

Plenary: Opening Remarks—Prasad Chaparala [Audio](#) [Visuals](#)

Technical Program Remarks—Chris Henderson [Audio](#) [Visuals](#)

Keynotes 1 & 2 (audio & visuals not available) [titles/abstract/biographies](#)

Awards—Giuseppe La Rosa [Audio](#) [Visuals](#)

2A: Interconnect Metalization Reliability

2B: Soft Errors

2C: Compound/Opto Electronics

2D: Circuits Aging Simulation/Circuits Reliability

2E: Memory

2F: Chip Package Interaction

3A: BEOL Dielectric Reliability

3B: Product IC Reliability

3C: Process Integration

3D: MEMS Sensor Reliability and Compound/Optoelectronics

3E: 3D/TSV Reliability

3F: Failure Analysis

- 4A: Transistor - Failure Analysis
- 4B: Electronic Systems Reliability
- 4C: ESD and Latchup
- 5A: Interconnect Metalization Reliability
- 5B: Gate Dielectrics
- 5C: MEMS Sensor Reliability
- 5D: Circuit Aging Simulation/Circuits Reliability
- 5E: Memory
- 5F: Soft Errors
- 6A: Transistor
- 6B: Circuit Aging Simulation/Circuits Reliability
- 6C: Compound Opto Electronics

Closing 2014—Opening 2015

[Audio](#)

[Visuals](#)

Links to some poster visuals next page



# 2A: Interconnect Metalization Reliability

---

Audio

Visuals

Audio

## 2A-1 Stress Migration in a Copper - Aluminum Hybrid Technology

Cathryn Christiansen, Jonathan Chapple-Sokol, Michael Coster, Douglas Hunt, Tom C. Lee, William Murphy, Jeffrey Gambino, Edward Cooney III, Timothy Kemerer, Richard Rassel, Tony Stamper, Gregory U'Ren, Stephane Lariviere and Stephane Brandon

Visuals

Audio

## 2A-2 On the Distribution of Stress-Induced Voiding Failures under Vias

Gavin D. R. Hall and Derryl D. J. Allman

Visuals

Audio

## 2A-3 Lifetime Prediction for Stress-Induced Voiding in Nose-Shape Lines by Using a Stress-Diffusion Analytical Model

Shinji Yokogawa

Visuals

Audio

## 2A-4 Electromigration in Strapped Metal Layers with Large Dimensions for Lateral Power Device Applications

Young-Joon Park, Jungwoo Joh and Kil-Soo Ko

Visuals

## 2B: Soft Errors

Audio

Visuals

---

Audio 2B-1 Cross-Layer System Resilience at Affordable Power  
Visuals (Invited)

Meeta S. Gupta, Jude A. Rivers, Liang Wang and Pradip Bose

Audio 2B-2 Bias Dependence of Muon-Induced Single Event  
Visuals Upsets in 28 nm Static Random Access Memories

Brian D. Sierawski, Bharat Bhuvra, Robert Reed, Katsuhiko Ishida, Nelson Tam, Adrian Hillier, Balaji Narasimham, Michael Trinczek, Ewart Blackmore, Shi-Jie Wen and Richard Wong

Audio 2B-3 Heavy-Ion Induced Single Event Upsets in Phase-  
Visuals Change Memories

S. Gerardin, M. Bagatin, A. Paccagnella, A. Visconti, M. Bonanomi, S. Beltrami, C. Frost and V. Ferlet-Cavrois

Audio 2B-4 Development of Thermal Neutron SER-Resilient High-  
Visuals K/Metal Gate Technology

Jongwoo Park, Gunrae Kim, Ming Zhang, Kyungsik Park, Miji Lee, Ilgon Kim, Jongsun Bae, Sangwoo Pae, Jinwoo Choi, Dongsuk Shin, Nae-In Lee and Kee Sup Kim

Audio

## 2C-1 Toward a Physical Understanding of the Reliability-Limiting $E_C$ -0.57 eV Trap in GaN HEMTs

Visuals

A. Sasikumar, D. W. Cardwell, A. R. Arehart, J. Lu, S. W. Kaun, S. Keller, U. K. Mishra, J. P. Speck, J. P. Pelz and S. A. Ringel

Audio

## 2C-2 Sensitivity Analysis of a Technique for the Extraction of Interface Trap Density in SiC MOSFETs from Subthreshold Characteristics

