P. Reinhard, A. Chirilă, F. Pianezzi, S. Nishiwaki, S. Buecheler, A. N. Tiwari, *Swiss Federal Labs. for Material Sci. and Technol., Switzerland*
- 14:05 (S3-2) Performance Enhancement of Dye-Sensitized Solar Cells with Organic Dyes (Invited)  
T. N. Murakami, N. Koumura, *Nat'l Inst. of Advanced Industrial Sci. and Technol.(AIST), Japan*
- 14:35 (S3-3) Flexible Thin Film Si Solar Cells and Modules (Invited)  
A. Takano, T. Tsuji, H. Matsuyama, T. Kuwabara, M. Masuda, S. Sawayanagi, H. Nakamura, T. Wada, T. Ishikawa, S. Fujikake, *Fuji Electric, Japan*

**Author Interviews** (15 : 05 ~ 15 : 35)

**Poster Session** (15 : 35 ~ 17 : 35)

**Chairpersons :** A. Heya, *Univ. of Hyogo, Japan*  
S. Horita, *JAIST, Japan*  
Y. Ishikawa, *NAIST, Japan*  
H. Okada, *Univ. of Toyama, Japan*

**FPDp**

- (P-1) A Simple Pixel Structure to Compensate Non-Uniform Threshold Voltage and Mobility of Poly-Si TFTs for Large-Size AMOLED Displays  
J. -S. Na, O. -K. Kwon, *Hanyang Univ., Korea*
- (P-2) High Transmittance Liquid Crystal Display with Polarized Organic Light-Emitting Device as a Backlight Unit  
S. I. Jo, Y. -J. Lee, J. -H. Kim, *Hanyang Univ., Korea*
- (P-3) Emission Duty Extension Pixel Structure for High-Resolution Active Matrix Organic Light Emitting Diode Displays  
Y. -N. Jang, O. -K. Kwon, *Hanyang Univ., Korea*
- (P-4) A Novel a-InGaZnO TFT Based Voltage Programmed Pixel Circuit to Compensate Threshold Voltage and Mobility Variations  
Y. Kim<sup>1</sup>, J. Kanicki<sup>2</sup>, H. Lee<sup>1</sup>, <sup>1</sup>*Soongsil Univ., Korea*, <sup>2</sup>*Univ. of Michigan, USA*
- (P-5) A New Decoder-Type Integrated Gate Driver with a-Si:H TFTs for Active Matrix Displays  
J. -S. Kim, B. -D. Choi, *Hanyang Univ., Korea*
- (P-L1) A Low-Power Scan Driver Using Depletion-Mode Amorphous Indium-Gallium-Zinc-Oxide Thin-Film Transistors for High-Resolution Active-Matrix Liquid-Crystal Displays  
C. -H. Lee, O. -K. Kwon, *Hanyang Univ., Korea*

**TFTp**

- (P-6) Grain Growth Control by Micro-Thermal-Plasma-Jet Irradiation to Amorphous Silicon Strips through Slit Masks and Its Application to High-Performance Thin-Film Transistors  
S. Hayashi<sup>1,2</sup>, Y. Fujita<sup>1</sup>, S. Morisaki<sup>1</sup>, T. Kamikura<sup>1</sup>, S. Yamamoto<sup>1</sup>, M. Akazawa<sup>1</sup>, S. Higashi<sup>1</sup>,  
<sup>1</sup>*Hiroshima Univ., Japan*, <sup>2</sup>*the Japan Society for the Promotion of Sci., Japan*



