2018 IEEE International Integrated Reliability Workshop

PROGRAM SCHEDULE

SUNDAY, October 7 Please have lunch before arriving at the camp; no lunch will be served at the camp.

3:00-6:00 p.m.	Registration: Pick up badges, electronic handout, and attendee gift; Discussion Group and SIG Signup (*Lodge Lounge*)
3:00-8:00 p.m.	Lodge check-in: Get room assignment (prearranged) & room key. (If physically challenged, please notify desk of special needs.)
6:00-7:30 p.m.	DINNER (*Dining Room*)
7:30-8:30 p.m.	**Sunday Night Tutorial** (*Angora Room*) Semiconductor Reliability History — Joe McPherson, McPherson Reliability consulting
8:30-10:00 p.m.	Social (*Old Lodge*)

MONDAY, October 8

7:00-8:00 a.m.	BREAKFAST (*Dining Room*)
	Plenary Session (*Angora Room*)
8:00-8:10 a.m.	Welcome & Introduction— Luca Larcher, Univ. of Modena and Reggio Emilia
8:10-8:20 a.m.	Technical Program Overview— Zakariae Chbili, GLOBALFOUNDRIES
8:20-9:20 a.m.	**Keynote:** Universal Reliability Modeling from Defect Centric Perspective: A Pipe-Dream? — Tibor Grasser, TU Wien
	Session #1 (*Angora Room*) — **RF Reliability,** Chair: Charles LaRow, Samsung
9:20-9:55 a.m.	1.1 **(INVITED)** Considerations for Hot Carrier Modeling in CMOS RF Applications— Stewart Rauch, GLOBALFOUNDRIES
9:55-10:20 a.m.	Coffee and Snack Break
10:20-11:20 a.m.	**Tutorial #1** Training Fully Connected Networks with Non-Volatile Memories: prospects and challenges — Stefano Ambrogio, IBM
11:20-11:55 a.m.	1.2 **(INVITED)** RF/DC reliability and random telegraph noise under the influence of a magnetic field on CMOS advanced technologies — Edmundo Gutierrez, Instituto Nacional de Astrofisica, Optica y Electronica
12:00-1:00 p.m.	LUNCH (*Dining Room*)
1:00-1:05 p.m.	Announcements (*Angora Room*)
	Session #2 (*Angora Room*) **— Circuit Reliability,** Chair: Brad Bittel, Intel
1:05-1:30 p.m.	2.1 Self-heating effects on Hot carrier degradation and its impact on Ring-Oscillator reliability — P. Paliwoda, Z. Chbili, A. Kerber, T. Nigam, D. Singh, K. Nagahiro, P. P. Manik, S. Cimino and D. Misra, GLOBALFOUNDRIES Inc and New Jersey Institute of Technology
1:30-1:40 p.m.	Innovative Probing solutions — K. Armendariz, Celadon Systems
1:40-2:05 p.m.	2.2 New Insights on device level TDDB at GHz Speed in advanced CMOS nodes — M. Arabi, X. Federspiel, F. Cacho, M. Rafik, A. Nguyen, X. Garros and G. Ghibaudo, ST Microelectronics
2:05-2:30p.m.	2.3 Off-state Impact on FDSOI Ring Oscillator Degradation under High Voltage Stress — J. Trommer, V. Havel, G. Krause, T. Chohan, G. Bossu, W. Arfaoui, A. Muehlhoff, F. Mehmood, T. Mikolajick and S. Slesazeck, Namlab gGmbH, GLOBALFOUNDRIES and TU Dresden.
2:30-2:55 p.m.	2.4 FDSOI Mosfet gate dielectric breakdown Vd dependancy — X. Federspiel, M. Arabi, F. Cacho, M. Rafik and A. Cros, Namlab gGmbH, ST Microelectronics.
3:00-3:30 p.m.	Coffee and Snack Break
	Session #3 (*Angora Room*) **— Reliability and defects,** Chair: Chadwin Young, UT Dallas
3:30-3:50 p.m.	**(INVITED)** Electron Devices Society: Activities and Opportunities – Fernando Guarin, IEEE EDS
3:50-4:25 p.m.	3.1 **(INVITED)** Memory Reliability and Characterization — Christian Zambelli, University Ferrara
4:25-4:50 p.m.	3.2 Correlated Defect Creation in HfO2 films — A. Shluger and J. Strand, University College London.
4:50-5:15 p.m.	3.3 Distribution Function Based Simulations of Hot-Carrier Degradation in Nanowire FETs — M. Vandemaele, B. Kaczer, Z. Stanojevic, S. Tyaginov, A. Makarov, A. Chasin, H. Mertens, D. Linten and G. Groeseneken, KU Leuven, imec, Global TCAD Solutions, TU Wien.
5:15-5:50 p.m.	3.4 **(INVITED)** RRAM reliability and Characterization — Pragya Shrestha, NIST
5:50-6:00 p.m.	Discussion Group Overview (Angora Room)
6:00-7:30 p.m.	DINNER (*Dining Room*)
7:30-9:00 p.m.	**Discussion Groups I-II:** Chair: Gaddi Haase, Sandia National Laboratories
9:00-10:00 p.m.	Social (*Old Lodge*)