Visuals

D. R. Hughart, J. D. Flicker, S. Atcitty, M. J. Marinella and R. J. Kaplar

Audio

## 2C-3 A New Method for Extracting Interface State and Border Trap Densities in High-k/III-V MOSFETs

Visuals

G. Sereni, L. Vandelli, L. Larcher, L. Morassi, D. Veksler and G. Bersuker

Audio

## 2C-4 Modeling the Threshold Voltage Instability in SiC MOSFETs at High Operating Temperature

Visuals

Takuo Kikuchi and Mauro Ciappa

## 2D: Circuits Aging Simulation/Circuits Reliability

---

Audio

### 2D-1 I/O Design Optimization Flow for Reliability in

Visuals

### Advanced CMOS Nodes

F. Cacho, A. Gupta, A. Aggarwal, G. Madan, N. Bansal, M. Rizvi, V. Huard, P. Garg, C. Arnaud, R. Delater, C. Roma and A. Ripp

Audio

### 2D-2 Estimation of Instantaneous Frequency Fluctuation in

Visuals

### a Fast DVFS Environment Using an Empirical BTI Stress-

### Relaxation Model

Chen Zhou, Xiaofei Wang, Weichao Xu, Yuhao Zhu, Vijay Janapa Reddi and Chris H. Kim

Audio

### 2D-3 Diagnosing Bias Runaway in Analog/Mixed Signal

Visuals

### Circuits

Ketul B. Sutaria, Pengpeng Ren, Athul Ramkumar, Rongjun Zhu, Xixiang Feng, Runsheng Wang, Ru Huang and Yu Cao

Audio

### 2D-4 Maximizing Reliable Performance of Advanced CMOS

Visuals

### Circuits - A Case Study

B. Kaczer, C. Chen, P. Weckx, Ph. J. Roussel, M. Toledano-Luque, J. Franco, M. Cho, J. Watt, K. Chanda, G. Groeseneken and T. Grasser

Audio

### 2D-5 New Insights about Oxide Breakdown Occurrence at

Visuals

### Circuit Level

M. Saliva, F. Cacho, V. Huard, D. Angot, X. Federspiel, M. Durand, M. Parra, A. Bravaix and L. Anghel

Audio

2D-6 Re-Investigating the Adequacy of Projecting Ring

Visuals

Oscillator Frequency Shift from Device Level Degradation

Y.-C. Huang, T.-Y. Yew, M.-H. Hsieh, A. Misra, W. Wang, Y.-H. Lee, J. R. Shih and K. Wu



# 2E: Memory

Audio

Visuals

---

## 2E-1 Scaling and Reliability of NAND Flash Devices (Invited)

Youngwoo Park, Jaeduk Lee, Seong Soon Cho, Gyoyoung Jin and Eunseung Jung

Audio

## 2E-2 A New Spectral Approach to Modeling Charge Trapping/Detrapping in NAND Flash Memories

Visuals

Giovanni M. Paolucci, Christian Monzio Compagnoni, Carmine Miccoli, Massimo Bertuccio, Silvia Beltrami, John Barber, Jeffrey Kessenich, Andrea L. Lacaita, Alessandro S. Spinelli and Angelo Visconti

Audio

## 2E-3 Defects Characterization of Hybrid Floating Gate/Inter-Gate Dielectric Interface in Flash Memory

Visuals

M. B. Zahid, R. Degraeve, L. Breuil, P. Blomme, J. G. Lisoni, G. Van den bosch, J. Van Houdt and B. J. Tang

Audio

## 2E-4 Study on the $V_t$ Variation and Bias Temperature Instability Characteristics of TiN/W and TiN Metal Buried-Gate Transistor in DRAM Application

Visuals

Tae-Su Jang, Kyung-Do Kim, Min-Soo Yoo, Yong-Taik Kim, Seon-Yong Cha, Jae-Goan Jeong and Seok-Hee Lee

more 2E next page

Audio

## 2E-5 Origin of the Endurance Degradation in the Novel HfO<sub>2</sub>-Based 1T Ferroelectric Non-Volatile Memories

Visuals

Ekaterina Yurchuk, Stefan Mueller, Dominik Martin, Stefan Slesazeck, Uwe Schroeder, Thomas Mikolajick, Johannes Müller, Jan Paul, Raik Hoffmann, Jonas Sundqvist, Till Schlösser, Roman Boschke, Ralf van Bentum and Martin Trentzsch