- (P-7) Reduction of Hump Effect of Thin-Film Transistor by SiN<sub>x</sub> Film  
T. Kobayashi<sup>1</sup>, N. Matsuo<sup>1</sup>, A. Heya<sup>1</sup>, S. Yokoyama<sup>2</sup>  
*<sup>1</sup>Univ. of Hyogo, Japan, <sup>2</sup>Hiroshima Univ., Japan*
- (P-8) Fabrication Optimization to Improve Performance of Gallium-Doped Zinc Oxide Thin-Film Transistors  
S. Zhang, D. Han, S. Wang, Y. Tian, D. Shan, F. Huang, Y. Cong, S. Zhang, X. Zhang, Y. Wang,  
*Peking Univ., China*
- (P-9) Thermal Degradation and Theoretical Analysis of Amorphous Oxide Thin-Film Transistor  
S. Urakawa<sup>1</sup>, S. Tomai<sup>2</sup>, M. Kasami<sup>2</sup>, K. Yano<sup>2</sup>, D. Wang<sup>3</sup>, M. Furuta<sup>3</sup>, M. Kimura<sup>4</sup>, M. Horita<sup>1,5</sup>, Y. Ishikawa<sup>1,5</sup>, Y. Uraoka<sup>1,5</sup>, *<sup>1</sup>Nara Inst. of Sci. and Technol. (NAIST), Japan, <sup>2</sup>Idemitsu Kosan, Japan, <sup>3</sup>Kochi Univ. of Technol., Japan, <sup>4</sup>Ryukoku Univ., Japan, <sup>5</sup>Japan Sci. and Technol. Agency, Japan*
- (P-10) Reliability of Amorphous InGaZnO Thin-Film Transistors Passivated by Polysilsesquioxane-Based Passivation Layer  
J. P. Bermundo<sup>1</sup>, Y. Ishikawa<sup>1</sup>, H. Yamazaki<sup>1</sup>, T. Nonaka<sup>2</sup>, Y. Uraoka<sup>1</sup>, *<sup>1</sup>Nara Inst. of Sci. and Technol. (NAIST), Japan, <sup>2</sup>AZ Electronic Materials Manufacturing Japan, Japan*
- (P-11) Characterization of Stress-Controlled a-IGZO Thin Films and their Applications to Thin-Film Transistor and Micro-Electromechanical System Processes  
S. Iwamatsu<sup>1</sup>, K. Takechi<sup>2</sup>, Y. Abe<sup>1</sup>, T. Yahagi<sup>1</sup>, H. Tanabe<sup>2</sup>, S. Kobayashi<sup>1</sup>, *<sup>1</sup>Yamagata Res. Inst. of Technol., Japan, <sup>2</sup>NLT Technologies, Japan*
- (P-12) Characterization of Intrinsic Hysteresis of Pentacene-Based Organic Thin-Film Transistor through In-Situ Electrical Measurement  
S. -W. Liu<sup>1</sup>, W. -C. Su<sup>2</sup>, C. -C. Lee<sup>2</sup>, W. -L. Wang<sup>2</sup>, J. -M. Wen<sup>2</sup>, Y. -H. Ho<sup>2</sup>, C. -F. Lin<sup>1</sup>, *<sup>1</sup>Ming Chi Univ. of Technol., Taiwan, <sup>2</sup>Nat'l Taiwan Univ. of Sci. and Technol., Taiwan*
- (P-L2) Thin Film Photo-Sensor by BLDA to Realize System on Panel  
C. J. Koswaththage, S. Chinen, K. Sugihara, T. Okada, T. Noguchi, *Univ. of the Ryukyus, Japan*

(P-L3) Artificial Retina Using Poly-Si TFTs  
- Operation Confirmation of Real-Time Detection -  
S. Ohyama, T. Higashiyama, T. Matsuda,  
M. Kimura, *Ryukoku Univ., Japan*

(P-L4) Detection of 2D and 3D Distributions of Magnetic  
Field by Moving a Poly-Si Micro Hall Device  
S. Kurisu, D. Tadokoro, T. Matsuda, M. Kimura  
*Ryukoku Univ., Japan*

