

Program

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

An ECI Conference Series

**June 26 - July 1, 2011
Hong Kong, China**

Conference Chair

Yue Kuo
Texas A&M University, USA

Conference Co-Chair

Gennadi Bersuker
SEMATECH, USA



**Engineering Conferences International
32 Broadway, Suite 314 - New York, NY 10004, USA
Phone: 1 - 212 - 514 - 6760, Fax: 1 - 212 - 514 - 6030
www.engconfintl.org – info@engconfintl.org**

Engineering Conferences International (ECI) is a not-for-profit global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

ECI BOARD MEMBERS

Barry C. Buckland, President

Peter Gray

Raymond McCabe

David Robinson

Jules Routbort

William Sachs

Eugene Schaefer

P. Somasundaran

Deborah Wiley

Chair of ECI Conferences Committee: William Sachs

ECI Technical Liaison for this conference: Norman Li

ECI Director: Barbara K. Hickernell

ECI Associate Director: Kevin M. Korpics

Financial Sponsors

Semiconductor Energy Laboratory

Electrochemical Society Electronics and Photonics Division

SEMATECH

Technical sponsors

Korea Physical Society Semiconductor Division

IEEE ED/SSC Hong Kong

Japan Society of Applied Physics

IMEC

Sunday, June 26, 2011

16:30 – 18:30	Registration
18:30 – 20:00	Welcome Reception

Notes

- Welcome Reception: Salon II & III
- Technical Session: Regency Ballroom I
- Poster Session with Social Hour: Salon I
- Meals:
 - June 27 Lunch & Dinner Regency Ballroom I
 - June 28 Lunch & Dinner Regency Ballroom I
 - June29 Lunch Regency Ballroom I
 - Dinner on your own
 - June 30 Reception Sha Tin 18 Upper Deck
 - Banquet Dinner Sha Tin 18 Lower Deck
 - July 1 Lunch Regency Ballroom I
- Audiotaping, videotaping and photography of presentations are prohibited.
- Speakers – Please leave at least 3-5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm (with your initials) that the listing is correct. A corrected copy will be sent to all participants after the conference.

Monday, June 27, 2011

07:00 – 08:00	Breakfast Buffet
08:00 – 08:10	Welcome and Conference Overview Y. Kuo and G. Bersuker, Conference Chairs
	<u>Plenary Talks</u> Session Chair: Y. Kuo, Texas A&M University
08:10 – 08:55	It's a 3D World - Challenges and opportunities for 3D logic and memory ULSI devices R. Jammy, SEMATECH
08:55 – 09:40	Semiconductor technology evolution for ULSIC H.-K. Kang, Samsung Electronics
09:40 – 10:25	Nanoscale metal silicides L. J. Chen, National Tsing Hua University
10:25 – 10:50	Coffee Break
	<u>Nano Devices</u> Session Chairs: G. Bersuker, SEMATECH T. Asano, Kyushu University
10:50 – 11:20	Silicon grow-in-place nanowires and their applications S. Fonash, Pennsylvania State University
11:20 – 11:50	In-plane silicon nanowires for field effect transistor applications L. Yu and P. R. i Cabarrocas, CNRS
11:50 – 12:20	Application of graphene and carbon nanotubes to transistors and interconnects S. Sato, M. Nihei, and N. Yokoyama, AIST
12:20 – 14:00	Lunch
14:00 –	Afternoon Coffee
14:00 – 15:30	<u>Panel Discussion: Challenges in extremely large and small scalings</u> Moderators: S. Srinivasan and H.-K. Kang
16:00 – 18:30	Free time for discussion, <i>ad hoc</i> sessions, leisure
18:30 – 19:30	<u>Poster Session/Social Hour</u> Session Chairs: F. Yan, Hong Kong Polytechnic University
19:30 – 20:30	Dinner
20:30 – 21:30	Social Hour & Discussion

Tuesday, June 28, 2011

07:00 – 08:20

Breakfast Buffet

IC Devices & Materials

Session Chairs: W. Milne, Cambridge University
S. J. Fonash, Pennsylvania State University

08:20 – 09:00

Keynote: Unipolar CMOS logic for post-Si ULSI and for TFT technologies
T. P. Ma, Yale University

