



**SISC 2007**

**38<sup>th</sup> IEEE  
Semiconductor Interface  
Specialists Conference**

December 6-8, 2007  
Key Bridge Marriott Hotel, Arlington, VA  
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**ABSTRACTS**

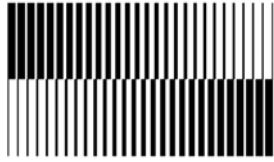
General Chair: Matt Copel

Technical Chair: Ben Kaczer

Arrangements Chair: Dina Triyoso

Ex-Officio: Glen Wilk

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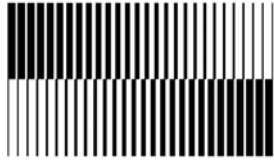
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*This meeting is sponsored by the IEEE Electron Devices Society*



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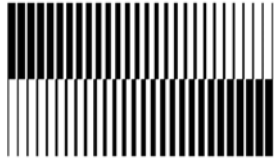
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## **SISC Ed Nicollian Award for Best Student Paper**

In 1995, the SISC began presenting an award for the best student presentation, in honor of Professor E.H. Nicollian, University of North Carolina at Charlotte. Professor Nicollian was a pioneer in the exploration of the metal-oxide-semiconductor system, particularly in the area of electrical measurements. His efforts were fundamental in establishing the SISC in its early years, and he served as its technical program chair in 1982. With John Brews, he wrote the definitive book, “MOS Physics and Technology,” published by Wiley Interscience.

The *SISC Ed Nicollian Award for Best Student Paper* is presented to the lead student author or either an oral or poster presentation. The winner is chosen by members of the technical program committee at the end of the SISC. The award consists of a plaque and an honorarium sent to the winner after the conference. To honor the winner, the award is announced at the conference taking place the following year.

The *2006 SISC Ed Nicollian Award for Best Student Paper* was given to Laurent Thevenod of CEA-LETI/MINATEC, Grenoble, France. The paper was entitled “Characterization of TiN/HfO<sub>2</sub>/SiO<sub>2</sub> MOSFETs by extracting mobility from magnetoresistance measurements” with co-authors M. Cassé, W. Desrat, M. Mouis, G. Reibold, and F. Boulanger.



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## Conference Agenda Overview

### Wednesday, December 5, 2007

Registration .....	6:00 PM – 9:00 PM
Hospitality Room .....	7:00 PM – Midnight

### Thursday, December 6, 2007

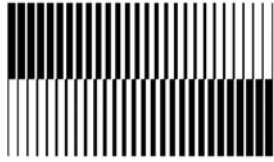
Registration .....	8:00 AM – 5:00 PM
Session 1 – High-k Defects and FET Mobility .....	8:00 AM – 9:20 AM
Poster Session 1 – Oxide Defects .....	9:25 AM – 9:40 AM
Session 2 – Reliability .....	10:10 AM – 11:30 AM
Poster Session 2 – Reliability and Non-Volatile Memories.....	11:35 AM – 12:02 PM
Session 3 – Advanced High-k Stacks .....	1:30 PM – 2:30 PM
Poster Session 3 – High-Mobility Substrates .....	2:35 PM – 3:02 PM
Session 4 – Non-Volatile Memories.....	3:30 PM – 4:50 PM
Poster Session 4 – Metal Gates and Work Function Control.....	4:55 PM – 5:16 PM
Poster Reception .....	7:00 PM – 10:00 PM
Hospitality Room .....	9:00 PM – Midnight

### Friday, December 7, 2007

Registration .....	8:00 AM – Noon
Session 5 – High-Mobility Substrates I.....	8:00 AM – 10:00 AM
Session 6 – High-Mobility Substrates II .....	10:30 AM – 12:10 PM
Technical Committee / Invited Speaker Luncheon .....	12:10 PM – 1:30 PM
Optional Rump Sessions .....	3:00 PM – 5:30 PM
Conference Banquet and Limerick Contest.....	7:00 PM – 10:00 PM
Hospitality Room .....	10:00 PM – Midnight

### Saturday, December 8, 2007

Session 7 – Theory .....	8:20 AM – 10:00 AM
Session 6 – Work Function Control.....	10:20 AM – 11:45 AM