## **TFMDp**

(P-13) Comparison of Crystal Structures among  
CAAC-InGaZnO, nc-InGaZnO, and Solution-  
Processed InGaZnO  
E. Kikuchi, N. Ishihara, M. Oota, M. Tsubuku,  
H. Tomisu, M. Nakashima, T. Hirohashi,  
M. Takahashi, S. Yamazaki, *Semicond. Energy  
Lab., Japan*

(P-14) Analysis of Nanoscale Crystalline Structure of  
In-Ga-Zn-O Thin Film with Nano Beam Electron  
Diffraction  
S. Ito<sup>1</sup>, E. Takahashi<sup>1</sup>, K. Dairiki<sup>1</sup>, M. Oota<sup>1</sup>,  
T. Hirohashi<sup>1</sup>, M. Takahashi<sup>1</sup>, M. Tsubuku<sup>1</sup>,  
S. Yamazaki<sup>1</sup>, N. Kimizuka<sup>2</sup>, <sup>1</sup>*Semicond. Energy  
Lab, Japan*, <sup>2</sup>*Universidad de Sonora, Mexico*

(P-15) Crystallography of Excimer Laser-Crystallized  
n-Ga-Zn-O Film  
A. Shimomura, M. Koyama, T. Ishiyama, M. Ohta,  
M. Tsubuku, E. Kikuchi, T. Hirohashi, M. Takahashi  
S. Yamazaki, *Semicond. Energy Lab, Japan*

(P-16) Characteristics of Photosensors with TiO<sub>2</sub> Nanorods  
I. -T. Tang<sup>2</sup>, T. -H. Meen<sup>1</sup>, L. -W. Ji<sup>1</sup>, Y. -J. Hsiao<sup>3</sup>,  
W. -S. Shih<sup>1</sup>, T. -H. Fang<sup>4</sup>, <sup>1</sup>*Nat'l Formosa Univ.,  
Taiwan*, <sup>2</sup>*Nat'l Univ. of Tainan, Taiwan*, <sup>3</sup>*Nat'l Nano  
Device Labs., Taiwan*, <sup>4</sup>*Nat'l Kaohsiung, Univ. of  
Applied Sci., Taiwan*

(P-17) Withdrawn

- (P-18) Forming SiO<sub>2</sub> Thin Film by CO<sub>2</sub> Laser Annealing of Spin-On Glass on Polycrystalline Silicon Thin Film  
D. Hishitani<sup>1</sup>, M. Horita<sup>1,2</sup>, Y. Ishikawa<sup>1,2</sup>, H. Ikenoue<sup>3</sup>, Y. Watanabe<sup>4</sup>, Y. Uraoka<sup>1,2</sup>, <sup>1</sup>*Nara Inst. of Sci. and Technol. (NAIST), Japan*, <sup>2</sup>*CREST, Japan*, <sup>3</sup>*Kyushu Univ., Japan*, <sup>4</sup>*GIGAPHOTON, Japan*
- (P-19) Properties of Pentacene Films Prepared by Heated Metal Mesh  
A. Heya, N. Matsuo, *Univ. of Hyogo, Japan*
- (P-20) Effects of Film Morphology on Ambipolar Transport of Top-Gate-Type Polymer Light-Emitting Transistors Utilizing Ambipolar Polymer-Blend Films  
H. Kajii, K. Koiwai, H. Tanaka, Y. Ohmori, *Osaka Univ., Japan*
- (P-L5) Effect of a Stimulation Layer on Solid-Phase Crystallization of an Amorphous Si Film by Pulse Laser Irradiation  
M. L. T. Kieu, K. Mochizuki, S. Horita, *Japan Advanced Inst. of Sci. and Technol., Japan*