TUESDAY, October 9

7:00-8:00 a.m.	BREAKFAST (*Dining Room*)

Time	Event
8:00-8:05 a.m.	Announcements (*Angora Room*)
	Reliability Experts Forum (*Angora Room*)
8:05-10:00 a.m.	**Panel #1:** A review of Hot Carrier Degradation in advanced nodes — Moderator, Stanislas Tyaginov, TU Wien
10:00-10:30 a.m.	Coffee and Snack Break
10:30-11:55 a.m.	**Panel #2:** A review of Time Dependent Dielectric Breakdown in advanced nodes — Moderator, Luca Larcher, Univ. of Modena and Reggio Emilia
12:00-1:00 p.m.	LUNCH (*Dining Room*)
1:00-1:05 p.m.	Announcements (*Angora Room*)
1:05-2:35 p.m.	**Panel #2 (Continued):** A review of Time Dependent Dielectric Breakdown in advanced nodes — Moderator, Luca Larcher, Univ. of Modena and Reggio Emilia
2:35-3:00 p.m.	Coffee and Snack Break
3:00-6:00 p.m.	**Panel #3:** A review of Bias Temperature Instability in advanced nodes — Moderator, Jason Campbell, NIST
6:00-7:30 p.m.	DINNER *(Dining Room)*
7:30-9:00 p.m.	**Poster Session** (*Cathedral Room*), Chair: Pat Lenahan, Pensylvania State University. Mark Anders, NIST
9:00-10:00 p.m.	Social (*Old Lodge*)

Wednesday, October 10

Time	Event
7:00-8:00 a.m.	BREAKFAST (*Dining Room*)
8:00-8:05 a.m.	Announcements (*Angora Room*)
	Session #4 (*Angora Room*) **— Automotive and Power devices,** Chair: Matt Ring, ON semiconductors
8:05-9:05 a.m.	**Tutorial #2:** An Overview of Automotive Reliability — Andreas Aal, Volkswagen
9:05-9:30 a.m.	4.1 Voltage- and Temperature-Dependent Degradation of AlN/GaN High Electron Mobility Transistors — T. Kemmer, M. Dammann, M. Baeumler, P. Brückner, H. Konstanzer, R. Quay and O. Ambacher, Fraunhofer Institute for Applied Solid State Physics and University of Freiburg
9:30-10:05 a.m.	4.2 **(INVITED)** SiC power MOSFET reliability — Daniel J. Lichtenwalner, Wolfspeed
10:05-10:30a.m.	Coffee and Snack Break
	Session #5 (*Angora Room*) **— FET Reliability,** Chair: Suresh Uppal
10:30-10:55 a.m.	5.1 On the Impact of Metal Work-Function on BTI Charge Trapping Component — J. Franco, Z. Wu, G. Rzepa, L.-Å Ragnarsson, H. Dekkers, A. Vandooren, G. Groeseneken, N. Horiguchi, N. Collaert, D. Linten, T. Grasser, B. Kaczer, imec
10:55-11:20 a.m.	5.2 Improved PBTI Reliability in Junction-less nFETs Fabricated at Low Thermal Budget for 3D Sequential Integration — Zhicheng Wu, Jacopo Franco and Anne Vandooren, imec
11:20-11:55 a.m.	5.3 **(INVITED)** Time Dependent Dielectric Breakdown Universality — Ernest Wu, IBM
11:55-12:05 p.m.	GROUP PICTURE
12:05-1:00 p.m.	LUNCH (*Dining Room*)
1:00-1:05 p.m.	Announcements (*Angora Room*)
1:05-6:00 p.m.	Open—The afternoon is free for discussion, hiking & other recreation. All attendees are required to be back before dark.
6:00-7:30 p.m.	DINNER (*Dining Room*)
7:30-9:00 p.m.	**Discussion Groups III-IV:** Chair: Andreas Aal, Volkswagen

Thursday, October 11

Time	Event
7:00-8:00 a.m.	BREAKFAST (*Dining Room*)
8:00-8:05 a.m.	Announcements (*Angora Room*)
	Session #6 (*Angora Room*) **— Defect, reliability and modeling** Chair: Pat Lenahan, Pensylvania State University
8:05-8:40 a.m.	6.1 **(INVITED)** Extraction of defect band properties — Gerhard Rzepa, TU Wien
8:40-9:15 a.m.	6.2 Border Trap Based Modeling of SiC Transistor Transfer Characteristics — Stanislav Tyaginov, Markus Jech, Gerhard Rzepa, Alexander Grill, Al-Moatasem Bellah El-Sayed, Gregor Pobegen, Alexander Makarov, Tibor Grasser. Imec, TU Wien, KAI GmbH.
9:15-9:40 a.m.	6.3 Cross-Temperature Effects of Program and Read Operations in 2D and 3D NAND Flash Memories — Cristian Zambelli, Luca Crippa, Rino Micheloni and Piero Olivo, Univeristy Ferrara
9:40-10:05 a.m.	6.4 Identifying Defects Responsible For Leakage Currents in Thin Dielectric Films — Ryan Waskiewicz, Elias Frantz, Patrick Lenahan, Sean King, Nicholas Harmon, Michael Flatte. The Pennsylvania State University, Intel, University of Iowa.
10:05-10:35 a.m.	Coffee and Snack Break
10:35-11:00 a.m.	6.5 Self-Heating Effect in Silicon-Germanium Heterostructure Bipolar Transistors in Stress and Operating Conditions — Francesco Maria Puglisi, Marco Ghillini, Luca Larcher and Paolo Pavan, Univ. of Modena and Reggio Emilia
11:00-11:30 a.m.	**DG Summary / Wrap-up**
12:00-1:00 p.m.	LUNCH (*Dining Room*) & then the Workshop Ends