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**Conference Program**

**Session 1 - High-k Defects and FET Mobility**

**Thursday, December 6, 2007**

**Session Chair: M. Frank**

- 8:00 AM Welcome and opening remarks
- 8:05 AM 1.1 *Invited* - **Electron Transport in Bulk-Si NMOSFET's in Presence of High-k Gate Insulator**, K. Maitra<sup>1</sup>, M. Frank<sup>2</sup>, V. Narayanan<sup>2</sup>, B. P. Linder<sup>2</sup>, E. Gusev<sup>3</sup>, V. Misra<sup>4</sup>, E. Cartier<sup>2</sup>, <sup>1</sup>AMD, <sup>2</sup>IBM, <sup>3</sup>Qualcomm, <sup>4</sup>North Carolina State University
- 8:40 AM 1.2 - **Inherent point defects at the epitaxial Lu<sub>2</sub>O<sub>3</sub>/(111)Si interface probed by electron spin resonance**, A. Stesmans<sup>1</sup>, P. Somers<sup>1</sup>, V. V. Afanas'ev<sup>1</sup>, W. Tian<sup>2</sup>, L. F. Edge<sup>2</sup>, D. G. Schlom<sup>2</sup>, <sup>1</sup>Katholieke Universiteit Leuven, Belgium, <sup>2</sup>Pennsylvania State University
- 9:00 AM 1.3 - **Trap Energy Levels in HfO<sub>2</sub>, HfAl<sub>y</sub>O<sub>x</sub>, and Al<sub>2</sub>O<sub>3</sub> Thin Films**, C.-C. Yeh<sup>1</sup>, N. Ramaswamy<sup>2</sup>, N. Rocklein<sup>2</sup>, D. Gealy<sup>2</sup>, K. Min<sup>3</sup>, T. Graettinger<sup>2</sup>, T. P. Ma<sup>1</sup>, <sup>1</sup>Yale University, <sup>2</sup>Micron Technology, <sup>3</sup>Intel Corporation

**Poster Session 1 - Oxide Defects**

**Thursday, December 6, 2007**

**Session Chair: E. Vogel**

- 9:25 AM P.1 - **Effect of electrical bias on paramagnetic defects at high-k (HfO<sub>2</sub>)<sub>x</sub>(SiO<sub>2</sub>)<sub>1-x</sub> on (100)Si**, P. T. Chen, B. B. Triplett, Y. Nishi, J. Chambers, L. Colombo, *Stanford University*
- 9:28 AM P.2 - **Characterization of Dysprosium oxide (Dy<sub>2</sub>O<sub>3</sub>) incorporated HfO<sub>2</sub> gate oxide devices**, T. Lee, J. C. Lee, S. K. Banerjee, *University of Texas at Austin*
- 9:31 AM P.3 - **Effect of oxidation pressure on Pb center generation and H termination for thin thickness SiO<sub>2</sub> under 2.5 nm**, D. Matsushita, K. Kato, K. Muraoka, Y. Mitani, *Toshiba Corporation, Japan*
- 9:34 AM P.4 - **Effects of Aging on Strained Si-Si Bonds and O Vacancies near the SiO<sub>2</sub>/Si Interface**, X. J. Zhou<sup>1</sup>, D. M. Fleetwood<sup>1</sup>, I. Danciu<sup>1</sup>, A. Dasgupta<sup>1</sup>, S. A. Francis<sup>1</sup>, A. D. Touboul<sup>2</sup>, <sup>1</sup>Vanderbilt University, <sup>2</sup>University Montpellier, France
- 9:37 AM P.5 - **Effect of STI Mechanical Stress on p-Channel Gate Oxide Integrity**, C.-Y. Hsieh<sup>1</sup>, Y.-T. Lin<sup>1</sup>, T.-H. Liang<sup>1</sup>, W.-C. Lee<sup>2</sup>, J.-B. Bouche<sup>1</sup>, M.-J. Chen<sup>1</sup>, <sup>1</sup>National Chiao-Tung University, Taiwan, <sup>2</sup>TSMC, Taiwan
- 9:40 AM Break