## PVp

- (P-21) Fabrication of High Conductive ITO Thin Film for Photovoltaic Applications  
X. Li, C. Li<sup>1</sup>, D. Wang, C. Pradeep, M. Furuta, A. Hatta, *Kochi Univ. of Technol., Japan*
- (P-22) Activation of Silicon Implanted with Phosphorus Atoms by Microwave Heating  
S. Yoshidomi<sup>1</sup>, C. Akiyama<sup>1</sup>, J. Furukawa<sup>1</sup>, M. Hsumi<sup>1</sup>, T. Ishii<sup>1</sup>, T. Sameshima<sup>1</sup>, Y. Inouchi<sup>2</sup>, M. Naito<sup>2</sup>, <sup>1</sup>*Tokyo Univ. of Agriculture and Technol., Japan*, <sup>2</sup>*Nissin Ion Equipment, Japan*
- (P-23) Minority Carrier Annihilation at Crystalline Silicon Surface in MOS Structure  
J. Furukawa, S. Yoshidomi, M. Hasumi, T. Sameshima, *Tokyo Univ. of Agriculture and Technol., Japan*

- (P-24)      Efficient Subphthalocyanine/C<sub>60</sub> Planar  
Heterojunction Photovoltaic Device with Buffer  
Layer of Molybdenum Oxide  
W. -C. Su<sup>1</sup>, C. -C. Lee<sup>1</sup>, S. -W. Liu<sup>2</sup>, C. -F. Lin<sup>2</sup>,  
C. -C. Chou<sup>1</sup>, B. -Y. Huang<sup>1</sup>, and C. -W. Cheng<sup>1</sup>,  
*<sup>1</sup>Nat'l Taiwan Univ. of Sci. and Technol., Taiwan,*  
*<sup>2</sup>Ming Chi Univ. of Technol., Taiwan*
- (P-L6)      Effect of Anti-Soiling Photocatalytic Coating for  
Concentrator Photovoltaic Module  
Y. Ota<sup>1</sup>, T. Sueto<sup>1</sup>, M. Yokota<sup>1</sup>, K. Araki<sup>2</sup>,  
K. Nishioka<sup>1</sup>, *<sup>1</sup>Univ. of Miyazaki, Japan,* *<sup>2</sup>Daido*  
*Steel, Japan*

## Friday, July 5

### Session4: Si TFT (9 : 00 ~ 10 : 25)

**Chairpersons :** T. Noguchi, *Univ. of the Ryukyus, Japan*  
H. Tanabe, *NLT Technologies, Japan*

- 9:00 (4-1) Overcoming Current Limitations of Silicon Thin-Film Technology for Flexible Electronics (Invited)  
J. N. Jang, D. H. Lee, M. Hong, *Korea Univ., Korea*
- 9:25 (4-2) High Performance Poly-Si Thin-Film Transistor with One-Dimensionally Long Si Grains Using DLB Continuous-Wave Laser Lateral Crystallization  
M. Yamano<sup>1</sup>, S. Kuroki<sup>1</sup>, T. Sato<sup>1</sup>, K. Kotani<sup>2</sup>  
*<sup>1</sup>Hiroshima Univ., Japan, <sup>2</sup>Tohoku Univ., Japan.*
- 9:45 (4-3) Control of Drain Induced Barrier Lowering in Short Channel Poly-Si TFTs for AMOLED Displays  
K. Y. Byun, S. Jang, B. -T. Son, Y. -H. Yang, Y. Lee, Y. -T. Kim, H. Cho, M. -H. Yoo, *Samsung Display, Korea*
- 10:05 (4-4) Characteristic Deviation of Excimer-Laser Crystallized Poly-Si Thin-Film Transistors and Layout Design of Operational Amplifiers  
M. Kimura, S. Morii, Y. Ono, Y. Ito, T. Matsuda  
*Ryukoku Univ., Japan*

