

6th IEEE Electron Devices Technology and Manufacturing (EDTM) Conference 2022

Monday, March 7

Room A

8:30-9:00 Opening Remarks

Opening Remarks

General Chair of EDTM 2022
Kazunari Ishimaru, KIOXIA Corp.

9:00-11:15 Plenary Session

Chair: Masumi Saitoh, KIOXIA Corp.

PL-1 9:00-9:40

Intelligent, Data-Driven Approach to Sustainable Semiconductor Manufacturing,
Naga Chandrasekaran, Micron

PL-2 9:40-10:20

The Requirement for a Bright Future in Semiconductor Device Manufacturing is...Innovation, Collaboration and care for the Environment, Akihisa Sekiguchi, Tokyo Electron Ltd.

PL-3 10:35-11:15

Chips, Dies, Chiplets and Dielets and Heterogeneous Integration, Subramanian S. Iyer, University of California, Los Angeles, CHIPS

11:15-11:55 Keynote Lecture

Chair: Masumi Saitoh, KIOXIA Corp.

KL 11:15-11:55

Hayabusa2: Successful Sample Return from Asteroid Ryugu, Yuichi Tsuda, JAXA / ISAS

13:45-15:25 1A-DE1: Advanced Transistors Beyond FinFETs

Chairs: Masaharu Kobayashi, The University of Tokyo
Runsheng Wang, Peking University

1A-DE1-1 (Invited) 13:45-14:10

The Extension of the FinFET Generation Towards Sub-3nm: The Strategy and Guidelines, Steve S. Chung¹, C. K. Chiang¹, H. Pai¹, E. R. Hsieh², and J.C. Guo¹, ¹National Chiao Tung University, ²National Central University

1A-DE1-2 14:10-14:35

Performance Optimization and Design of CFET Correlated with Self-Heating Effect, Songhan Zhao, Pan Zhao, Yandong He, Xiaoyan Liu, and Gang Du, Peking University

1A-DE1-3 14:35-15:00

SiGe and Si Gate-All-Around FET Fabricated by Selective Etching the Same Epitaxial Layers, Wei-Yuan Chang¹, Guang-Li Luo¹, Yi-Shuo Huang², Chun-Lin Chu¹, Yao-Jen Lee¹, Bo-Yuan Chen¹, Chun-Hsiung Lin², Wen-Fa Wu¹, and Wen-Kuan Yeh¹, ¹TSRI, ²National Yang Ming Chiao Tung University

1A-DE1-4 **15:00-15:25**

Investigation of NH₃ Plasma Nitridation on Hysteresis-Free Gate-All-Around Stacked Poly-Si Nanosheet Channel FeFETs, Dong-Ru Hsieh, Chia-Chin Lee, Zi-Yang Hong, and Tien-Sheng Chao, National Yang Ming Chiao Tung University

Room B

13:45-15:25 **1B-PO1: Si Power Devices**

Chairs: Wataru Saito, Kyushu University

Qian Sun, Suzhou Institute of Nano-Tech and Nano-Bionics

1B-PO1-1 (Invited) 13:45-14:10

Prediction and Process Control Technique of Wafer Warpage for Advanced Trench Field Plate Power MOSFETs, Hiroaki Kato, Toshifumi Nishiguchi, Saya Shimomura, Katsura Miyashita, and Kenya Kobayashi, Toshiba Electronic Devices & Storage Corporation

1B-PO1-2 **14:10-14:35**

Ultrathin Vertical Gate Oxide for Trench Power Device Technology, Shin Phay Lee, C. W. Khor, and V. C. Ngwan, STMicroelectronics Pte Ltd.

1B-PO1-3 **14:35-15:00**

Low-cost, CMOS integrable Step Field Plate RF LDMOS Transistor with Low IM3 Distortion and High Drain Efficiency, Rutu Patel, and Nihar R. Mohapatra, Indian Institute of Technology Gandhinagar

1B-PO1-4 **15:00-15:25**

Optimized Layout for Lateral Power Device with Improved Tradeoff between High Voltage and Low On-resistance, Jie Wei, Kaiwei Dai, Zhen Ma, and Xiaorong Luo, University of Electronic Science and Technology of China

Room D

13:45-15:25 **1D-NA1: Nanotechnology Based Electronics and Photonics**

Chairs: Stephen Goodnick, Arizona State University

Mutsuko Hatano, Tokyo Institute of Technology

1D-NA1-1 (Invited) 13:45-14:10

Low-Voltage Transistors and Diodes ; Extending the Road beyond CMOS, Sungjae Cho, Korean Advanced Institute of Science and Technology

1D-NA1-2 (Invited) 14:10-14:35

Potential of Diamond Solid-State Quantum Sensors, Mutsuko Hatano, Tokyo Institute of Technology

1D-NA1-3 **14:35-15:00**

Optimizing the Positions of Quantum Dot Layers to Increase the light Absorption in Quantum Dot Solar Cells with Light Trapping Structure, Yusuke Oteki, Maxime Giteau, Kei Fukushima, Kento Kitahara, Naoya Miyashita, Ryo Tamaki, and Yoshitaka Okada, The University of Tokyo

1D-NA1-4 **15:00-15:25**

Low-Loss RF Passive Elements by Top-Metal Air-Gap Technology, Clarissa Prawoto¹, Zichao Ma¹, Ying Xiao¹, Salahuddin Raju¹, Changjian Zhou^{1,2} and Mansun Chan¹, ¹The Hong Kong University of Science and Technology, ²South China University of Technology

Room E

13:45-15:25 1E-SE1: Sensor Technology

Chair: Hongyu Yu, The Hong Kong University of Science and Technology

1E-SE1-1 (Invited) 13:45-14:10

Research on Wafer Temperature Monitoring in IC Process, Chao Wang, and Jing Jiang, University of Electronic Science and Technology of China

1E-SE1-2 14:10-14:35

Cs₂AgBiBr₆ -Tellurium heterojunction-Based High-Performance X-ray Detectors, Guan-Hua Dun¹, Ken Qin¹, Hai-Nan Zhang¹, Jun-Hui Yuan², Rui Zhao³, Xiang-Shun Geng¹, Dan Xie¹, Ren-Rong Liang¹, Kan-Hao Xue², Xiang-Shui Miao², He Tian¹, Yi Yang¹, and Tian-Ling Ren¹, ¹Tsinghua University, ²Huazhong University of Science and Technology, ³National Institute of Metrology