Audio

## 2E-6 28nm Advanced CMOS Resistive RAM Solution as Embedded Non-Volatile Memory

Visuals

A. Benoist, S. Blonkowski, S. Jeannot, S. Denorme, E. Vianello, H. Grampeix, J. F. Nodin, E. Jalaguier, J. Damiens, J. Berger, P. Candelier, L. Perniola and B. Allard

# 2F: Chip Package Interaction

---

Audio

Visuals

Visuals 2F-1 Package Reliability and Performance Trends in an Era of Product Integration (Invited)

Jun He

Audio 2F-2 Mechanical Stability of Cu/Low-k BEOL

Visuals Interconnects

Mario Gonzalez, Kris Vanstreels, Vladimir Cherman, Kristof Croes, Luka Kljucar, Ingrid De Wolf and Zsolt Tökei

Audio 2F-3 Effects of Various Assembly and Reliability

Visuals Stresses on Chip to Package Interaction

Shiguo Rao, Li Lin, Xiaopeng Xu, Bei Deng and Ricardo Borges

Audio 2F-4 Acceleration of Chip - Package Failures

Visuals in Temperature Cycling

David Huitink, Kabir Enamul, Sudarshan Rangaraj and Alan Lucero

Audio 2F-5 A Fabless Company's Perspective on Large Die Chip

Visuals Package Interaction (CPI) Challenges

Kaushik Chanda and Vadali Mahadev

Audio

## 3A-1 New Breakdown Data Generation and Analytics Methodology to Address BEOL and MOL Dielectric TDDB Process Development and Technology Qualification Challenges

Fen Chen, Carole Graas, Michael Shinosky, Chuck Griffin, Roger Dufresne, Ronald Bolam, Cathryn Christiansen, Kai Zhao, Shreesh Narasimha, Chunyan Tian and Choon-Leong Lou

Visuals

Visuals

## 3A-2 Towards the Understanding of Intrinsic Degradation and Breakdown Mechanisms of a SiOCH Low-k Dielectric

C. Wu, Y. Li, Y. Barbarin, I. Ciofi, B. Tang, T. Kauerauf, K. Croes, J. Bömmels, I. DeWolf and Zs. Tőkei

Audio

## 3A-3 A New Methodology for Copper/Low-K Dielectric Reliability Prediction

Shou-Chung Lee and A. S. Oates

Visuals

Audio

## 3A-4 Study on Vertical TDDB Degradation Mechanism and Its Relation to Lateral TDDB in Cu/Low-k Damascene Structures

N. Suzumura, M. Ogasawara, T. Furuhashi and T. Koyama

Visuals

Audio

## 3A-5 New Insight in BEOL TDDDB Cu Diffusion Mechanism: A Constant Current Stress Approach

Visuals

Tian Shen, Hao Jiang, Wenyi Zhang, Tommy Cahyadi, Eng Chye Chua and Cristiano Capasso

# 3B: Product IC Reliability

Audio

Visuals

Audio

## 3B-1 Universality of NBTI - From Devices to Circuits and Products

Visuals

S. Mahapatra, V. Huard, A. Kerber, V. Reddy, S. Kalpat and A. Haggag

Audio

## 3B-2 Mission Profiles Derived from Lifetests and Field Return Data Using Inverse Problem Theory

Visuals

Zhongning Liang and Ramun M. Kho

Audio

## 3B-3 Voltage Ramp Stress Test to Determine TDDB Performance in SRAM Vehicle

Visuals

Jae-Gyung Ahn, Suresh Parameswaran, Dean Tsaggaris, Chien-Wei Ku, Ping-Chin Yeh and Jonathan Chang

Visuals

## 3B-4 Systematic Reliability Characterizations on Average Output Voltage (AVO) Shift of Display Driver IC by HTOL

Jungdong Kim, Donghun Kim, Minhyeok Choe, Kidan Bae, Sangchul Shin, Sangwoo Pae and Jongwoo Park

Visuals

## 3B-5 Impact of VLSI Scaling on Die Qualification

Amr Haggag, Michael Phillips and J. K. Jerry Lee

# 3C: Process Integration

Audio

Visuals

Visuals

## 3C-1 CMOS Image Sensor: Process Impact on Dark Current

J.-P. Carrère, S. Place, J.-P. Oddou, D. Benoit and F. Roy

Audio

## 3C-2 SILC and Gate Oxide Breakdown Characterization of 22nm Tri-Gate Technology

Visuals

S. Ramey and J. Hicks

Visuals

## 3C-3 Aluminum Charge/Dipole Passivation Induced by Hydrogen Diffusion in High-K Metal Gate

G. Ribes, V. Barral, S. Chhun, M. Gros-Jean, P. Caubet and D. Petit

Audio

## 3C-4 Guidelines for Reducing NBTI Based on Its Correlation with Effective Work Function Studied by CV-BTI on High-k First MOS Capacitors with Slant-Etched SiO<sub>2</sub>

