

Program

Semiconductor Technology for Ultra Large Scale Integrated Circuits and Thin Film Transistors V

An ECI Conference Series
June 14-18, 2015
Lake Tahoe, California, USA

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Yue Kuo
Texas A&M University, USA

Co-Chairs

Gennadi Bersuker
The Aerospace Corporation, USA

Olivier Bonnaud
University of Rennes 1 and GIP-CNFM, France



Engineering Conferences International
32 Broadway, Suite 314 - New York, NY 10004, USA
Phone: 1 - 212 - 514 - 6760
www.engconfintl.org – info@engconfintl.org

Granlibakken Conference Center and Lodge
725 Granlibakken Road
Tahoe City, CA 96145
Tel: +1-530-583-4242

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Previous conferences in this series

Semiconductor Technology for Ultra Large Scale Integrated Circuits and Thin Film Transistors
July 29-Aug 3, 2007

Barga, Italy

Conference Chairs:

Yue Kuo, Texas A&M University, USA
Michael Shur, Rensselaer Polytechnic Institute, USA
Dieter Ast, Cornell University, USA

Semiconductor Technology for Ultra Large Scale Integrated Circuits and Thin Film Transistors II
July 5-10, 2009

Xi'an, China

Conference Chair:

Yue Kuo, Texas A&M University, USA
Michael Shur, Rensselaer Polytechnic Institute, USA
Dieter Ast, Cornell University, USA
William Milne, Cambridge University, UK
Shaozhen Xiong, Nankai University, China

Semiconductor Technology for Ultra Large Scale Integrated Circuits and Thin Film Transistors III
June 26-July 1, 2011

Hong Kong, China

Conference Chairs:

Yue Kuo, Texas A&M University, USA
Gennadi Bersuker, Sematech, USA

Semiconductor Technology for Ultra Large Scale Integrated Circuits and Thin Film Transistors IV
July 8-11, 2013

Grenoble, France

Conference Chair:

Yue Kuo, Texas A&M University, USA
Gennadi Bersuker, Sematech, USA
C. Claeys, IMEC, Belgium

Conference Sponsors



Sunday, June 14, 2015

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|---------------|--|
| 16:00 - 17:30 | Conference Check-in (Cedar House Deck) |
| 17:30 - 18:30 | Reception (Cedar House) |
| 18:30 - 20:00 | Dinner (Cedar House) |

Notes

- *All technical sessions will be in Courtview I and II. The poster session will be in the Pavilion.*
- *Breakfasts and lunches will be in the Garden Deck (or the Granhall in case of inclement weather). Dinners will be in Cedar House.*
- *Audiotaping, videotaping and photography of presentations are prohibited.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3-5 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

Monday, June 15, 2015

07:00 - 08:00 Breakfast

08:00 - 08:10 Introductions
Yue Kuo, Conference Chair
Norman Li, ECI Liaison

Plenary

08:10 - 08:50 **Wide band gap semiconductors transistors for power devices and FPD**
Eun-Soo Nam, ETRI, South Korea

08:50 - 09:30 **Solving the Metallization Challenges in Semiconductor Manufacturing**
Sundar Ramamurthy, Metal Deposition Products, USA

09:30 - 10:00 Coffee Break

Oxide TFTs

Session Chair: Alex Balandin, UCR, USA and Jin Jang, Kyung Hee University, Korea

10:00 - 10:30 **The Multidisciplinary Approach: a Common Trend for ULSI and Thin Film Technology**
Olivier Bonnaud, University of Rennes 1, France

10:30 - 11:00 **Advances in Oxide Thin-film Transistors in Recent Decade and Their Future**
Hideuya Kumomi, Tokyo Institute of Technology, Japan

11:00 - 11:30 **The Behavior of C-axis-aligned a-b-plane-anchored Crystal (CAA Crystal)**
Shunpei Yamazaki, Semiconductor Energy Laboratory Co., Ltd., Japan