## Session 2 - Reliability

Thursday, December 6, 2007

Session Chair: P. Lenahan

- 10:10 AM Opening remarks
- 10:15 AM 2.1 *Invited* - **Reversible and Irreversible Instabilities in High-k/Metal Gate Stacks**, G. Bersuker, *SEMATECH*
- 10:50 AM 2.2 - **Hot Carrier Injection Study on Sidewall Surfaces of HfSiON/TiN FinFETs**, C. D. Young<sup>1</sup>, K. Matthews<sup>2</sup>, S. Suthram<sup>3</sup>, M. M. Hussain<sup>1</sup>, C. Smith<sup>1</sup>, R. Harris<sup>4</sup>, R. Choi<sup>1</sup>, H.-H. Tseng<sup>1</sup>, <sup>1</sup>*SEMATECH*, <sup>2</sup>*ADTF*, <sup>3</sup>*University of Florida*, <sup>4</sup>*AMD*
- 11:10 AM 2.3 - **Electron energy dependence of defect generation in high-κ gate stacks**, R. O'Connor<sup>1</sup>, L. Pantisano<sup>1</sup>, R. Degraeve<sup>1</sup>, T. Kauerauf<sup>1</sup>, B. Kaczer<sup>1</sup>, Ph. J. Roussel<sup>1</sup>, G. Groeseneken<sup>2</sup>, <sup>1</sup>*IMEC, Belgium*, <sup>2</sup>*Katholieke Universiteit Leuven, Belgium*

## Poster Session 2 - Reliability and Non-Volatile Memories

Thursday, December 6, 2007

Session Chair: C.-G. Wang

- 11:35 AM P.6 - **Tunneling Component Suppression in Charge Pumping Measurement and Reliability Study for Thin High-k Gated MOSFETs**, C.-C. Lu, K.-S. Chang-Liao, C.-Y. Lu, S.-C. Chang, T.-K. Wang, *National Tsing Hua University, Taiwan*
- 11:38 AM P.7 - **Mechanism for SILC Trap Creation Due to Released Bi-Hydrogen from Gate Oxide Interface**, Y. Mitani<sup>1</sup>, T. Yamaguchi<sup>1</sup>, H. Satake<sup>1</sup>, A. Toriumi<sup>2</sup>, <sup>1</sup>*Toshiba Corporation, Japan*, <sup>2</sup>*University of Tokyo, Japan*
- 11:41 AM P.8 - **PBTI Associated Hot Carrier Characteristics of Nano-scale NMOSFETs with Advanced Gate Stack of Metal Gate/High-k dielectrics**, K. T. Lee<sup>1,5</sup>, C. Y. Kang<sup>2</sup>, R. Choi<sup>2</sup>, S. C. Song<sup>2</sup>, B. H. Lee<sup>2,3</sup>, O. S. Yoo<sup>4,5</sup>, H.-D. Lee<sup>4,5</sup>, Y.-H. Jeong<sup>1</sup>, <sup>1</sup>*Pohang University, Korea*, <sup>2</sup>*SEMATECH*, <sup>3</sup>*IBM*, <sup>4</sup>*Chungnam National University, Korea*, <sup>5</sup>*University of Texas at Austin*
- 11:44 AM P.9 - **Impact of the Hard Breakdown detection method on the extraction of the Wearout distribution parameters**, S. Sahhaf<sup>1</sup>, R. Degraeve<sup>2</sup>, Ph. J. Roussel<sup>2</sup>, B. Kaczer<sup>2</sup>, T. Kauerauf<sup>2</sup>, G. Groeseneken<sup>1</sup>, <sup>1</sup>*Katholieke Universiteit Leuven, Belgium*, <sup>2</sup>*IMEC, Belgium*
- 11:47 AM P.10 - **Electron tunneling spectroscopy study of traps in Si<sub>3</sub>N<sub>4</sub> for SONOS technology**, M. Wang, C.-C. Yeh, C.-C. Ho, T. P. Ma, *Yale University*
- 11:50 AM P.11 - **A Physical Model of the Switching Mechanism in Oxide Resistive Switching Random Access Memory**, L. F. Liu, J. F. Kang, B. Sun, J. F. Yang, B. G. Yan, C. Chen, N. Xu, X. Sun, H. Tang, D. D. Han, Y. Wang, X. Y. Liu, X. Zhang, R. Q. Han, *Peking University, China*
- 11:53 AM P.12 - **Retention Improvement in fluorinated-HfO<sub>2</sub>/SiO<sub>2</sub> Tunnel stack for Non-Volatile Flash Memory**, S. Verma<sup>1</sup>, P. Majhi<sup>2</sup>, H. Hwang<sup>3</sup>, P. Kapur<sup>1</sup>, G. Bersuker<sup>4</sup>, K. Parat<sup>2</sup>, W. Tsai<sup>2</sup>, K. C. Saraswat<sup>1</sup>, <sup>1</sup>*Stanford University*, <sup>2</sup>*Intel Corporation*, <sup>3</sup>*GIST, Korea*, <sup>4</sup>*SEMATECH*
- 11:59 AM P.13 - **NH<sub>3</sub> treatments of Hf-based layers for application as NVM active dielectrics**, M. Bocquet<sup>1,2</sup>, G. Molas<sup>2</sup>, E. Martinez<sup>2</sup>, H. Grampeix<sup>2</sup>, F. Martin<sup>2</sup>, J. P. Colonna<sup>2</sup>, J. Buckley<sup>2</sup>,