1E-SE1-3 14:35-15:00

A Low-cost, Low-power, and Practical Nano-heterojunction Pollution Gas Sensor Based on Accurate Dielectrophoresis Technology, Jinming Jian, Tianrui Cui, Houfang Liu, Yi Yang, and Tian-Ling Ren, Tsinghua University

1E-SE1-4 15:00-15:25

Liquid Metal Microfluidic Electromagnetic Wave Reflection Attenuator, Xu Gao¹, Ping Li², Zhou Yang^{1,3}, Lingchun An², Zhenhai Wang², Jiarui Guo², Nuo Xu², and Wei Wang¹, ¹Peking University, ²Beijing Institute of Mechanical Equipment, ³China University of Geosciences

Room A

16:00-19:00 Special Session on Integrated Materials 1

Organizer: Francesca Iacopi, University of Technology Sydney, Chair of EDS Materials Initiative Ad-Hoc Committee

Chairs: Francesca Iacopi, University of Technology Sydney
Pei-Wen Li, National Yang Ming Chiao Tung University

16:00-16:10

Introduction by chairs

SS1-1 16:10-16:40

Some Key Process Enablers for 3D Sequential Integrations, Sylvain Maitrejean, CEA Leti

SS1-2 16:40-17:10

Interface Design for Advanced Ge FETs - What is Different between Ge and Si? -, Akira Toriumi, The University of Tokyo

SS1-3 17:10-17:40

Beyond CMOS – From Materials to Devices, Maria Merlyne De Souza, The University of Sheffield

SS1-4 17:40-18:10

Integration of Memristor with Capacitor and Resistors to Configure a Physical Kernel for Neuromorphic Applications, Cheol Seong Hwang, Seoul National University

18:15-19:00

Panel Discussion

Panelists: Speakers of Session 1 and Heike E. Riel, IBM Research

Room B

15:50-17:30 2B-ME1: Ferroelectric Memories and MRAM

Chairs: Reika Ichihara, KIOXIA Corp.
Yangying Chen, Western Digital

2B-ME1-1 (Invited) 15:50-16:15

Demonstration of Fatigue and Recovery Phenomena in $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$ -based 1T1C FeRAM Memory Arrays, Jun Okuno¹, Tsubasa Yonai¹, Takafumi Kunihiro¹, Kenta Konishi¹, Monica Materano², Tarek Ali³, Maximilian Lederer³, Konrad Seidel³, Thomas Mikolajick^{2,4}, Uwe Schroeder², Masanori Tsukamoto¹, and Taku Umebayashi¹, ¹Sony Semiconductor Solutions Corp., ²NaMLab gGmbH, ³Fraunhofer IPMS, ⁴IHM, TU Dresden

2B-ME1-2 16:15-16:40

BEOL Integrated Ferroelectric HfO_2 Based Capacitors for FeRAM: Extrapolation of Reliability Performance to Use Conditions, R. Alcalá¹, M. Materano¹, P.D. Lomenzo¹, L. Grenouillet², T. Francois², J. Coignus², N. Vaxelaire², C. Carabasse², S. Chevalliez², F. Andrieu², T. Mikolajick¹, and U. Schroeder¹, ¹NaMLab/TU Dresden gGmbH, ²CEA Leti

2B-ME1-3 16:40-17:05

Design Space Exploration for Scaled FeFET Nonvolatile Memories: High-k Spacer as a Powerful Aid, You-Sheng Liu, Yuan-Yu Huang and Pin Su, National Yang Ming Chiao Tung University

2B-ME1-4 (Invited) 17:05-17:30

Feasibility Analysis of Embedded MRAM Solutions at Advanced Process Nodes, Manu Perumkunnil Komalan, Mohit Gupta, Siddharth Rao, Woojin Kim, Farrukh Yasin, Sebastien Couet, Arnaud Furnemont and Gouri Sankar Kar, imec

Room C

15:50-17:30 2C-PR1: 3D Integration and Sustainability

Chairs: Keiichi Nakazawa, Sony Semiconductor Solutions Corp.
Yoshiki Yamamoto, Renesas Electronics Corp.

2C-PR1-1 (Invited) 15:50-16:15

Monolithic 3D Integration Process and Its Device Applications, Changhwan Choi, Hanyang University

2C-PR1-2 16:15-16:40

Heat Management in Monolithic 3D RF Platform, Jaeyong Jeong¹, Seong Kwang Kim¹, Jongmin Kim², Dae-Myeong Geum¹, and SangHyeon Kim¹, ¹Korea Advanced Institute of Science and Technology, ²Korea Advanced Nano Fab Center

2C-PR1-3 (Invited) 16:40-17:05

The Environmental Impact of CMOS Logic Technologies, L-Å Ragnarsson¹, M. Garcia Bardon¹, P. Wuytens¹, G. Mirabelli¹, D. Jang¹, G. Willems¹, A. Mallik¹, A. Spessot¹, J. Ryckaert¹, and B. Parvais^{1,2}, ¹imec, ²Vrije Universiteit Brussel

2C-PR1-4 (Invited) 17:05-17:30

SmartSiC™ for Manufacturing of SiC Power Devices, N. Daval¹, A. Drouin¹, H. Biard¹, L. Viravaux¹, D. Radisson¹, S. Rouchier¹, G. Gaudin¹, J. Widiez², F. Allibert¹, E. Rolland², K. Vladimirova², G. Gélinau², N. Troutot², C. Navone², G. Berre³, D. Bosch³, Y.L Leow³, A. Duboust³, J-M. Bethoux¹, R. Boulet¹, A. Chapelle¹, E. Cela¹, G. Lavaitte¹, A. Bouville-Lallart¹, S. Bhargava³, W. Schwarzenbach¹, C. Maddalon¹, I. Radu¹, S. Odoul¹, D. Delprat¹, O. Bonnin¹, and C. Maleville¹, ¹Soitec SA, ²CEA Leti, ³AMAT

Room D

15:50-17:30 2D-MO1: Modeling and Simulation 1

Chairs: Dondee Navarro, KIOXIA Corp.