1:00 p.m. Shuttle Bus to San Francisco International Airport leaves Stanford Sierra Camp

Poster Presentations

Refereed Posters

RP01 Reliability of High Speed Photodetector for Silicon Photonic Applications - Fatoumata Sy, Quentin Rafhay, Carine Besset, Gaelle Beylier, Philippe Grosse, David Roy and Jean-Emmanuel Broquin, STMicroelectronics, Univ. Grenoble Alpes INP IMEP-LAHC, CEA Leti.

RP02 Multiple Modes of Electromigration Failure in SAC Solder Alloys - Deborah Noble, Matthew Ring and Jim Lloyd. SUNY Polytechnic Institute Albany, ON Semiconductor.

RP03 Gate-to-via ratio design for reliability - Tam Lyn Tan, GLOBALFOUNDRIES.

RP04 Aging Control of Power Amplifier using Power Detector - Rania Lajmi, Florian Cacho, Vincent Knopik, Philippe Cathelin, José Lugo, Philippe Benech, Estelle Lauga Larroze, Sylvain Bourdel and Xavier Federspiel. ST Microelectronics, IMEP-LAHC Univ. Grenoble Alpes.

RP05 Gate Oxide Degradation Assessment by Electrical Stress and Capacitance Measurements - Dann Morillon, Pascal Masson, Franck Julien, Philippe Lorenzini, Jerome Goy, Clement Pribat, Olivier Gourhant, Thibault Kempf, Jean-Luc Ogier, Alexandre Villaret, Giada Ghezzi, Nathalie Cherault and Stephan Niel, ST Microelectronics, Polytech'Lab Nice Sophia-Antipolis University.

RP06 New Physics-based Electromigration Model and Its Potential Application on Degradation Simulation for FinFET SRAM - Rui Zhang, Kexin Yang, Taizhi Liu and Linda Milor.

RP07 Investigation of the effects of Pulsed Direct Current at low frequencies on the Electromigration Lifetime - Jennifer Passage, Sophia Rogalskyj, Nabihah Azhari and Jim Lloyd SUNY Albany.

RP08 Process Optimization in IMD Deposition: A Successful Application of Isothermal Fast Wafer-Level Electromigration - Guanggeng Yao, Zhi Gang Han, Hin Kiong Yap, Foong Peng Yuen, Chun Pheng Tan, Pee Ya Tan and Chee Wee Eng, GLOBALFOUNDRIES.

RP09 Relevance of off-state NBTI degradation in depletion HVNMOS transistor for automotive application. Marc Strasser, Stefano Aresu, Katja Puschkarsky, Roberta Stradiotto, Holger Poehle and Wolfgang Gustin, Infineon Technologies

RP10 Synaptic Behavior of Nanoscale ReRAM Devices for the Implementation in a Dynamic Neural Network Array- Karsten Beckmann, Wilkie Olin-Ammentorp, Sierra Russell, Nadia Suguitan, Chris Hobbs, Martin Rodgers, Nathaniel Cady, Garrett Rose and Joseph Van Nostrand, SUNY Polytechnic Institute, Air Force Research Laboratory.

RP11 Fast Power-Temperature Cycling of BEOL test structures for Power Devices - Matthew Ring, Bill Cowell, Darren Moore and Jeff Gambino, ON Semiconductor.

RP12 Aging Investigation of Digital Circuit using In-situ Monitor. Riddhi Shah, Florian Cacho, Rania Lajmi and Lorena Anghel, STMicroelectronics.

Open Posters

OP01 Lifetime Estimation Using Ring Oscillators for Prediction in FinFET Technology - Shu-Han Hsu, Kexin Yang, Rui Zhang and Linda Milor, Georgia Institute of Technology

OP02 Live Determination of Health State of GaN Transistors - Ayotunde Odejayi and Charles Kim, Howard University.

OP03 Burn-In Optimization for Indium Phosphide Laser Diodes - Charles Recchia, David Woodilla, Mark Bachman and Hugh Carolan, MACOM.

OP04 A New Analytic Reliability Tool To Study Leakage Currents in Thin Films: Near Zero Field Magneto- Resistance Spectroscopy – Elias Frants and Patrick Lenahan, The Pennsylvania State University