C. Licitra<sup>2</sup>, N. Rochat<sup>2</sup>, T. Veyron<sup>2</sup>, A. M. Papon<sup>2</sup>, F. Aussenac<sup>2</sup>, V. Delaye<sup>2</sup>, M. Gély<sup>2</sup>, G. Pananakakis<sup>1</sup>, B. De Salvo<sup>2</sup>, G. Ghibaudo<sup>1</sup>, S. Deleonibus<sup>2</sup>, <sup>1</sup>IMEP-CNRS/INPG, France, <sup>2</sup>CEA-LETI, France

12:02 AM Adjourn for lunch

## Session 3 – Advanced High-k Stacks

Thursday, December 6, 2007

Session Chair: M. Takayanagi

1:30 PM Opening remarks

1:35 PM 3.1 *Invited* - **Photoemission Study of Metal/High-k Dielectric Gate Stack**, S. Miyazaki<sup>1</sup>, H. Yoshinaga<sup>1</sup>, A. Ohta<sup>1</sup>, Y. Akasaka<sup>2</sup>, K. Shiraishi<sup>3</sup>, K. Yamada<sup>4</sup>, S. Inumiya<sup>2</sup>, M. Kadoshima<sup>2</sup> and Y. Nara<sup>2</sup>, <sup>1</sup>Hiroshima University, Japan, <sup>2</sup>Selete, Japan, <sup>3</sup>University of Tsukuba, Japan, <sup>4</sup>Waseda University, Japan

2:10 PM 3.2 - **Electron and hole trapping in oxides: amorphous vs. crystalline materials**, A. Kimmel, K. McKenna, J. Gavartin, A. Shluger, University College London, UK

## Poster Session 3 - High-Mobility Substrates

Thursday, December 6, 2007

Session Chair: G. Reimbold

2:35 PM P.14 - **First-principles investigation of oxygen adsorption on GaAs(001)**, M. Scarozza<sup>1,2</sup>, G. Pourtois<sup>1</sup>, M. Houssa<sup>1,2</sup>, A. Stesmans<sup>2</sup>, M. Meuris<sup>1</sup>, M. Heyns<sup>1,2</sup>, <sup>1</sup>IMEC, Belgium, <sup>2</sup>Katholieke Universiteit Leuven, Belgium

2:38 PM P.15 - **InAs and In<sub>0.8</sub>Ga<sub>0.2</sub>As Field-Effect-Transistors with Al<sub>2</sub>O<sub>3</sub> Gate Dielectric Deposited by Molecular-Atom-Deposition (MAD)**, N. Li<sup>1</sup>, E. S. Harmon<sup>1</sup>, D. Salzman<sup>1</sup>, X. W. Wang<sup>2</sup>, T. P. Ma<sup>2</sup>, <sup>1</sup>Lightspin Technologies, Inc., <sup>2</sup>Yale University