Visuals

H. Arimura, L.-Å. Ragnarsson, T. Schram, J. Albert, B. Kaczer, R. Degraeve, E. Bury, M. Aoulaiche, T. Kauerauf, A. Thean, N. Horiguchi and G. Groeseneken

Audio

## 3C-5 Positive Bias Instability in Gate-First and Gate-Last InGaAs Channel n-MOSFETs

Visuals

S. Deora, G. Bersuker, T. W. Kim, D. H. Kim, C. Hobbs, P. D. Kirsch, K. C. Sahoo and A. S. Oates

# 3D: MEMS Sensor Reliability and Compound/Optoelectronics

---

Audio

Visuals

- Audio 3D-1 Double-Sampling Architectures (Invited)  
Visuals Michael Nicolaidis
- Audio 3D-2 Error-Resilient Design Techniques for Reliable and Dependable Computing (Invited)  
Visuals Shidhartha Das, David Bull and Paul Whatmough
- Audio 3D-3 Resilient and Adaptive Circuits for Voltage, Temperature, and Reliability Guardband Reduction (Invited)  
Visuals Carlos Tokunaga, Joseph F. Ryan, Tanay Karnik and James W. Tschanz
- Audio 3D-4 Reliability Issues in GaN and SiC Power Devices (Invited)  
Visuals Tetsuzo Ueda



# 3E: 3D/TSV Reliability

Audio

Visuals

Audio

## 3E-1 Impact of Cu TSVs on BEOL Metal and Dielectric Reliability

Visuals

Yunlong Li, Kristof Croes, Nabi Nabiollahi, Stefaan Van Huylenbroeck, Mario Gonzalez, Dimitrios Velenis, Hugo Bender, Anne Jourdain, Marianna Pantouvaki, Michele Stucchi, Kris Vanstreels, Myriam Van De Peer, Joke De Messemaeker, Chen Wu, Gerald Beyer, Ingrid De Wolf and Eric Beyne

Audio

## 3E-2 Mass Transport-Induced Failure in Direct Copper (Cu) Bonding Interconnects for 3-D Integration: The Electromigration Point of View

Visuals

S. Moreau, Y. Beilliard, P. Coudrain, D. Bouchu, R. Taïbi and L. Di Cioccio

Audio

## 3E-3 Effects of Sidewall Scallops on Open Tungsten TSVs

Visuals

L. Filipovic, R. L. de Orio, S. Selberherr, A. Singulani, F. Roger and R. Minixhofer

Audio

## 3E-4 Impacts of Cu Contamination in 3D Integration Process on Memory Retention Characteristics in Thinned DRAM Chip

Visuals

Kangwook Lee, Seiya Tanikawa, Hideki Naganuma, Jichel Bea, Mariappine Murugesan, Takafumi Fukushima, Tetsu Tanaka and Mitsumasa Koyanagi

# 3F: Failure Analysis

Audio

Visuals

---

Audio

## 3F-1 Fundamentals and Future Applications of Laser Voltage Probing

Visuals

Ulrike Kindereit

Audio

## 3F-2 Backside Device Physical Analysis for Yield and Reliability of Advanced Bulk-Si CMOS ICs

Visuals

Yuanjing Li and Howard Lee Marks

Audio

## 3F-3 A Novel Analysis of Oxide Breakdown Based on Dynamic Observation Using Ultra-High Speed Video Capturing up to 10,000,000 Frames Per Second

Visuals

Rihito Kuroda, Fan Shao, Daiki Kimoto, Kiichi Furukawa, Hidetake Sugo, Tohru Takeda, Ken Miyauchi, Yasuhisa Tochigi, Akinobu Teramoto and Shigetoshi Sugawa