11:30 - 12:00 **Oxide TFTs for future display**
Chi-Sun Hwang, ETRI, South Korea

12:00 - 13:30 Lunch

13:30 - 18:30 *ad hoc* sessions / Free time

18:30 - 20:00 Dinner

20:00 - 21:30 **Poster Session** and Social Hour

Tuesday, June 16, 2015

07:00 - 08:00 Breakfast

Memories and materials

Session Chair: Gennadi Bersuker, The Aerospace Corporation, and Mamoru Furuta, Kochi University of Technology

08:00 - 08:30 **FEDRAM: A Capacitor-less DRAM Based on Ferroelectric-Gated Field-Effect Transistor**

T.P. Ma, Yale University, USA

08:30 - 09:00 **Material features controlling electrical characteristics of hafnia-based non-volatile memories**

Gennadi Bersuker, The Aerospace Corporation, USA

09:00 - 09:30 **Metal-Insulator-Metal devices with High-K dielectric for Nonvolatile or Dynamic Random Access Memories**

Ahmad Bsiesy, Université Grenoble Alpes, France

09:30 - 10:00 **Resistive Memory for Harsh Electronics**

Chih-Hsiang Ho, Purdue University, USA

10:00 - 10:30 Coffee Break

Oxide TFT fabrications

Session Chair: Po-Tsun Liu, National Chiao Tung University and Shunpei Yamazaki, Semiconductor Energy Laboratory Co., Ltd.

10:30 - 11:00 **High Performance Oxide TFT by Solution Process**

Jin Jang, Kyung Hee University, South Korea

11:00 - 11:30 **Solution-process oxide TFTs for Hybrid Low-Voltage CMOS Applications**

Yongtaek Hong, Seoul National University, South Korea

11:30 - 12:00 **Doping and Defect Passivation in In-Ga-Zn- by Fluorine**

Mamoru Furuta, Kochi University of Technology, Japan

12:00 - 12:30 **Reliability Enhancement of High-Mobility Amorphous Indium-Tungsten Oxide TFT**

Po-Tsun Liu, National Chiao Tung University/ Department of Photonics, Taiwan

12:30 - 14:00 Lunch

14:00 - 18:30 *ad hoc* sessions / Free time

18:30 - 20:00 Dinner

20:00 - 21:30 **Social Hour / Panel Discussion: Challenges in oxide applications in IC, displays, etc.**

Wednesday, June 17, 2015

- 07:00 - 08:30 Breakfast
- Etching & Dept. Processes: Etching & Deposition Processes**
Session Chair: Olivier Bonnaud, IETR Univ-Rennes 1 and Chi-Sun Hwang, ETRI
- 08:30 - 09:00 **Opportunities of high performance Ge CMOS**
Akira Toriumi, University of Tokyo, Japan
- 09:00 - 09:30 **Atomically Controlled Processing for Germanium-Based CVD Epitaxial Growth**
Junichi Murota, Tohoku University, Japan
- 09:30 - 10:00 **Simulation of Equipment and Processes for Semiconductor Device Manufacturing**
Peter Ventzek, Tokyo Electron America Inc., USA
- 10:00 - 10:30 **A New Frontier of Plasma Patterning: Atomic Layer Etch**
Ying Zhang, Applied MAterials, USA
- 10:30 - 11:00 Coffee Break
- Oxide and Si TFTs: Oxide and Si TFTs and GaN**
Session Chair: T.P. Ma, Yale University and Akira Toriumi, University of Tokyo
- 11:00 - 11:30 **Integrated Gate Driver Circuits Using a-Si TFT and Oxide TFT**
Yong Ho Jang, LG Display, South Korea
- 11:30 - 12:00 **High Performance Top Gate and Double Gate LT CLC Poly-Si TFTs on Glass Substrate**
Akito Hara, Tohoku Gakuin University, Japan
- 12:00 - 12:30 **Influence of Annealing with High Pressures Water for Atomic-Layer-Deposited Al₂O₃ on GaN**
Yukiharu Uraoka, Nara Institute of Science and Technology, Japan
- 12:30 - 12:50 **Analysis for Extremely Low Off-State Current in CAAC-IGZO FETs**
Masashi Tsubuku, Semiconductor Energy Laboratory, Japan
- 13:00 Boxed Lunch available
- 13:30 - 17:30 Free time for recreation
- 19:00 - 19:30 Reception
- 19:30 - 21:30 Banquet
- 21:30 - 22:30 **Social Hour / Panel Discussion: Challenges in nano transistors / Free Discussions**