2:41 PM P.16 - **Electrical and Chemical Properties of ALD Grown HfO<sub>2</sub> Films on GeO<sub>x</sub>N<sub>y</sub>/Ge Substrates after Thermal Treatment**, Y. Oshima<sup>1,3</sup>, Y. Sun<sup>2</sup>, D. Kuzum<sup>1</sup>, T. Sugawara<sup>3</sup>, K. C. Saraswat<sup>1</sup>, P. Pianetta<sup>2</sup>, P. C. McIntyre<sup>1</sup>, <sup>1</sup>Stanford University, <sup>2</sup>Stanford Synchrotron Radiation Laboratory, <sup>3</sup>Tokyo Electron Ltd, Japan

2:44 PM P.17 - **GaAs MOS C-V Measurements - Surface Chemistry and Device Physics Perspective**, P. D. Ye<sup>1</sup>, J. M. Woodall<sup>1</sup>, T. Yang<sup>1</sup>, Y. Xuan<sup>1</sup>, D. Zemlyanov<sup>1</sup>, T. Shen<sup>1</sup>, Y. Q. Wu<sup>1</sup>, R. M. Wallace<sup>2</sup>, <sup>1</sup>Purdue University, <sup>2</sup>University of Texas at Dallas

2:47 PM P.18 - **Charge pumping characterization of germanium MOSFETs**, K. Martens<sup>2</sup>, B. Kaczer<sup>1</sup>, T. Grasser<sup>3</sup>, B. De Jaeger<sup>1</sup>, M. Meuris<sup>1</sup>, G. Groeseneken<sup>2</sup>, H. Maes<sup>2</sup>, <sup>1</sup>IMEC, Belgium, <sup>2</sup>Katholieke Universiteit Leuven, Belgium, <sup>3</sup>Technische Universität Wien, Austria

2:50 PM P.19 - **ALD high-k dielectric growth on high-mobility graphene surface**, Y. Xuan, Y. Q. Wu, T. Shen, P. D. Ye, Purdue University

2:53 PM P.20 - **Atomic Layer Deposition of Al<sub>2</sub>O<sub>3</sub> and HfO<sub>2</sub> on GaAs substrates**, D. Shahrjerdi, S. Coffee, J. G. Ekerdt, S. K. Banerjee, University of Texas at Austin

2:59 PM P.21 - **Study of surface preparation for high-k dielectrics on GaAs**, F. S. Aguirre-Tostado<sup>1</sup>, M. Milojevic<sup>1</sup>, S. McDonnell<sup>1</sup>, R. Contreras-Guerrero<sup>1</sup>, C. L. Hinkle<sup>1</sup>, K. J. Choi<sup>1</sup>, J. Kim<sup>1</sup>, E. M. Vogel<sup>1</sup>, A. Herrera-Gomez<sup>1</sup>, R. M. Wallace<sup>1</sup>, T. Yang<sup>2</sup>, Y. Xuan<sup>2</sup>, P. D. Ye<sup>2</sup>, <sup>1</sup>University of Texas at Dallas, <sup>2</sup>Purdue University

3:02 PM Break

## Session 4 - Non-Volatile Memories

Thursday, December 6, 2007

Session Chair: B.-H. Lee

3:30 PM Opening remarks

3:35 PM 4.1 *Invited* - **Resistance Switching Characteristics of Doped Metal Oxide for Non-Volatile Memory Applications**, D. S. Lee, W. Xiang, R. Dong, D. J. Seong, H. Hwang, *GIST, Korea*

4:10 PM 4.2 - **Dielectric Layer Quality Effect on Charge Transport Mechanisms in a Localized Trapping-Based Nonvolatile Memory Device**, Y. Shur<sup>1</sup>, Y. Shacham-Diamand<sup>1</sup>, B. Eitan<sup>2</sup>, A. Shappir<sup>2</sup>, <sup>1</sup>*Tel Aviv University, Israel*, <sup>2</sup>*Saifun Semiconductors, Israel*

4:30 PM 4.3 - **Al<sub>2</sub>O<sub>3</sub> as the Interpoly or Blocking Dielectric In Flash Memories**, X. W. Wang, S.-I. Shim, T. P. Ma, *Yale University*

## Poster Session 4 - Metal Gates and Work Function Control

Thursday, December 6, 2007

Session Chair: P. D. Ye

4:55 PM P.22 - **Fluorine in Metal Gate / High-k Gate Stacks: Diffusion and Electrically Active States**, M. M. Frank, E. A. Cartier, R. Jha, V. R. Deline, *IBM*