— Coffee Break —

### Session 5 : Notable Study in Photovoltaics (10: 45 ~ 11 : 35)

**Chairpersons :** T. N. Murakami, *AIST, Japan*  
Y. Ishikawa, *NAIST, Japan*

- 10:45 (5-1) Natural Resource Limitations to Terawatt-Scale Solar Photovoltaics (Invited)  
C. S. Tao<sup>1</sup>, J. Jiang<sup>1</sup>, M. Tao<sup>2</sup>, *<sup>1</sup>Univ. of Texas, USA, <sup>2</sup>Arizona State Univ., USA*
- 11:15 (5-2) Annihilation of Photo-Induced Minority Carrier Caused by Ion Implantation and Rapid Thermal Annealing  
T. Sameshima<sup>1</sup>, S. Shibata<sup>2</sup>, *<sup>1</sup>Tokyo Univ. of Agriculture and Technol., Japan, <sup>2</sup>Panasonic, Japan*

## Session 6 : Flat Panel Display (11: 40 ~ 12 : 45)

**Chairpersons :** N. Watanabe, *Sharp, Japan*  
H. Okada, *Univ. of Toyama, Japan*

11:40 (6-1) Ultra-High Resolution and Wide Viewing-Angle  
651 ppi LTPS LCDs (Invited)  
T. Iizuka, Y. Hisatake, T. Kawamura, H. Kimura,  
T. Nishibe, Y. Takubo, *Japan Display, Japan*

12:05 (6-2) 13.5-inch Quadra-FHD Flexible AMOLED with  
Crystalline Oxide FET  
T. Aoyama<sup>1</sup>, R. Komatsu<sup>1</sup>, R. Nakazato<sup>1</sup>, N. Ohno<sup>1</sup>,  
Y. Jinbo<sup>1</sup>, S. Eguchi<sup>1</sup>, A. Chida<sup>1</sup>, S. Kawashima<sup>1</sup>,  
Y. Hirakata<sup>1</sup>, S. Yamazaki<sup>1</sup>, M. Ohno<sup>2</sup>, J. Yanaka<sup>2</sup>,  
S. Obana<sup>2</sup>, K. Yamamoto<sup>2</sup>, Y. Yasuda<sup>3</sup>, S. Okazaki<sup>3</sup>,  
W. Nakamura<sup>3</sup>, S. Mitsui<sup>3</sup>, <sup>1</sup>*Semicond. Energy Lab.,  
Japan, <sup>2</sup>Advanced Film Device, Japan, <sup>3</sup>Sharp, Japan*

12:25 (6-3) Highly Reliable a-Si TFTs Gate Driver with Voltage  
Control Function according to Threshold Voltage  
Shift and Temperature Change  
S. Moon<sup>1,2</sup>, J. Lee<sup>2</sup>, B. Kim<sup>2</sup>, O. Kim<sup>1</sup>, <sup>1</sup>*Pohang Univ.  
of Sci. and Technol., Korea, <sup>2</sup>LG Display, Korea*

— Lunch —

## Session 7: Organic and Oxide Semiconductor Materials

(14: 05 ~ 15 : 10)

**Chairpersons :** K. Matsumoto, *Osaka Univ., Japan*  
M. Furuta, *Kochi Univ. of Technol., Japan*

14:05 (7-1) Anisotropic Carrier Transport in Organic  
Semiconductors Studied by Time-Resolved Optical  
Second-Harmonic Generation (Invited)  
T. Manaka, M. Iwamoto, *Tokyo Inst. of Technol.,  
Japan*

14:30 (7-2) Crystallography of In-Ga-Zn-O Thin Film Having  
CAAC Structure  
D. Ohgarane<sup>1</sup>, M. Konishi<sup>1</sup>, K. Dairiki<sup>1</sup>, M. Oota<sup>1</sup>,  
T. Hirohashi<sup>1</sup>, M. Takahashi<sup>1</sup>, M. Tsubuku<sup>1</sup>,  
S. Yamazaki<sup>1</sup>, Y. Kanzaki<sup>2</sup>, H. Matsukizono<sup>2</sup>,  
S. Kaneko<sup>2</sup>, S. Mori<sup>2</sup>, T. Matsuo<sup>2</sup>, <sup>1</sup>*Semicond.  
Energy Lab, Japan, <sup>2</sup>Sharp, Japan*