Lining Zhang, Peking University

2D-MO1-1 (Invited) 15:50-16:15

The Device Compact Model Based on Multi-gradient Neural Network and Its Application on MoS₂ Field Effect Transistors, Guodong Qi¹, Qihang Yang¹, Xinyu Chen¹, Zengxing Zhang^{1,2}, Peng Zhou¹, Wenzhong Bao¹, and Ye Lu¹, ¹Fudan University, ²National Integrated Circuit Innovation Center

2D-MO1-2 (Invited) 16:15-16:40

Modeling Technologies from Analog/Mixed-Signal Circuit Designer Viewpoint, Haruo Kobayashi¹, Hitoshi Aoki², Jun-ichi Matsuda¹, Yushiro Okabe¹, Atsushi Motozawa³, and Anna Kuwana¹, ¹Gunma University, ²Teikyo-Heisei University, ³Renesas Electronics Corp.

2D-MO1-3 16:40-17:05

Automatic Parameter Extraction of MOSFET Compact Models Using Differential Evolution With Population Prediction (DEpred), Gazmend Alia^{1,2}, Andi Buzo¹, Hannes Maier-Flaig¹, Klaus-Willi Pieper¹, Linus Maurer², and Georg Pelz¹, ¹Infineon Technologies AG, ²Bundeswehr University Munich

2D-MO1-4 17:05-17:30

Operating-Condition Optimization of MG-MOSFETs for Low-Voltage Application, Soumajit Ghosh¹, Mitiko Miura-Mattausch¹, Takahiro Iizuka¹, Hafizur Rahaman², and H.J. Mattausch¹, ¹Hiroshima University, ²Indian Institute of Engineering Science and Technology

Room E

15:50-17:55 2E-FL1: Flexible and Wearable Electronics 1

Chairs: Luisa Petti, Free University of Bozen-Bolzano

Juan Paolo Bermundo, Nara Institute of Science and Technology

2E-FL1-1 (Invited) 15:50-16:15

Flexible Organic Electrochemical Sensors for Monitoring Marine Conditions, Shuo Wu, Napasorn Phongphaew, and Tse Nga Ng, University of California, San Diego

2E-FL1-2 (Invited) 16:15-16:40

Pathogen and Protein Detection using Organic Electronics, Anil Koklu, Keying Guo, Shofarul Wustoni, Raik Grunberg, Stefan Arold, and Sahika Inal, King Abdullah University of Science and Technology

2E-FL1-3

16:40-17:05

Screen-Printed Flexible Circular and Rectangular Silver Spirals for Planar Electrodynamic Loudspeakers: A Comparative Study of Pressure Frequency Response, Mallikarjun

Madagalam^{1,3}, Paolo La Torraca², Mukhtar Ahmed¹, Ali Douaki¹, Ignacio Merino SanchezFayos¹, Nitzan Cohen¹, Luisa Petti¹, and Paolo Lugli¹, ¹Free University of Bolzano-Bozen, ²University of Reggio Emilia, ³Politecnico di Torino

2E-FL1-4

17:05-17:30

Solution-Processed Biopolymer Dielectric Based Organic Field-Effect Transistors for

Sustainable Electronics, Gargi Konwar, Pulkit Saxena, Vivek Raghuwanshi, Sachin Rahi, and Shree Prakash Tiwari, Indian Institute of Technology Jodhpur

2E-FL1-5

17:30-17:55

Analysis of Dispense and Water Transfer Printing as Fabrication Methods for UHF Antennas

on 3D Printed Substrates, Arvind Gurusekaran, Mukhtar Ahmad, Manuela Ciocca, Enrico Avancini, Paolo Lugli, and Luisa Petti, Free University of Bolzano

Tuesday, March 8

Room A

9:00-12:00 Special Session on Integrated Materials 2

Organizer: Francesca Iacopi, University of Technology Sydney, Chair of EDS Materials Initiative Ad-Hoc Committee

Chairs: Paul Berger, The Ohio State University

Albert Chin, National Yang Ming Chiao Tung University

9:00-9:10

Introduction by chairs

SS2-1 9:10-9:40

Oxide Heterostructures for Classical and Quantum Memories, Supratik Guha, University of Chicago and Argonne National Laboratory

SS2-2 9:40-10:10

Charge Trapping and Its Impact on Devices and Circuits, Gilson Wirth, Universidade Federal do Rio Grande do Sul

SS2-3 10:10-10:40

Mind the Gap: Integrating Materials and Engineering Research, Paul A Lane, National Science Foundation

SS2-4 10:40-11:10

Advanced Interconnect Technology for Next Gen Computing, Griselda Bonilla, IBM

11:15-12:00

Panel Discussion

Panelists: Speakers of Session 2

Room B

8:00-9:40 3B-PO2: GaN Devices

Chairs: Rongming Chu, The Pennsylvania State University
Man Hoi Wong, University of Massachusetts Lowell

3B-PO2-1 (Invited) 8:00-8:25

10 kV GaN Power Diodes and Transistors with Performance beyond SiC Limit (Invited), Yuhao Zhang¹, Ming Xiao¹, Yunwei Ma¹, and Kai Cheng², ¹Virginia Polytechnic Institute and State University, ²Enkris Semiconductor Inc.

3B-PO2-2 (Invited) 8:25-8:50

A Co-Design Approach to Understanding the Impact of Ultra-Wide-Bandgap Semiconductor Material Properties on Power Device Performance, R. Kaplar¹, S. Goodnick², J. Shoemaker², R. Vatan², J. Flicker¹, A. Binder¹, and S. Chowdhury³, ¹Sandia National Laboratories, ²Arizona State University, ³Stanford University

3B-PO2-3 8:50-9:15

8.85-kV/0.72-A Charge-Balanced GaN Super-Heterojunction Schottky Barrier Diode, Sang-Woo Han, Mansura Sadek, Jesse T. Kemmerling, Rian Guan, and Rongming Chu, The Pennsylvania State University

3B-PO2-4 9:15-9:40

Noninvasive Lift-off Technology for Integration of GaN HEMTs with Diamond, Mei Wu, Xinchuang Zhang, Ling Yang, Xiaohua Ma, and Yue Hao, Wide Bandgap Semiconductor Technology

Room C

8:00-9:40 3C-DI1: Dynamical Systems for Novel Computing Paradigms

Chairs: Matthew W. Daniels, National Institute of Standards and Technology
Changjin Wan, Nanjing University