Audio

## 3F-4 Measuring Propagation Delays of Critical Paths Using Time-Resolved LADA

Visuals

K. Erington, D. Bodoh, K. A. Serrels, C. Nemirow, N. Leslie, T. R. Lundquist, P. Vedagarbha, C. Ferrell and D. T. Reid

# 4A: Transistor - Failure Analysis

Audio

Visuals

Audio

## 4A-1 Modeling of Transient and Static Components of Intrinsic Emission from VLSI Circuits

Visuals

Andrea Bahgat Shehata, Franco Stellari, Alan Weger and Peilin Song

Audio

## 4A-2 Energy Driven Modeling of OFF-State and Sub-Threshold Degradation in Scaled NMOS Transistors

Visuals

D. Varghese, M. Nandakumar, S. Tang, V. Reddy and S. Krishnan

## 4A-3 Origin and Implications of Hot Carrier Degradation of Gate-All-Around Nanowire III-V MOSFETs

SangHoon Shin, Muhammad A. Wahab, Muhammad Masuduzzaman, Mengwei Si, Jiangjiang Gu, P. D. Ye and Muhammad A. Alam

Audio

## 4A-4 Self-Heating Effect in FinFETs and Its Impact on Devices Reliability Characterization

Visuals

S. E. Liu, J. S. Wang, Y. R. Lu, D. S. Huang, C. F. Huang, W. H. Hsieh, J. H. Lee, Y. S. Tsai, J. R. Shih, Y.-H. Lee and K. Wu

Audio

## 4A-5 A Unified Perspective of RTN and BTI

Visuals

T. Grasser, K. Rott, H. Reisinger, M. Wlatl, J. Franco and B. Kaczer

Audio

## 4A-6 Analyzing Correlation between Multiple Traps in RTN Characteristics

Visuals

Toshiki Obara, Akinobu Teramoto, Akihiro Yonezawa, Rihito Kuroda, Shigetoshi Sugawa and Tadahiro Ohmi

Audio

## 4B-1 Role of Hardware Security in Product Reliability (Invited - Paper not in proceedings)

K. Bernstein

Visuals

Audio

## 4B-2 Simulation-Based Reliability Evaluation for Analog Applications

Eduard Weber and Klaus Echtele

Visuals

Audio

## 4B-3 Analysis of Reliability/Performance Trade-Off in Solid State Drives

Lorenzo Zuolo, Cristian Zambelli, Rino Micheloni, Davide Bertozzi and Piero Olivo

Visuals

Audio

## 4B-4 Impact of Sum of Failure Rates (SOFR) Model on Thermal Design in SoC's for Next Generation Game Consoles

K. Maitra, T. Ngyuen, B. Langendorf, J. Purtell, S. Dixit, S. Chen, N. Liu, M. McCormack, R. Gannmani, R. Jensen, A. Marathe and R. Master

Visuals

Audio

## 4B-5 Collaborative Approach for Practical Modeling of Microcircuit Failures in High-Reliability Applications

David A. Sunderland, Anduin E. Touw, Florian Moliere, Lori E. Bechtold, David Redman and Bahig Tawfellos

Visuals

Audio

4B-6 Hard Disk Drive Failure Physics and the Reliability

Visuals

Process for Consumer Electronics Applications

(Invited - paper not in proceedings)

B. Hiller

# 4C: ESD and Latchup

Audio

Visuals

- 
- Audio** 4C-1 Novel Area-Efficient Techniques for Improving ESD Performance of Drain Extended Transistors  
**Visuals** Aravind Appaswamy, Farzan Farbiz and Akram Salman
- Audio** 4C-2 Improvement on CDM ESD Robustness of High-Voltage Tolerant nLDMOS SCR Devices by Using Differential Doped Gate  
**Visuals** S.-H. Chen, D. Linten, M. Scholz, G. Hellings, R. Boschke, G. Groeseneken, Y.-C. Huang and M.-D. Ker
- Visuals** 4C-3 Monolithic ESD Protection for Distributed High Speed Applications in 28-nm CMOS Technology  
Javier A. Salcedo, Srivatsan Parthasarathy and Jean-Jacques Hajjar
- Audio** 4C-4 Design of a Low Leakage ESD Clamp for High Voltage Supply in 65nm CMOS Technology  
**Visuals** Srivatsan Parthasarathy, Javier A. Salcedo and Jean-Jacques Hajjar
- Visuals** 4C-5 Novel Dual Direction PNP with Self-Bias Ring Structure  
Tsung-Che Tsai, Jam-Wem Lee, Ming-Fu Tsai, Yi-Feng Chang, Shui-Ming Cheng and Ming-Hsiang Song