14:50 (7-3) Evaluation of Damages Using Electron Spin  
Resonance (ESR) in Oxide Semiconductors  
Induced by Plasma  
T. Matsuda, D. Nishimoto, K. Takahashi,  
T. Ueno, M. Kimura, *Ryukoku Univ., Japan*

**Session 8 : Advanced TFT (15: 25 ~ 16 : 30)**

**Chairpersons :** J. Jang, *Kyung Hee Univ., Korea*  
T. Takenobu, *Waseda Univ., Japan*

15:25 (8-1) Carbon Nanotube-Based Thin-Film Transistors on Plastic Film (Invited)  
Y. Ohno, *Nagoya Univ., Japan*

15:50 (8-2) High Performance Self-Aligned Top-Gate Amorphous Indium Zinc Oxide Thin-Film Transistors  
J. C. Park<sup>1,2</sup>, C. J. Kim<sup>1</sup>, U. -I. Chung<sup>1</sup>, S. Im<sup>2</sup>,  
<sup>1</sup>*Samsung Electronics, Korea*, <sup>2</sup>*Univ. of Yonsei, Korea*

16:10 (8-3) Self-Aligned Planar Metal Double-Gate Low-Temperature Polycrystalline-Silicon Thin-Film Transistors on Glass Substrate  
S. Sasaki, H. Ogata, A. Hara, *Tohoku Gakuin Univ., Japan*

**Late News : (16:30 ~ 17 : 00)**

**Chairpersons :** J. Jang, *Kyung Hee Univ., Korea*  
T. Takenobu, *Waseda Univ., Japan*

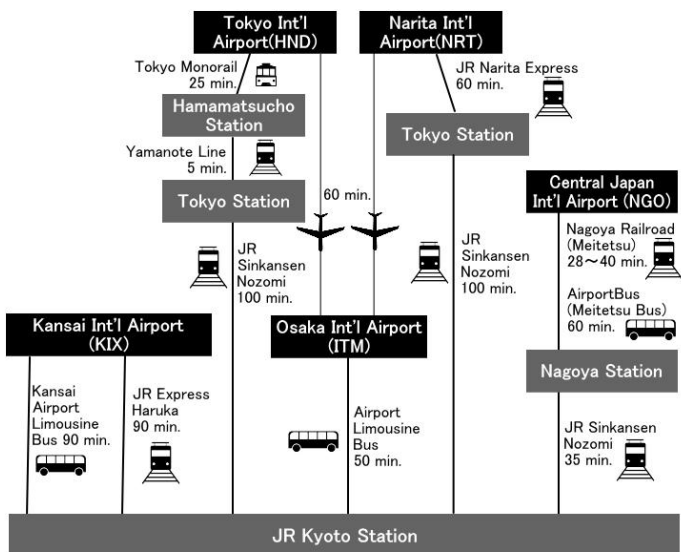
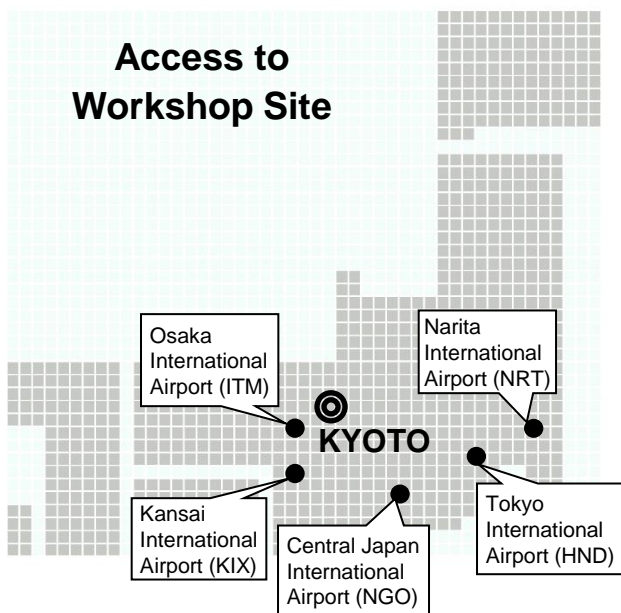
16:30 (L-2) Oblique Lateral Grain Growth of Si Film in CW Diode Laser Annealing  
W. Yeh, R. Morioka, *Shimane Univ., Japan*