3C-DI1-1 (Invited) 8:00-8:25

Oscillator-based Dynamical Computing Platforms to Solve Combinatorial Optimization, Antik Mallick, Mohammad Khairul Bashar, and Nikhil Shukla, University of Virginia

3C-DI1-2 (Invited) 8:25-8:50

Novel Thermal Material Properties for Post-CMOS Neuromorphic Computing, Suhas Kumar, Sandia National Laboratories

3C-DI1-3 8:50-9:15

Inter Spike Interval and Stochasticity Engineering of Floating Gate Technology-based Neurons for Spiking Neural Network Hardware, Akira Goda, Chihiro Matsui and Ken Takeuchi, The University of Tokyo

3C-DI1-4 9:15-9:40

Realization of NOR Logic Using Cu/ZnO/Pt CBRAM, Chunyang Liu^{1,2}, Lei Guo^{1,2}, Zheng Qiao^{1,2}, Jie Li^{1,2}, Pengpeng Ren^{1,2}, Sheng Ye^{1,2}, Bo Zhou³, Jianfu Zhang³, Zhigang Ji^{1,2}, Runsheng Wang^{1,2} and Ru Huang^{1,2}, ¹Shanghai Jiao Tong university, ²Peking University, ³Liverpool John Moores University

Room D

8:00-9:40 3D-PR2: Manufacturing and Yield

Chairs: Anupam Mitra, KIOXIA Corp.

Sanghyeon Kim, Korea Advanced Institute of Science and Technology

3D-PR2-1 (Invited) 8:00-8:25

Novel E-Beam Techniques for Inspection and Monitoring, Andrzej J. Strojwas, Tomasz Brozek, Kelvin Doong, Indranil De, Xumin (William) Shen, and Marcin Strojwas, PDF Solutions Inc.

3D-PR2-2 8:25-8:50

New Method for BEOL Overlay and Process Margin Characterization, Linrong Yang¹, Runling Li¹, Jiadong Ren¹, Linlin Sun¹, Yawen Xue¹, Wenchao Yang¹, Ruilin Zhang¹, Yefang Zhu¹, Yan Zhang¹, Ikai Hsu², Haiqiong Zhang², Guifeng Zhang², Yingying Fu², Shan Yin², Yujie Jia², Bo Yu², and Tomasz Brozek², ¹Huali Integrated Circuit Corporation, ²PDF Solutions, Inc.

3D-PR2-3 8:50-9:15

Validating Optimized 22FDSOI Standard cells with Enhanced Design Rules, Navneet Jain, Juhan Kim, Jeff Kim, Deepti Pant, Shibly Ahmed, Nigel Chan and Mahbub Rashed, GLOBALFOUNDRIES, Inc.

3D-PR2-4 (Invited) 9:15-9:40

Unique Multi-Level Metal Layer Electronics Solutions Offered by Advanced 3D Printing, Mengze Li¹, Yang Yang¹, Jaim Nulman², Minoru Yamada² and Francesca Iacopi¹, ¹University of Technology Sydney, ²Nano Dimension

Room E

8:00-9:15 3E-PA1: Trend of Advanced Heterogeneous Integration

Chairs: Yasumitsu Oorii, NAGASE & CO., & LTD.

Akihiro Horibe, IBM Research

3E-PA1-1 (Invited) 8:00-8:25

Surface Silicon Bridge Direct Bonded Heterogeneous Integration (s-DBHi), Takashi Hisada¹, Isabel De Sousa², Aakrati Jain¹, Chinami Marushima¹, Toyohiro Aoki¹, Sayuri Kohara¹, Hiroyuki Mori¹ and Kamal Sikka¹, ¹IBM Research, ²IBM Systems

3E-PA1-2 (Invited) 8:25-8:50

Trends and Challenges in Advanced Packaging Development for Silicon Photonics Beyond 400Gbps in Hyperscale Data Center Networking Applications, Jie Xue, Sandeep Razdan, Peter De Dobbelaere, Angelo Miele, Aparna Prasad, Tong Wang, Vipul Patel, and Ginni Chadha, Cisco Systems, Inc.

3E-PA1-3 (Invited) 8:50-9:15

Thermal Challenges for HPC 3DIC Packages and Systems, Kathy Yan, Po-Yao Lin, and Sheng-Liang Kuo, TSMC

Room B

10:05-11:45 4B-NA2: Two-Dimensional Materials and Devices

Chairs: Mark Hersam, Northwestern University
Joan Redwing, The Pennsylvania State University

4B-NA2-1 (Invited) 10:05-10:30

Gate-Tunable Neuromorphic Devices Enabled by Two-Dimensional Materials, Mark C. Hersam, Northwestern University

4B-NA2-2 (Invited) 10:30-10:55

Bottom-Up Synthesized Graphene Nanoribbon Transistors, Zafer Mutlu and Jeffrey Bokor, University of California, Berkeley

4B-NA2-3 (Invited) 10:55-11:20

Epitaxial Growth of Wafer-Scale Transition Metal Dichalcogenide Monolayers by Metalorganic Chemical Vapor Deposition, Nicholas Trainor, Chen Chen, Haoyue Zhu, Thomas V. Mc Knight, Tanushree H. Choudhury, and Joan M. Redwing, The Pennsylvania State University

4B-NA2-4 11:20-11:45

Metal-Semiconductor Schottky Diodes with Record-High Rectification and Conductance Using Two-Dimensional Monolayer Decoration, Simran Shahi, Maomao Liu, Hemendra Nath Jaiswal, Anindita Chakravarty, Sichen Wei, Yu Fu, Asma Ahmed, Anthony Cabanillas, Fei Yao, and Huamin Li, University at Buffalo, The State University of New York

Room C

10:05-11:45 4C-EM1: Quantum and Neuromorphic Computing 1

Chairs: John Dallessase, University of Illinois at Urbana-Champaign
Masumi Saitoh, KIOXIA Corp.