Thursday, June 18, 2015

07:00 - 08:00 Breakfast

New Devices

Session Chair: Junichi Murota, Tohoku University and Ying Zhang, Applied Materials

08:30 - 09:00 **Thin Film Transistors using 2D Materials for Selective Gas Sensing**
Alexander Balandin, University of California - Riverside, USA

09:00 - 09:30 **Hetero interface of ionic/covalent oxides for Nano-electronics**
Toshihide Nabatame, National Institute for Materials Science, Japan

09:30 - 10:00 **A New Type of Antifuse Made of High-k Dielectric**
Yue Kuo, Texas A&M University, USA

10:00 - 10:30 **Graphene Heat Spreaders and Interconnects for Advanced Electronics**
Alexander Balandin, University of California - Riverside, USA

10:30 - 11:00 Coffee Break

New Devices Applications

Session Chair: Peter Ventzek, Tokyo Electron America Inc. and Yukiharu Uraoka, Nara Institute of Science and Technology

11:00 - 11:30 **Advanced Germanium Epitaxy for Photonics Application**
Yuji Yamamoto, IHP, Germany

11:30 - 12:00 **From Thin To Ultra-Thin Film Transistors For Wearable In-teractive Electronics**
Muhammad Hussain, KAUST, Saudi Arabia

12:00 - 12:30 **Silicon CMOS on glass and plastic - Crystallization and layer transfer approaches -**
Seiichiro Higashi, Hiroshima University, Japan

12:30 - 12:50 **Bulk barrier source-gated transistors with improved drain current dynamic range and temperature coefficient**
Radu A. Sporea, University of Surrey, United Kingdom

12:50 – 13:00 Conclusions / Next Conference

13:00 - 14:00 Lunch and Departures

Poster List

Poster Session Chairs: Ahmad Bsiesy, Université Grenoble Alpes
and Hideya Kumomi, Tokyo Institute of Technology

1. **Vertical thin-film transistors based on oxide semiconductor for 3D memory array applications**
Chih-Hsiang Chang, National Chiao Tung University, Taiwan
2. **N-type degradation of oxide semiconductor TFTs under drain current stress**
Haruyuki Baba, Semiconductor Energy Laboratory Co., Ltd., Japan
3. **An Electrically Detected Magnetic Resonance Study of Leakage Mechanisms in Low-k Interlayer Dielectrics**
Michael Mutch, Pennsylvania State University, USA
4. **High Current Stress-Induced Heating Effects in Thin-Film Transistors on Plastic: Oxide vs. LTPS**
Suhui Lee, Advanced Display Research Center, South Korea
5. **Evidence for Structural Change From Negative Bias Temperature Stress in 4H-SiC DMOSFET Bulk**
Mark Anders, Penn State University, USA
6. **The Stability of Noise Behavior in Amorphous Indium Gallium Zinc Oxide Thin Film Transistors under Illumination**
Chun-Yi Chang, National Chiao Tung University, Taiwan
7. **High Photo Sensitivity Low-Temperature Polycrystalline Silicon Thin-Film Transistor Using Body Extension Contact**
Chun-Yi Chang, National Chiao Tung University, Taiwan
8. **Effect of precursor concentration and annealing on solution processed SnO₂ thin film transistors**
Priyadarshini Devaraddi Mangannavar, IIT Madras, India
9. **Instability behaviour of sprayed ZnO based Ferroelectric field-effect transistors with copolymer gate dielectric**
Junhee Cho, University of Cambridge, United Kingdom