16:45 (L-3) Investigation on Anti-Reflection Coating for High Resistance to Potential Induced Degradation  
K. Mishina<sup>1</sup>, A. Ogishi<sup>1</sup>, K. Ueno<sup>2</sup>, T. Doi<sup>3</sup>, K. Hara<sup>3</sup>, N. Ikeno<sup>4</sup>, D. Imai<sup>1</sup>, T. Saruwatari<sup>1</sup>, T. Yamazaki<sup>2</sup>, A. Ogura<sup>4</sup>, Y. Ohshita<sup>5</sup>, A. Masuda<sup>3</sup>, <sup>1</sup>*Shimadzu, Japan*, <sup>2</sup>*Choshu Industry, Japan*, <sup>3</sup>*Nat'l Inst. of Advanced Industrial Sci. and Technol.(AIST), Japan*, <sup>4</sup>*Meiji Univ., Japan*, <sup>5</sup>*Toyota Technological Inst., Japan*

**Closing Remarks (17 : 00 ~ 17 : 05)**

**Author Interviews (17 : 05 ~ 17 : 35)**

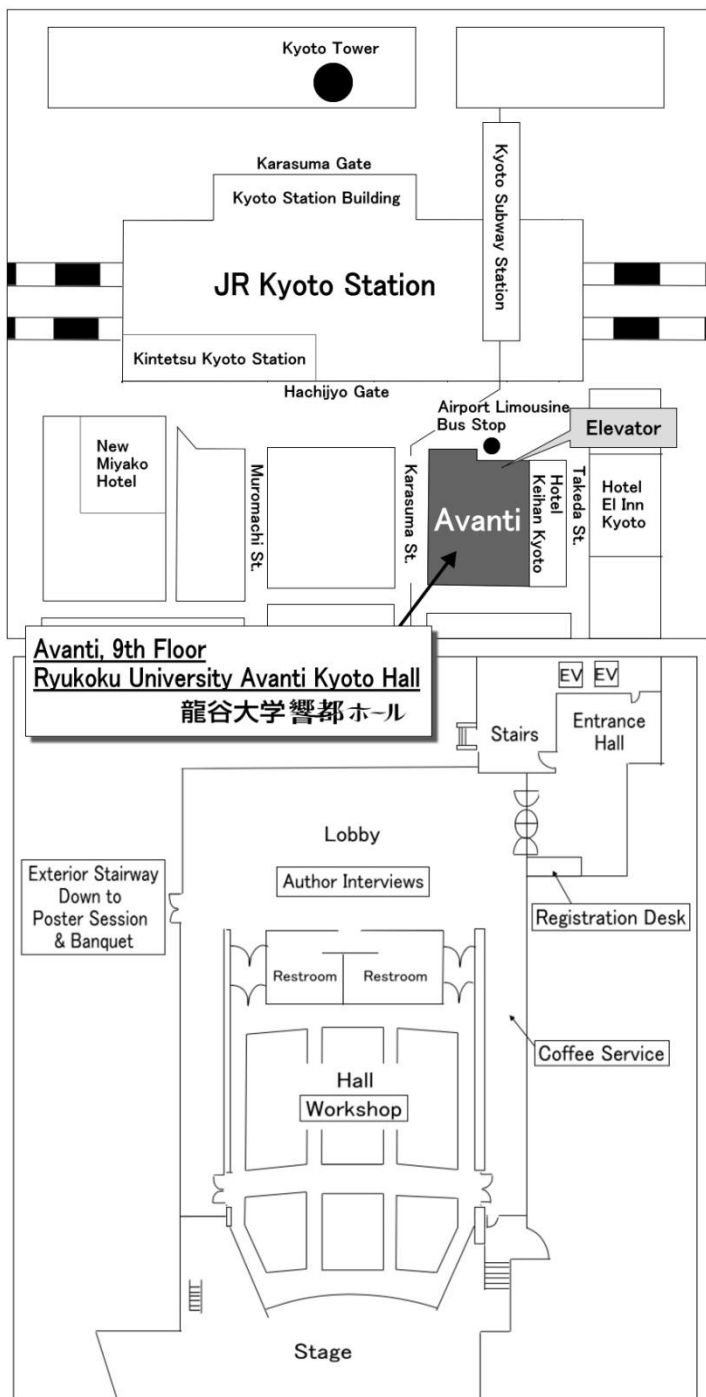
# Access to Workshop Site



Hachijo Gate  5 min.

Ryukoku University Avanti Kyoto Hall (Avanti 9th Floor)  
 龍谷大学響都ホール





# AM-FPD '13 Time Table

	Tuesday, July 2	Wednesday, July 3	Thursday, July 4	Friday, July 5	
Registration	17:30-19:00	8:30-17:00	8:30-17:00	8:30-14:30	
Workshop	9:00-9:15	Opening Session	9:00-10:30	<b>Session 4 :</b> Si TFT	
	9:15-11:15	<b>Session 1 :</b> Anniversary Session	10:30-10:45	10:25-10:45	
	11:15-11:35	<i>Coffee Break</i>	<b>Symposium 2:</b> Breakthrough for Future Applications of Thin-Film Transistor	<i>Coffee Break</i>	
	11:35-12:35	<b>Session 2 :</b> Keynote Address	10:45-12:15	<b>Session 5 :</b> Notable Study in Photovoltaics	