4C-EM1-1 (Invited) 10:05-10:30

The Dawn of Superconducting Quantum Information Processing, Irfan Siddiqi, University of California, Berkeley

4C-EM1-2 (Invited) 10:30-10:55

Quantum Information Processing with Semiconductor Quantum Dots, John Nichol, University of Rochester

4C-EM1-3 (Invited) 10:55-11:20

Towards a Large-Scale Silicon Quantum Processor, A. R. Mills, C. R. Guinn, M. J. Gullans, A. J. Sigillito, M. M. Feldman, and J. R. Petta, Princeton University

4C-EM1-4 (Invited) 11:20-11:45

Timing Selector: Using Transient Switching Dynamics to Solve The Sneak Path Issue of Crossbar Arrays, J. Joshua Yang, University of Southern California

Room D

10:05-11:45 4D-FL2: Flexible and Wearables Electronics 2

Chairs: Feng Yan, Hong Kong Polytechnic University

Juan Paolo Bermundo, Nara Institute of Science and Technology

4D-FL2-1 (Invited) 10:05-10:30

Deep-Subthreshold Ambipolar Printed-CNT TFTs Toward Sustainable Ultra-Low-Power Edge Computing, Vincenzo Pecunia¹ and Luis Portilla², ¹Simon Fraser University, ²Fudan University

4D-FL2-2 (Invited) 10:30-10:55

Flexible Printed Organic Sensors and Their Applications, Shizuo Tokito, Yamagata University

4D-FL2-3 10:55-11:20

Liquid-Metal-Printed Ultrathin Channel In₂O₃ Transistors for Large Area Transparent Electronics, William J. Scheideler, Andrew B. Hamlin, Youxiong Ye, Julia E. Huddy, and Md Saifur Rahman, Dartmouth College

4D-FL2-4 11:20-11:45

First Demonstration of Flexible Poly-Si Nano-FETs (W/L_g= 50/80 nm) on the Polyimide Utilizing Multi-Wavelength Laser Annealing Assisted by Laser-Buffer Layer, Po-Cheng Hou¹, Wen-Hsien Huang², Ming-Hsuan Kao², Shih-Wei Chen², Hsing-Hsiang Wang², Chang-Hong Shen², Jia-Min Shieh², Fu-Ming Pan¹, and Li Chang¹, ¹National Yang Ming Chiao Tung University, ²TSRI

Room E

10:05-12:10 4E-PH1: Advanced Photonics

Chairs: Hang Zhou, Peking University

Kai Wang, Sun Yat-sen University

4E-PH1-1 (Invited) 10:05-10:30

Performance Improvement of III-nitrides Visible and Ultraviolet Photodetectors by Manipulating Polarization Effect, Zesheng Lv¹, Lijie Sun¹, Yao Guo¹, Zhongkun Liao¹, and Hao Jiang^{1,2}, ¹Sun Yat-Sen University, ²Optoelectronic Materials and Technologies

4E-PH1-2 (Invited) 10:30-10:55

High-performance DUV-C Solar-Blind n-ZnO Quantum Dot/p-CuO Micro-pyramid Photodetector Arrays, Iman S. Roqan¹, Norah Alwadai², Somak Mitra¹, and Hadeel Amoudi¹, ¹King Abdullah University of Science and Technology, ²Princess Nourah bint Abdulrahman University

4E-PH1-3 (Invited) 10:55-11:20

All Organic Integration for Active-Matrix Addressed Optical Imagers, Xiaojun Guo, Xiao Hou, Xiaokuan Yin, and Tong Shan, Shanghai Jiao Tong University

4E-PH1-4 11:20-11:45

A 12×12 Imager Array Based on Randomly-Accessible Active Pixel Sensor Inspired by Retinal Photoreceptor, Zhenhao Feng¹, Yihong Qi^{1,2}, Kuiren Su¹, Xiaolin Liu^{1,2}, Qian Li¹, Chao Gao¹, Jianping Guo¹, and Kai Wang^{1,2}, ¹Sun Yat-sen University, ²Pazhou Lab

4E-PH1-5 11:45-12:10

Localized Surface Plasmon-Enhanced Photodetection in β -Ga₂O₃ Solar-Blind Photodetector with Sn Nanoparticles Array, Sishuo Yang and Ling-Xuan Qian, University of Electronic Science and Technology of China

Room A

13:30-15:10 5A-PO3: SiC Devices

Chairs: Hiroshi Yano, University of Tsukuba

Moufu Kong, University of Electronic Science and Technology of China

5A-PO3-1 (Invited) 13:30-13:55

Realization of Monolithic SiC Power IC Utilizing the Compatible Process for CMOS and Power MOSFET, Mitsuo Okamoto, Atsushi Yao, Hiroshi Sato, and Shinsuke Harada, Advanced Industrial Science and Technology

5A-PO3-2 13:55-14:20

High Temperature Performance of 6500V 4H-SiC MOSFET With Embedded Schottky Barrier Diode, Hang Chen¹, Yourun Zhang¹, Maojiu Luo¹, Shiyun Li², Peng He¹, Song Bai² and Bo Zhang¹, ¹University of Electronic Science and Technology of China, ²Nanjing Electronic Devices Institute of China

5A-PO3-3 14:20-14:45

Thermal Characteristics Study on 650-V/50-A 4H-SiC JBS Diodes by Convolution Method, Yourun Zhang¹, Denghao Wu¹, Maojiu Luo¹, Chao Lu², Fanxin Meng², and Bo Zhang¹, ¹University of Electronic Science and Technology of China, ²China Zhenhua Group Yongguang Electrical Co., Ltd.

5A-PO3-4 14:45-15:10

A Novel Lateral Reverse Conducting Trench IGBT on SOI Employing NPN Bipolar with Small Area Penalty and Switching Energy Loss, Suyang Liu, Yue Zhang, Zijian Zhang, and Masahide Inuishi, Waseda University

Room B

13:30-14:45 5B-ME2: Selector Devices, Access Transistors, and Nonvolatile SRAM

Chairs: Jianshi Tang, Tsinghua University

Jiyong Woo, Kyungpook National University

5B-ME2-1 13:30-13:55

Hold Voltage Behavior in NbO_x Based Threshold Switches for Selector Technology and Neuromorphic Computing Applications, Hyun Wook Kim, Sol Jin, Heebum Kang, Eun Ryeong Hong, and Jiyong Woo, Kyungpook National University

5B-ME2-2 13:55-14:20

A Systematic Investigation of La Diffusion and Transistor Dimension Effect on the Performance Improvement of HKMG NMOSFETS in DRAM Process, Xingsong Su, Zhaoqiang Bai, Chao Lin, Meng Huang, Wenli Zhao, Weiping Bai, Deyuan Xiao, Jie Bai, and Kanyu Cao, Changxin Memory Technologies, Inc.