Audio

## 5A-1 Electromigration Simulation at Circuit Levels (Invited)

Cher Ming Tan

Visuals

Audio

## 5A-2 Electromigration Failure of Circuit-Like Interconnects: Short Length Failure Time Distributions with Active Sinks and Reservoirs

A. S. Oates and M. H. Lin

Visuals

Audio

## 5A-3 Interconnects Exhibiting Enhanced Electromigration Short-Length Effects by Line Width Variation

R. G. Filippi, P.-C. Wang, A. T. Kim, B. Redder and C.-K. Hu

Visuals

Audio

## 5A-4 Variability Challenges to Electromigration (EM) Lifetime Projections

Baozhen Li, Cathryn Christiansen and Ronald Filippi

Visuals

Audio

## 5A-5 Scaling Effects on Microstructure and Electromigration Reliability for Cu and Cu(Mn) Interconnects

Linjun Cao, Lijuan Zhang, Paul S. Ho, Patrick Justison and Meike Hauschildt

Visuals

# 5B: Gate Dielectrics

Audio

Visuals

Audio  
Visuals

## 5B-1 Dynamic Off-State TDDB of Ultra Short Channel HKMG nFETS and Its Implications on CMOS Logic Reliability

S. Kupke, S. Knebel, S. Rahman, S. Slesazeck, T. Mikolajick, R. Agaiby and M. Trentzsch

Audio  
Visuals

## 5B-2 Time-Dependent Clustering Model versus Combination-Based Approach for BEOL/MOL and FEOL Non-Uniform Dielectric Breakdown: Similarities and Disparities

Ernest Y. Wu, Baozhen Li, James H. Stathis and Charles LaRow

Audio  
Visuals

## 5B-3 Activation of Electrically Silent Defects in the High-k Gate Stacks

D. Veksler, G. Bersuker, M. B. Watkins and A. Shluger

Audio  
Visuals

## 5B-4 Impact of Ionic Drift and Vacancy Defect Passivation on TDDB Statistics and Lifetime Enhancement of Metal Gate High-k Stacks

Nagarajan Raghavan, Kin Leong Pey, Daniel D. Frey and Michel Bosman

Visuals

## 5B-5 The Physical Mechanism Investigation of AC TDDB Behavior in Advanced Gate Stack

C. L. Chen, S. W. Chang, S. C. Chen, Y.-H Lee, Y. W. Lee, D. S. Huang, J. R. Shih and K.Wu



# 5C: MEMS Sensor Reliability

Audio

Visuals

5C-1 Study of Charge Injection and Trapping Mechanisms for Dielectric Charging in MEMS Switches (Invited - Not available)

F. Souchon

Audio

5C-2 Reliability of High-Q Micromechanical

Visuals

Resonators (Invited - paper not in proceedings)

F. Ayazi

Visuals

5C-3 Dielectric Charging Characterization in MEMS Switches with Insulator-Insulator Contact

David Molinero, Shawn Cunningham, Dana DeReus and Art Morris

5C-4 Induced Charging Phenomena on  $\text{SiN}_x$  Dielectric Films

Used in RF MEMS Capacitive Switches

M. Koutsourelis, L. Michalakis and G. Papaioannou

Audio

5C-5 Influence of Temperature Distribution on Behavior,

Visuals

Modeling, and Reliability of BAW Resonators

A. Tag, R. Weigel, A. Hagelauer, B. Bader, C. Huck, M. Pitschi, D. Karolewski, C. Schäffel and K. Wagner

# 5D: Circuit Aging Simulation/Circuits Reliability

---

- Audio** 5D-1 A New Gate Pattern Measurement for Evaluating the  
**Visuals** BTI Degradation in Circuit Conditions  
A. Subirats, X. Garros, J. Cluzel, J. El Hussein, F. Cacho, X. Federspiel, V. Huard, M. Rafik, G. Reibold, O. Faynot and G. Ghibaudo
- Visuals** 5D-2 Non-Monte-Carlo Methodology for High-Sigma  
Simulations of Circuits under Workload-Dependent BTI  
Degradation - Application to 6T SRAM  
P. Weckx, B. Kaczer, H. Kukner, Ph. J. Roussel, P. Raghavan, F. Catthoor and G. Groeseneken
- Audio** 5D-3 AAS-Maps: Aging-Aware Sensitivity-Maps for  
**Visuals** Reliability Driven Analog Circuit Design  
Nico Hellwege, Nils Heidmann, Dagmar Peters-Drolshagen and Steffen Paul
- Audio** 5D-4 HCI/BTI Coupled Model: The Path for Accurate and  
**Visuals** Predictive Reliability Simulations  
F. Cacho, P. Mora, W. Arfaoui, X. Federspiel and V. Huard
- Audio** 5D-5 An LDMOS Hot Carrier Model for Circuit Reliability  
**Visuals** Simulation  
Guido T. Sasse, Jan A. M. Claes and Bart De Vries