09:00 – 09:30

Epitaxial techniques for semiconductor manufacturing
S. Srinivasan, Applied Materials

09:30 – 10:00

Electron and hole trapping in polycrystalline and amorphous oxides for novel CMOS devices
A. Shluger, K. McKenna, University College London; G. Bersuker, SEMATECH

10:00 – 10:30

Coffee Break

Oxide and Organic TFTs

Session Chairs: J. Murota, Tohoku University
S. Srivanasan, Applied Materials

10:30 – 11:00

Zinc Oxide-Based Transparent TFTs Produced at Low Temperature
W. Milne, F. Li, M. Mann, R. Waddingham, A. Kiani and A. Flewitt, Cambridge University

11:00 – 11:30

High performance a-IGZO TFT and TFT circuits for display application
J. Jang, Kyung Hee University

11:30 – 11:50

Comparative analysis of organic thin film transistor structures for flexible E-paper and AMOLED displays
L. Feng, X. Xu, X. Guo, Shanghai Jiao Tong University

12:00 – 14:00

Lunch

14:00 –

Afternoon Coffee

14:00 – 16:00

Panel Discussion: Challenges in materials and fabrication
Moderators: M. Caymax and J. Jang

16:30 – 19:00

Free Time for discussion, *ad hoc* sessions, leisure.

19:00 – 20:30

Dinner

20:30 – 21:30

Social Hour & Discussion

Wednesday, June 29, 2011

07:00 – 08:00

Breakfast Buffet

Memories and Interfaces

Session Chairs: G. Fortunato, CNR-IMM
S. Sato, AIST

08:00 – 08:30

Structural characteristics of transition metal oxides enabling resistive memory operations

G. Bersuker, SEMATECH

08:30 – 09:00

Nonvolatile memories for nano and giga electronics applications

Y. Kuo, Texas A&M University

09:00 – 09:30

Understanding the switching mechanism in RRAM devices and the dielectric breakdown of ultrathin high-k gate stacks from first principles calculations

B. Magyari-Kope and Y. Nishi, Stanford University

09:30 – 9:50

Manipulation of graphene properties by interface engineering

J. B. Xu, X. M. Wang, C. L. Wang, W. G. Xie, and J. Du, The Chinese University of Hong Kong

10:00 – 10:30

Coffee Break

Si-based TFTs

Session Chairs: T. P. Ma, Yale University
Y. Saito, Toshiba

10:30 – 11:00

Short channel effects and drain field relief architectures in polysilicon TFTs

G. Fortunato, M. Cuscunà, L. Maiolo, L. Mariucci, M. Rapisarda, A. Pecora and A. Valletta, CNR-IMM, S.D. Brotherton, TFT Consultant, UK

11:00 – 11:30

The potential application of oxide thin film transistor for active matrix display

T. Mohammed-Brahim and K. Kandoussi, University Rennes 1

11:30 – 12:00

Single-grain germanium TFTs

R. Ishihara, T. Chen, Delft University of Technology

12:00 – 12:20

Source-gated transistors for versatile large area electronic circuit design and fabrication

R. A. Sporea, C. Opoku, M. Shkunov, J. M. Shannon, and S. Ravi P. Silva, Advanced Technology Institute; X. Guo, Shanghai Jiao Tong University

12:20 – 14:00

Lunch

14:00

Free Time for leisure, recreation, discussion *ad hoc* sessions
Optional Excursions
Dinner on your own

Thursday, June 30, 2011

07:00 – 08:00

Breakfast

IC beyond Si

Session Chairs: O. Bonnaud, University Rennes 1
H. S. Kwok, Hong Kong University of Science Technology

08:30 – 09:00

SiGe, Ge and III-V materials and processes for beyond-Si CMOS and more-than-Moore applications

M. Caymax, IMEC

09:00 – 09:30

Electrical atomically controlled CVD processing for doping in future Si-based devices

J. Murota and M. Sakuraba, Tohoku University; B. Tillack, IHP and Technical University of Berlin

09:30 – 10:00

Physical modeling of charge transport and degradation in high-K stacks for logic device and memory applications