5B-ME2-3 14:20-14:45

Variation-Tolerant Recall Operation for Nonvolatile SRAM Integrated with Ferroelectric Capacitor, Ai-Fang Li¹, Rwei-Yu Huang², and Vita Pi-Ho Hu², National Central University, ²National Taiwan University

Room C

13:30-15:10 5C-MA1: Novel Functional Materials and Devices

Chair: Kazuhito Matsukawa, SUMCO Corp.

5C-MA1-1 (Invited) 13:30-13:55

Novel Functional Devices of Transition Metal Dichalcogenide Monolayers, Taishi Takenobu, Nagoya University

5C-MA1-2 (Invited) 13:55-14:20

High-Performance Atomic-Layer-Deposited Oxide Semiconductor Transistors with Atomically Thin Channel, Mengwei Si¹ and Peide Ye², ¹Shanghai Jiao Tong University, ²Purdue University

5C-MA1-3 14:20-14:45

Detection Limit of Photoluminescence Method for Determination of Carbon Impurity Concentration in Silicon, Yuta Satake, Michio Tajima, Shota Asahara, and Atsushi Ogura, Meiji University

5C-MA1-4 14:45-15:10

Local Capacitance-Voltage Profiling on MoS₂/SiO₂ and MoS₂/h-BN/SiO₂ by Scanning Nonlinear Dielectric Microscopy Assisted with an Insulating Tip, Taiyo Ishizuka, Kohei Yamasue, and Yasuo Cho, Tohoku University

Room D

13:30-15:10 5D-MO2: Modeling and Simulation 2

Chairs: Risho Koh, Renesas Electronics Corp.
Peng Huang, Peking University

5D-MO2-1 (Invited) 13:30-13:55

Silicon Quantum Annealing Machines Using Conventional CMOS Devices, Tetsufumi Tanamoto, Teikyo University

5D-MO2-2 (Invited) 13:55-14:20

A SPICE-Based Simulation Method for System Efficient Electrostatic Discharge Design, Yuan Wang, Peking University

5D-MO2-3 14:20-14:45

Deep Learning Approach to Estimating Work Function Fluctuation of Gate-All-Around Silicon Nanosheet MOSFETs with A Ferroelectric HZO Layer, Rajat Butola, Yiming Li, and Sekhar Reddy Kola, National Yang Ming Chiao Tung University

5D-MO2-4 14:45-15:10

A Simulation Approach to Analyze Bridge-Defects in a 6T-SRAM Bit Cell, Joydeep Ghosh¹, Shang Yi Lim¹, Ferdous Md. Meftahul², Senthilnath Jayavelu², and Aaron Voon-Yew Thean¹, ¹National University of Singapore, ²Agency for Science, Technology and Research (A*STAR)

Room E

13:30-15:10 5E-PR3: Device Process Optimization

Chairs: Makoto Miura, Hitachi High-Tech Corp.
Ming Li, Peking University

5E-PR3-1 (Invited) 13:30-13:55

Device Isolation process for 4H-SiC CMOS ICs, Bing-Yue Tsui¹, Ya-Ru Jhuang¹, Jian-Hao Lin¹, Yi-Ting Huang¹, Te-Kai Tsai¹, Kai-Ti Hsu², Yi-Han Su², and Yong-Fen Hsieh², ¹National Yang Ming Chiao Tung University, ²Materials Analysis Technology Inc.

5E-PR3-2 13:55-14:20

Investigation on Polarization and Trapping Dominated Reliability for Ferroelectric- HfZrO_x Ge FinFET Inverters, Tzu-Chieh Hong^{1,2}, Chun-Jung Su², Yao-Jen Lee², Yiming Li³, Seiji Samukawa⁴, and Tien-Sheng Chao¹, ¹National Yang Ming Chiao Tung University, ²National Applied Research Laboratories, ³National Chiao Tung University, ⁴Tohoku University

5E-PR3-3 14:20-14:45

Investigation of Ge Channel Complemental Field Effect Transistors (CFETs) Stacked Epitaxy or Layer Transfer, Tzu-Chieh Hong^{1,2}, Yu-Sin Ren^{2,3}, Chun-Jung Su², Yao-Jen Lee², and Tien-Sheng Chao¹, ¹National Yang Ming Chiao Tung University, ²National Applied Research Laboratories, ³National Cheng Kung University

5E-PR3-4 14:45-15:10

Investigation on Utilization of thin SOI layer as Resistor in SOTB Process, Yoshiki Yamamoto, Kazuhiko Segi, Hideki Makiyama, Tatsuyoshi Mihara, and Tamotsu Ogata, Renesas Electronics Corp.

Room A

15:35-17:15 6A-DE2: Non-Si Channel Semiconductor Devices

Chairs: Kuniyuki Kakushima, Tokyo Institute of Technology
Wansik Hwang, Korea Aerospace University

6A-DE2-1 (Invited) 15:35-16:00

III-V on a Si Platform for the Next Generations of Communication Systems, B.Parvais^{1,2}, A. Vais¹, S.Yadav¹, Y. Mols¹, B. Vermeersch¹, K. Vondkar Kodanarama¹, G. Boccardi¹, B. Kunert¹, and N. Collaert¹, ¹imec, ²Vrije Universiteit Brussels

6A-DE2-2 (Invited) 16:00-16:25

Current Status of Ga₂O₃ Power Devices in ETRI, Jae Kyoung Mun¹, Heejoong Ryou^{1,2}, Kyu Jun Cho¹, Woojin Chang¹, and Hun Ki Lee¹, ¹ETRI, ²Korea Aerospace University

6A-DE2-3 16:25-16:50

Extremely- Scaled Channel Thickness ZnO FET with High Mobility 86 cm²/V-s, Low SS of 83mV/dec and Low Thermal Budget Process (<300°C), Umesh Chand, Chen Chun-Kuei, Manohar Lal, Sonu Hooda, Hasita Veluri, Zihang Fang, Shih-Hao Tsai, and Aaron Voon-Yew Thean, National University of Singapore

6A-DE2-4 16:50-17:15

Field-Effect Mobility Enhancement in Low Temperature ALD ZnO Thin-film Transistors via Contact Defects Engineering Suitable for BEOL Integration, Mei Shen¹, Jiqing Lu^{1,2}, Wenhui Wang¹, Jun Lan¹, Jinxuan Liang¹, Feichi Zhou¹, Longyang Lin¹, and Yida Li¹, ¹Southern University of Science and Technology, ²Harbin Institute of Technology

Room B

15:35-17:15 6B-RE1: CMOS Reliability

Chairs: Stanislav Tyaginov, imec
Zakariae Chbili, Intel Corp.