	9:30-17:00	Excursion	12:35-13:50	12:15-13:35	<b>Session 6 :</b> Flat Panel Display
				<i>Lunch</i>	12:45-14:05
		<b>Special Session:</b> Printing/Flexible Display Panels for Large Area, Thin and Lightweight Applications	<b>Symposium 3:</b> Flexible/Printed photovoltaics	<b>Session 7 :</b> Organic and Oxide Semiconductor Materials	
		13:50-15:20	13:35-15:05	14:05-15:10	
		15:20-15:40		15:10-15:25	
		15:40-17:05		<i>Coffee Break</i>	
				<b>Session 8 :</b> Advanced TFT	
				Late News	
				Closing Remarks	
Author Interviews		17:05-17:35	15:05-15:35	17:00-17:05	
			Author Interviews	Author Interviews	
Poster Session			<b>Poster Session:</b> FPDp / TFTp / TEMDp / PVp / LNP		
Tutorial	18:00-20:00				
Banquet		18:00-20:00			
		<i>Banquet</i>			

**Workshop :** "Ryukoku University Avanti Kyoto Hall" (Avanti, 9th Floor)

**Registration :** Entrance (Avanti, 9th Floor)

**Poster Session :** Marriage Grande "Takao" (Avanti, 8th Floor)

**Author Interviews :** Lobby (Avanti, 9th Floor)

**Banquet :** Marriage Grande "Takao" (Avanti, 8th Floor)

**Tutorial :** "Ryukoku University Avanti Kyoto Hall" (Avanti, 9th Floor)

(See Page 23)



**THE TWENTIETH INTERNATIONAL WORKSHOP ON  
ACTIVE-MATRIX FLATPANEL DISPLAYS AND DEVICES  
— TFT TECHNOLOGIES AND FPD MATERIALS —  
(AM-FPD '13)**

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