4:58 PM P.23 - **Oxygen Transfer from Metal Gate to High-k Gate Dielectric Stacks: Interface Structure & Property Changes**, J.-H. Ha<sup>1</sup>, H. AlShareef<sup>2</sup>, J. Chambers<sup>2</sup>, Y. Sun<sup>3</sup>, P. Pianetta<sup>3</sup>, P. C. McIntyre<sup>1</sup>, L. Colombo<sup>2</sup>, <sup>1</sup>*Stanford University*, <sup>2</sup>*Texas Instruments*, <sup>3</sup>*Stanford Synchrotron Radiation Laboratory*

5:01 PM P.24 - **Investigation of the Work Function of TiN on High-K Dielectric / p-type Si Gate Stack Structures Using Photoemission Spectroscopy**, J. Choung<sup>1</sup>, K. Choi<sup>2</sup>, J. E. Rowe<sup>1</sup>, H. Jeon<sup>1,3</sup>, R. J. Nemanich<sup>1,4</sup>, <sup>1</sup>*North Carolina State University*, <sup>2</sup>*SEMATECH*, <sup>3</sup>*Hanyang University, Korea*, <sup>4</sup>*Arizona State University*

5:04 PM P.25 - **Ab initio Study of Metal Gate Electrode - Gate Oxide Interface Work Function**, B. Magyari-Kope<sup>1</sup>, Y. Nishi<sup>1</sup>, K. Cho<sup>2</sup>, <sup>1</sup>*Stanford University*, <sup>2</sup>*University of Texas at Dallas*

5:07 PM P.26 - **Effect of Gadolinium (Gd) incorporation in NiSi FUSI gate / High-k dielectric via Electrical and Structural Modification of the Gate stack**, B. Lee, S. R. Novak, N. Biswas, V. Misra, *North Carolina State University*

5:10 PM P.27 - **The effect of high pressure post metallization annealing in dilute oxygen ambient on effective work function of metal gate**, J.-M. Lee<sup>1</sup>, H. Park<sup>1</sup>, M. Hasan<sup>1</sup>, M. Jo<sup>1</sup>, M. Chang<sup>1</sup>, R. Choi<sup>2</sup>, B. H. Lee<sup>2,3</sup>, H. Hwang<sup>1</sup>, <sup>1</sup>*GIST, Korea*, <sup>2</sup>*SEMATECH*, <sup>3</sup>*IBM*

5:13 PM P.28 - **Investigations on PVD and CVD TiN workfunctions for advanced MOS applications**, C. Leroux<sup>1</sup>, M. Charbonnier<sup>1</sup>, V. Cosnier<sup>2</sup>, P. Besson<sup>2</sup>, J. Mitard<sup>1,2</sup>, G. Reimbold<sup>1</sup>, F. Martin<sup>1</sup>, <sup>1</sup>*CEA-LETI, France*, <sup>2</sup>*STMicroelectronics, France*