L. Larcher, A. Padovani, and L. Vandelli, Università di Modena e Reggio Emilia; G. Bersuker, SEMATECH

10:00 – 10:30

Coffee Break

TFT Devices and Processes

Session Chairs: C. Matty, IMEC
L. Larcher, Università di Modena e Reggio

10:30 – 11:00

Success in measuring the lowest off-state current of transistors in the world

Y. Sekine, K. Furutani, Y. Shionoiri, K. Kato, J. Koyama, S. Yamazaki, Semiconductor Energy Laboratory

11:00 – 11:30

Self-heating Issue of poly-Si TFT on glass substrate

T. Asano and G. Nakagawa, Kyushu University

11:30 – 12:00

Bridged-grain TFT

H. S. Kwok, M Wong, S Y Zhao and W Zhou, Hong Kong University of Science and Technology

12:20 – 14:00

Lunch

14:00 –

Afternoon Coffee

14:00 – 16:00

Panel Discussion: Challenges in Applications

Moderators: G. Bersuker and Y. Saito

16:30 – 19:00

Free Time for leisure, recreation, discussion *ad hoc* sessions

19:00 – 22:00

Conference Banquet

Friday, July 1, 2011

07:00 – 08:00	Breakfast Buffet
	<u>Packages and New Device Principles</u>
	Session Chairs: J. Jang, Kyung Hee University A. Shluger, University College London
08:00 – 08:40	Keynote: Recent advances on nano-materials for advanced packaging applications C. P. Wong, Chinese University of Hong Kong and Georgia Institute of Technology
08:40 – 09:10	Spin-based MOSFET and its applications Y. Saito, T. Inokuchi, M. Ishikawa, H.i Sugiyama, T. Marukame, and T. Tanamoto, Toshiba Corporation
09:10 – 09:40	Flexible thin film transistor arrays as an enabling platform technology: Opportunities and challenges G. B. Raupp, City University of Hong Kong
09:40 – 10:10	Coffee Break
10:10 – 11:50	<u>TFT New Application</u>
	Session Chairs: C. P. Wong, Chinese University of Hong Kong R. Ishihara, Delft University of Technology
10:10 – 10:40	Vertical channel thin film transistor: Improvement approach similar to multigate monolithic CMOS technology O. Bonnaud, Z. Peng , E. Jacques and R. Rogel, University Rennes 1
10:40 – 11:00	Low power 6.0-Inch extended graphics array reflective liquid crystal display using crystalline indium gallium zinc oxide semiconductor with electronic paper function M. Kaneyasu, H. Miyake, T. Nishi, Y. Hirakata, J. Koyama, S. Yamazaki Semiconductor Energy Laboratory Co.; R. Sato, M. Sakakura, Advanced Film Device Inc.
11:00– 11:30	Biosensors based on organic thin film transistors F. Yan, Hong Kong Polytechnic University
11:30 – 11:50	MILC PMOS poly-silicon TFT circuits and application in SOP P. Sun, S. Zhao, T.-K. Ho, M. Wong, and H. S. Kwok, Hong Kong University of Science and Technology; Z. Meng, Nankai University
11:50 - 12:00	Conclusion of Conference: Wrap-up, Thanks, and Future Y. Kuo, Texas A&M University, and G. Bersuker, SEMATECH
12:10	Lunch
14:00	Departure

List of Posters

Authors	Topic
1. S. Amano, H. Miyake, T. Nishi, Y. Hirakata, J. Koyama, S. Yamazaki (SEL)	Low power 6.0-inch extended graphics array transmissive liquid crystal display using crystalline indium gallium zinc oxide semiconductor with variable frame frequency
2. Y. Yuan, E. Ivanov (Tosoh)	Formation and characterization of rare earth metal silicides
3. J. Li, F. Yan (Hong Kong Polytechnic University)	Low voltage organic field-effect transistors based on poly(2,5bis(3-alkylthiophen-2-yl)-thieno[3,2-b]thiophene) semiconducting polymer
4. Sun Z., J. Li, F. Yan (Hong Kong Polytechnic University)	High carrier mobility of P3HT induced by TiO ₂ nanorods