6B-RE1-1 (Invited) 15:35-16:00

Reliability in Advanced Silicon Technologies, Chetan Prasad, Intel Corp.

6B-RE1-2 (Invited) 16:00-16:25

The Importance of Secondary Generated Carriers in Modeling of Full Bias Space, M. Jech, T. Grasser, M. Waltl, and TU Wien

6B-RE1-3 16:25-16:50

Experimental Analysis of Process Impacts on Fluorine Incorporated Gate Oxide Film Properties Near Gate Edge Region, Shuntaro Fujii, Isao Maru, Soichi Morita, and Tsutomu Miyazaki, Asahi Kasei Microsystems

6B-RE1-4 16:50-17:15

Area-efficient Power-rail ESD Clamp Circuit with False-Trigger Immunity in 28nm CMOS Process, Zilong Shen, Yize Wang, Xing Zhang and Yuan Wang, Peking University

Room D

15:35-16:25 6D-EM2: Quantum and Neuromorphic Computing 2

Chair: Masumi Saitoh, KIOXIA Corp.

6D-EM2-1 (Invited) 15:35-16:00

Quantum Computation and Simulation - Spins Inside, Lieven M.K. Vandersypen, Delft University of Technology

6D-EM2-2 (Invited) 16:00-16:25

Memristor Dynamics Enabled Computing, Yuchao Yang, Peking University

Room E

15:35-16:50 6E-PA2: Emerging Technologies of Heterogeneous Integration

Chairs: Atsushi Takahashi, NAGASE & CO., & LTD.
Masashi Nakazawa, Sony Semiconductor Solutions Corp.

6E-PA2-1 (Invited) 15:35-16:00

Plasma-Activated Cu-Cu Direct Bonding in Ambient for Die-Die and Die-Wafer Bonding, Liangxing Hu, Yu Dian Lim, Peng Zhao, Michael Joo Zhong Lim, and Chuan Seng Tan, Nanyang Technological University

6E-PA2-2 (Invited) 16:00-16:25

Bioelectronics Devices – Microtechnology Enabling a Revolution, Erik Jung, Fraunhofer IZM

6E-PA2-3 16:25-16:50

Temperature Dependence of Current-Voltage Characteristics of Ionic Liquid Type Intelligent Connection Device, Masakazu Kobayashi¹, Yasumitsu Orii¹, Hisashi Shima², Yasuhisa Naitoh², Hiroyuki Akinaga², Dan Sato^{2,3}, Takuma Matsuo^{2,3}, Kentaro Kinoshita³, Toshiki Nokami⁴, and Toshiyuki Itoh⁵, ¹NAGASE & Co., LTD, ²National Institute of Advanced Industrial Science and Technology, ³Tokyo University of Science, ⁴Tottori University, ⁵Toyota Physical and Chemical Research Institute

Room A

17:40-19:00 Plenary Session

Chair: Masumi Saitoh, KIOXIA Corp.

PL-4 17:40-18:20

Printing Technologies for Sensor Applications, Paolo Lugli, Ali Douaki, Bajramshahe Shkodra, Martina Aurora Costa Angeli, and Luisa Petti, Free University of Bozen-Bolzano

PL-5 18:20-19:00

What's Next in Computing – From Bits to Qubits, Heike E. Riel, IBM Research

Wednesday, March 9

Room A

8:00-9:15 7A-DE3: Emerging Devices for Low Power Computing

Chairs: Yuichiro Mitani, Tokyo City University

Xiao Gong, National University of Singapore

7A-DE3-1 (Invited) 8:00-8:25

HfO₂-based Ferroelectric Devices for Low Power Applications, Qianqian Huang, Mengxuan Yang, Jin Luo, Chang Su, and Ru Huang, Peking University

7A-DE3-2 8:25-8:50

Reconfigurable Ferroelectric Electrostatic Doped Negative Capacitance Nanosheet Field-Effect Transistors with Enhanced I_{ON}/I_{OFF} and Scaled $V_{DD} < 0.45$ V, Ning Liu¹, Jiuren Zhou¹, Siying Zheng¹, Hongrui Zhang¹, Qinyuan Yan¹, Jie Liang², Harshit Agarwal³, Yan Liu¹, Genquan Han¹, and Yue Hao¹, ¹Xidian University, ²Shanghai University, ³Institute of Technology Jodhpur

7A-DE3-3 8:50-9:15

Neuron Function with Single Device by using “PN-Body Tied SOI-FET” -Mimicking Leaky Integrate and Fire Characteristics-, Toru Sasaki, Takayuki Mori, and Jiro Ida, Kanazawa Institute of Technology

Room B

8:00-9:15 7B-PO4: Diamond and Ga₂O₃ Devices

Chairs: Wai Tung Ng, University of Toronto

Carol Zhan, ON Semiconductor Corporation

7B-PO4-1 (Invited) 8:00-8:25

Epitaxial CVD Diamond P-I-N Structures and Charge Transfer Doping Interfaces for Diamond Electronics, Robert J. Nemanich¹, Harshad Surdi¹, Mohamadali Malakoutian^{2,3}, Yu Yang¹, Yichen Yao¹, Xingye Wang¹, Franz A. Koeck¹, Srabanti Chowdhury³, and Stephen Goodnick¹, ¹Arizona State University, ²University of California, Davis, ³Stanford University

7B-PO4-2 (Invited) 8:25-8:50

Diamond Semiconductor Devices for Harsh Environmental Applications, Hitoshi Umezawa, National Institute of Advanced Industrial Science and Technology

7B-PO4-3 (Invited) 8:50-9:15

Lateral Gallium Oxide Field Effect Transistors with High Figure of Merit, Arkka Bhattacharyya¹, Praneeth Ranga¹, and Sriram Krishnamoorthy^{1,2}, ¹University of Utah, ²University of California, Santa Barbara