# 5E: Memory

Audio

Visuals

Audio

## 5E-1 Modeling of Crystallization Kinetics in Phase Change Memories for Set and Read Disturb Regimes

Nicola Ciochini and Daniele Ielmini

Visuals

Audio

## 5E-2 Impact of Electrode Nature on the Filament Formation and Variability in HfO<sub>2</sub> RRAM

B. Traoré, P. Blaise, E. Vianello, E. Jalaguier, G. Molas, J. F. Nodin, L. Perniola, B. De Salvo and Y. Nishi

Visuals

Audio

## 5E-3 Impact of SET and RESET Conditions on CBRAM High Temperature Data Retention

M. Barci, J. Guy, G. Molas, E. Vianello, A. Toffoli, J. Cluzel, A. Roule, M. Bernard, C. Sabbione, L. Perniola and B. De Salvo

Visuals

Audio

## 5E-4 Reset-Induced Variability of Retention Characteristics in Phase Change Memory (PCM)

M. Rizzi, N. Ciochini, A. Montefiori, M. Ferro, A. L. Lacaita, P. Fantini and D. Ielmini

Visuals

Audio

## 5E-5 In Situ Biasing TEM Investigation of Resistive Switching Events in TiO<sub>2</sub>-Based RRAM

Jonghan Kwon, Yoosuf N. Picard, Marek Skowronski, Abhishek A. Sharma and James A. Bain

Visuals

# 5F: Soft Errors

Audio

Visuals

- 
- Audio** 5F-1 IRT: A Modeling System for Single Event Upset  
**Visuals** Analysis that Captures Charge Sharing Effects  
Kerryann Foley, Norbert Seifert, Jyothi B. Velamala, William G. Bennett and Shashank Gupta
- Audio** 5F-2 Impact of Technology Scaling on the Combinational  
**Visuals** Logic Soft Error Rate  
N. N. Mahatme, N. J. Gaspard, T. Assis, S. Jagannathan, I. Chatterjee, T. D. Loveless, B. L. Bhuva, L. W. Massengill, S. J. Wen and R. Wong
- Audio** 5F-3 Sensitivity of NOR Flash Memories to Wide-Energy  
**Visuals** Spectrum Neutrons during Accelerated Tests  
M. Bagatin, S. Gerardin, A. Paccagnella, A. Visconti, L. Chiavarone, M. Calabrese and C. D. Frost
- Audio** 5F-4 High-Speed Pulsed-Hysteresis-Latch Design for  
**Visuals** Improved SER Performance in 20 nm Bulk CMOS Process  
Balaji Narasimham, Karthik Chandrasekharan, Jung K. Wang, Gregory Djaja, Nelson J. Gaspard, Nihaar N. Mahatme, Thiago R. Assis and Bharat L. Bhuva
- Visuals** 5F-5 Heavy Ions Test Result on a 65nm Sparc-V8  
Radiation-Hard Microprocessor  
C. Bottoni, M. Glorieux, J. M. Daveau, G. Gasiot, F. Abouzeid, S. Clerc, L. Naviner and P. Roche

# 6A: Transistor

Audio

Visuals

Audio  
Visuals  
**6A-1 Breakdown Mechanisms in MgO Based Magnetic Tunnel Junctions and Correlation with Low Frequency Noise (ESREF)**

S. Amara-Dababi, R. C. Sousa, H. Béa, C. Baraduc, K. Mackay and B. Dieny

Audio  
Visuals  
**6A-2 Suitability of High-k Gate Oxides for III-V Devices: A PBTI Study in  $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}$  Devices with  $\text{Al}_2\text{O}_3$**

J. Franco, A. Alian, B. Kaczer, D. Lin, T. Ivanov, A. Pourghaderi, K. Martens, Y. Mols, D. Zhou, N. Waldron, S. Sioncke, T. Kauerauf, N. Collaert, A. Thean, M. Heyns and G. Groeseneken