5:16 PM Adjourn

7:00 PM **Poster Reception**



## Session 5 - High-Mobility Substrates I

Friday, December 7, 2007

Session Chair: M. Fischetti

- 8:00 AM Morning announcements
- 8:05 AM **5.1 Invited - Ge and III/V: the CMOS of the Future**, M. Heyns<sup>1,2</sup>, C. Adelmann<sup>1</sup>, F. Bellenger<sup>1</sup>, G. Brammertz<sup>1</sup>, D. Brunco<sup>3</sup>, M. Caymax<sup>1</sup>, B. De Jaeger<sup>1</sup>, A. Delabie<sup>1</sup>, G. Eneman<sup>1</sup>, M. Houssa<sup>1</sup>, B. Kaczer<sup>1</sup>, D. Lin<sup>4</sup>, K. Martens<sup>1</sup>, M. Meuris<sup>1</sup>, J. Mittard<sup>1</sup>, K. Opsomer<sup>1</sup>, G. Pourtois<sup>1</sup>, A. Satta<sup>1</sup>, M. Scarrozza<sup>1</sup>, E. Simoen<sup>1</sup>, S. Sioncke<sup>1</sup>, L. Souriau<sup>1</sup>, V. Terzieva<sup>1</sup>, S. Van Elshocht<sup>1</sup>, <sup>1</sup>IMEC, Belgium, <sup>2</sup>Katholieke Universiteit Leuven, Belgium, <sup>3</sup>Intel Corporation, <sup>4</sup>Purdue University
- 8:40 AM **5.2 - Electronic structure of GeO<sub>2</sub>-passivated interfaces of (100)Ge with Al<sub>2</sub>O<sub>3</sub> and HfO<sub>2</sub>**, V. V. Afanas'ev<sup>1</sup>, A. Stesmans<sup>1</sup>, A. Delabie<sup>2</sup>, M. Houssa<sup>2</sup>, <sup>1</sup>Katholieke Universiteit Leuven, Belgium, <sup>2</sup>IMEC, Belgium
- 9:00 AM **5.3 - Elimination of Ge-O bonding in interfacial transition regions between Ge and Hf-based gate dielectrics: a necessary requirement of low defect density interfaces between n-type Ge and oxide dielectrics**, G. Lucovsky<sup>1</sup>, S. Lee<sup>1</sup>, J. P. Long<sup>1</sup>, H. Seo<sup>1</sup>, J. Luning<sup>2</sup>, <sup>1</sup>North Carolina State University, <sup>2</sup>Stanford Synchrotron Radiation Laboratory
- 9:20 AM **5.4 - Investigation of Poor Carrier Transport in Germanium NFETs**, A. Khakifirooz, A. Ritenour, J. Hennessy, D. A. Antoniadis, *Massachusetts Institute of Technology*
- 9:40 AM **5.5 - Charge Pumping and Carrier Separation Characteristics of High- $\kappa$  Gated SiGe Channel p-MOSFETs**, L. Y. Song<sup>1</sup>, A. Lubow<sup>1</sup>, C. Xiong<sup>1</sup>, X. Pan<sup>1</sup>, T. P. Ma<sup>1</sup>, R. Harris<sup>2</sup>, P. Majhi<sup>2</sup>, P. Kirsch<sup>2</sup>, H.-H. Tseng<sup>2</sup>, <sup>1</sup>Yale University, <sup>2</sup>SEMATECH
- 10:00 AM Break

## Session 6 - High-Mobility Substrates II

Friday, December 7, 2007

Session Chair: R. Nemanich

- 10:30 AM Opening remarks
- 10:35 AM **6.1 Invited - Structure and Composition of High-k Films on Alternative Channel Materials**, L. Goncharova, O. Celik, C.-L. Hsueh, T. Feng, E. Garfunkel and T. Gustafsson, *Rutgers University*
- 11:10 AM **6.2 - Influence of the substrate orientation on the electrical and material properties of GaAs MOSFETs Using HfO<sub>2</sub> and Silicon Interface Passivation Layer**, I.-J. Ok<sup>1</sup>, H. Kim<sup>1</sup>, M. Zhang<sup>1</sup>, F. Zhu<sup>1</sup>, S. Park<sup>1</sup>, J. Yum<sup>1</sup>, H. Zhao<sup>1</sup>, D. Garcia<sup>2</sup>, P. Majhi<sup>2</sup>, J. C. Lee<sup>1</sup>, <sup>1</sup>University of Texas at Austin, <sup>2</sup>SEMATECH
- 11:30 AM **6.3 - GaAs MOS Frequency Dispersion Reduction by Surface Oxide Removal and Passivation**, C. L. Hinkle, A. M. Sonnet, E. M. Vogel, S. McDonnell, M. Milojevic, B. Lee, F. S. Aguirre-Tostado, K. J. Choi, J. Kim, R. M. Wallace, *University of Texas at Dallas*
- 11:50 AM **6.4 - Enhancement-mode GaAs MOS-HEMTs with ALD Al<sub>2</sub>O<sub>3</sub>, HfO<sub>2</sub>, HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> laminate as high-k gate dielectrics**, H. C. Lin, T. Yang, H. Sharifi, S. K. Kim, Y. Xuan, T. Shen, S. Mohammadi, P. D. Ye, *Purdue University*

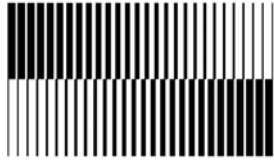
- 12:10 PM Adjourn for lunch ; Technical Committee / Invited Speaker Luncheon  
3:00 PM **Optional Rump Sessions – Topics TBD**  
7:00 PM **Conference Banquet and Limerick Contest**

**Session 7 - Theory**  
**Saturday, December 8, 2007**  
**Session Chair: K. Shiraishi**

- 8:20 AM Morning announcements
- 8:25 AM **7.1 Invited - First Principles Investigation of Defects at Semiconductor-Oxide Interfaces**, A. Pasquarello, *EPFL, Switzerland*
- 9:00 AM **7.2 - Band-gap and permittivity change at high-k gate stack interfaces - device perspective**, S. Markov<sup>1,2</sup>, S. Roy<sup>1</sup>, C. Fiegna<sup>2</sup>, E. Sangiorgi<sup>2</sup>, A. Asenov<sup>1</sup>, <sup>1</sup>*University of Glasgow, UK*, <sup>2</sup>*University of Bologna, Italy*
- 9:20 AM **7.3 - Defect Fermi level pinning model for HfO<sub>2</sub> on p-Metal gates**, J. Robertson, *Cambridge University, UK*
- 9:40 AM **7.4 - Role of Te on the effective work function of Mo/HfO<sub>2</sub>**, K. Xiong<sup>1</sup>, P. D. Delugas<sup>1</sup>, V. Fiorentini<sup>2</sup>, J. Robertson<sup>3</sup>, D. M. Liu<sup>3</sup>, G. Pourtois<sup>4</sup>, J. C. Hooker<sup>1</sup>, <sup>1</sup>*NXP Semiconductors, Belgium*, <sup>2</sup>*Universita di Cagliari, Italy*, <sup>3</sup>*Cambridge University, UK*, <sup>4</sup>*IMEC, Belgium*
- 10:00 AM Break

**Session 8 - Work Function Control**  
**Saturday, December 8, 2007**  
**Session Chair: J. Robertson**

- 10:20 AM Opening remarks
- 10:25 AM **8.1 - Origin of Threshold Voltage Shift and EOT Change in TiN Gate MOSFETs Analyzed by Positron Annihilation Spectroscopy and Backside X-ray Photoelectron Spectroscopy**, T. Matsuki<sup>1</sup>, T. Watanabe<sup>1</sup>, T. Miura<sup>1</sup>, N. Mise<sup>1</sup>, T. Eimori<sup>1</sup>, Y. Nara<sup>1</sup>, Y. Ohji<sup>1</sup>, K. Yamada<sup>2</sup>, A. Uedono<sup>3</sup>, <sup>1</sup>*Selete, Japan*, <sup>2</sup>*Waseda University, Japan*, <sup>3</sup>*University of Tsukuba, Japan*
- 10:45 AM **8.2 - Mechanism of V<sub>fb</sub> shift in SiO<sub>2</sub> and Hf-based gate dielectric stacks by capping Gd<sub>2</sub>O<sub>3</sub>**, M. Zhang, F. Zhu, I.-J. Ok, H.-S. Kim, H. Zhao, J. C. Lee, *University of Texas at Austin*
- 11:05 AM **8.3 - A Comprehensive Study on Effective Work Function Modulation of Metal/High-k Gate Stacks**, T. Hosoi<sup>1</sup>, Y. Kita<sup>1</sup>, Y. Kagei<sup>1</sup>, T. Shimura<sup>1</sup>, H. Watanabe<sup>1</sup>, K. Shiraishi<sup>2</sup>, Y. Nara<sup>3</sup>, K. Yamada<sup>4</sup>, <sup>1</sup>*Osaka University, Japan*, <sup>2</sup>*University of Tsukuba, Japan*, <sup>3</sup>*Selete, Japan*, <sup>4</sup>*Waseda University, Japan*
- 11:25 AM **8.4 - A Significant Shift of Strongly Pinned Charge Neutrality Level at Metal/Germanium Interface by Inserting Ultra-thin Oxides**, T. Nishimura, K. Kita, A. Toriumi, *University of Tokyo, Japan*
- 11:45 AM Closing remarks



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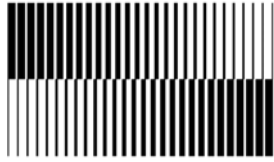
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