Audio  
Visuals  
**6A-3 SiGe Composition and Thickness Effects on NBTI in Replacement Metal Gate / High-k Technologies**

P. Srinivasan, J. Fronheiser, K. Akarvardar, A. Kerber, L. F. Edge, R. G. Southwick III, E. Cartier and H. Kothari

Audio  
Visuals  
**6A-4 A Comprehensive DC/AC Model for Ultra-Fast NBTI in Deep EOT Scaled HKMG p-MOSFETs**

N. Goel, S. Mukhopadhyay, N. Nanaware, S. De, R. K. Pandey, K. V. R. M. Murali and S. Mahapatra

Audio  
Visuals  
**6A-5 Bias Temperature Instability Variation on SiON/Poly, HK/MG and Trigate Architectures**

C. Prasad, M. Agostinelli, J. Hicks, S. Ramey, C. Auth, K. Mistry, S. Natarajan, P. Packan, I. Post, S. Bodapati, M. Giles, S. Gupta, S. Mudanai and K. Kuhn

Audio

Visuals

# 6A-6 Correlation of BTI Induced Device Parameter Degradation and Variation in Scaled Metal Gate / High-k CMOS Technologies

A. Kerber and T. Nigam

## 6B: Circuit Aging Simulation/Circuits Reliability

---

Audio

### 6B-1 Circuit Speed Timing Jitter Increase in Random Logic

Visuals

#### Operation after NBTI Stress

G. F. Jiao, J. W. Lu, J. P. Campbell, J. T. Ryan, K. P. Cheung, C. D. Young and G. Bersuker

Visuals

### 6B-2 Fast Characterization of PBTI and NBTI Induced Frequency Shifts under a Realistic Recovery Bias Using a Ring Oscillator Based Circuit

Xiaofei Wang, Seung-Hwan Song, Ayan Paul and Chris H. Kim

Audio

### 6B-3 The Impact of Hot Carrier Injection (HCI) on

Visuals

#### Voltage Control Oscillator Lifetime Prediction

Chih-Hsiang Ho, Keith A. Jenkins, Herschel Ainspan, Emily Ray and Peilin Song

Audio

### 6B-4 Adaptive Wearout Management with In-Situ Aging

Visuals

#### Monitors

V. Huard, F. Cacho, F. Giner, M. Saliva, A. Benhassain, D. Patel, N. Torres, S. Naudet, A. Jain and C. Parthasarathy

Audio

### 6B-5 Fast Aging Degradation Rate Prediction during

Visuals

#### Production Test

Xiaoxiao Wang, LeRoy Winemberg, Amr Haggag, Joe Chayachinda, Amandeep Saluja and Mohammad Tehranipoor

# 6C: Compound Opto Electronics

Audio

Visuals

Audio

## 6C-1 Correlating Reliability to Yield for Liftoff Metallization

Visuals

William J. Roesch and Dorothy June M. Hamada

Audio

## 6C-2 Threshold Voltage Instabilities in D-Mode GaN HEMTs for Power Switching Applications

Visuals

G. Meneghesso, R. Silvestri, M. Meneghini, A. Cester, E. Zanoni, G. Verzellesi, G. Pozzovivo, S. Lavanga, T. Detzel, O. Häberlen and G. Curatola

Audio

## 6C-3 Enhancement of $V_{th}$ Drift for Repetitive Gate Stress Pulses Due to Charge Feedback Effect in GaN MIS-HEMTs

Visuals

P. Lager, C. Ostermaier and D. Pogany

Audio

## 6C-4 Threshold Voltage Drift (PBTI) in GaN D-MODE MISHEMTs: Characterization of Fast Trapping Components

Visuals

G. P. Lansbergen, K. Y. Wong, Y. S. Lin, J. L. Yu, F. J. Yang, C. L. Tsai and A. S. Oates

Visuals

## 6C-5 Current Collapse in GaN Heterojunction Field Effect Transistors for High-Voltage Switching Applications

Jungwoo Joh, Naveen Tipirneni and Sameer Pendharkar, Srikanth Krishnan



Audio

Visuals

# 6C-6 Role of Buffer Doping and Pre-Existing Trap States in the Current Collapse and Degradation of AlGaN/GaN HEMTs

Matteo Meneghini, Isabella Rossetto, Davide Bisi, Antonio Stocco, Andrea Cester, Gaudenzio Meneghesso, Enrico Zanoni, Alessandro Chini, Alessio Pantellini and Claudio Lanzieri