Room C

8:00-9:40 7C-DI2: Dynamical Systems for Novel Computing Paradigms

Chair: Gina Adam, The George Washington University

7C-DI2-1 (Invited) 8:00-8:25

Si Platform for Implementing Spin-based Quantum Computer, Seigo Tarucha^{1,2}, ¹RIKEN, ²Tokyo University of Science

7C-DI2-2 (Invited) 8:25-8:50

In-sensor Computing Devices for Bio-inspired Vision Sensors, Fuyou Liao and Yang Chai, The Hong Kong Polytechnic University

7C-DI2-3 8:50-9:15

Pt/TiO_x/Ti-based Dynamic Optoelectronic Memristor for Neuromorphic Computing, Heyi Huang, Jianshi Tang, Bin Gao, Yuyan Wang, Xinyi Li, Ze Wang, He Qian, and Huaqiang Wu, Tsinghua University

7C-DI2-4 9:15-9:40

IGZO Nanofiber Photoelectric Synapse for Artificial Neural Networks, Yixin Zhu, and Changjin Wan, Nanjing University

Room D

8:00-9:40 7D-MA2: Emerging Materials and Devices

Chairs: Pei-Wen Li, National Yang Ming Chiao Tung University
Chun-Jung Su, National Yang Ming Chiao Tung University

7D-MA2-1 (Invited) 8:00-8:25

Crystallization of Hafnium-Oxide-Based Ferroelectrics for BEOL Integration, Martin M. Frank, Eduard A. Cartier, Christian Lavoie, Adra Carr, Jean L. Jordan-Sweet, Paul C. Jamison, Oleg Gluschenkov, John Rozen, and Vijay Narayanan, IBM Research

7D-MA2-2 (Invited) 8:25-8:50

Two-Dimensional Borides Discovery, Alejandro Lopez-Bezanilla, Los Alamos National Laboratory

7D-MA2-3 8:50-9:15

Germanium Quantum-Dot Single-Hole Transistors with Self-organized Tunnel Barriers and Self-aligned Electrodes Using Ingenious Sidewall Spacer and Oxidation Techniques, Rong-Cun Pan, I-Hsiang Wang, Chi-Cheng Lai, Thomas George, Horng-Chih Lin, and Pei-Wen Li, National Yang Ming Chiao Tung University

7D-MA2-4 9:15-9:40

Effect of Nitrogen Doping on the Dislocation Behaviors of 4H-SiC, Rong Wang¹, Xiaoshuang Liu¹, Jiajun Li¹, Hao Luo¹, Guang Yang², Deren Yang¹, and Xiaodong Pi¹, ¹Zhejiang University, ²Zhejiang Sci-Tech University

Room A

10:05-11:45 8A-ME3: PCM and In-Memory Compute Applications

Chairs: Kai Ni, Rochester Institute of Technology
Xinyu Bao, TSMC

8A-ME3-1 (Invited) 10:05-10:30

Device Study On OTS-PCM For Persistent Memory Application, W.C. Chien¹, L.M. Gignac², Y.C. Chou¹, C.H. Yang¹, N. Gong², H.Y. Ho¹, C.W. Yeh¹, H.Y. Cheng¹, W. Kim², I.T. Kuo¹, E.K. Lai¹, C.W. Cheng², L. Buzi², A. Ray², C.S. Hsu¹, D. Daudelin², R.L. Bruce², M. BrightSky², and H.L. Lung¹,
¹Macronix International Co., Ltd., ²IBM T.J. Watson Research Center

8A-ME3-2 (Invited) 10:30-10:55

Achieving Accurate In-Memory Neural Network Inference with Highly Overlapping Nonvolatile Memory State Distributions, Matthew J. Marinella^{1,2}, T. Patrick Xiao¹, Ben Feinberg¹, Chris Bennett¹, Vineet Agrawal³, Helmut Puchner³, and Sapan Agarwa¹, ¹Sandia National Laboratories, ²Arizona State University, ³Infineon Memory Solutions

8A-ME3-3 10:55-11:20

Realization of Logical NOT Based on Standard DRAM Cells for Security-Centric Compute-in-Memory Applications, Zheng Qiao^{1,2}, Jie Li^{1,2}, Chunyang Liu^{1,2}, Lei Guo^{1,2}, Pengpeng Ren^{1,2}, Sheng Ye^{1,2}, Bo Zhou³, Jianfu Zhang³, Zhigang Ji^{1,2}, Junhua Liu^{1,2}, Runsheng Wang^{1,2} and Ru Huang^{1,2},
¹Shanghai Jiao Tong University, ²Peking University, ³Liverpool John Moores University

8A-ME3-4 11:20-11:45

High-to-Low Flipping (HLF) Coding Strategy in Triple-Level-Cell (TLC) 3D NAND Flash Memory to Construct Reliable Image Storages, Binglu Chen, Yachen Kong, Zhaohui Sun, Xiaotong Fang, Xuepeng Zhan, and Jiezhi Chen, Shandong University

Room B

10:05-11:45 8B-PR4: Advanced Process Techniques

Chairs: Yasushi Akasaka, Tokyo Electron Ltd.
Tien-Sheng Chao, National Yang Ming Chiao Tung University

8B-PR4-1 (Invited) 10:05-10:30

New Innovative Etch Technologies Utilizing State-of-The-Art Atomic-Level Process for Advanced Patterning, Sho Kumakura, Takayuki Katsunuma, Tetsuya Nishizuka, Yoshihide Kihara, and Masanobu Honda, Tokyo Electron Ltd.

8B-PR4-2 (Invited) 10:30-10:55

Gas-Source Chemical Vapor Deposition of Atomically Thin WS₂ for LSI Device Applications, Toshifumi Irisawa, Mitsuhiro Okada, Naoya Okada, and Wen-Hsin Chang, National Institute of Advanced Industrial Science and Technology

8B-PR4-3 10:55-11:20

Surface Modulation of SiGe by Hydrogen Plasma Process with Site Exchange Mechanism between Si and Ge, Yohei Ishii¹, Ryoko Sugano², Yao-Jen Lee³, Wen-Fa Wu³, Kenji Maeda⁴, and Makoto Miura⁴, ¹Hitachi High-Tech America, ²Hitachi Ltd., ³TSRI, ⁴Hitachi High-Tech Corp.

8B-PR4-4

11:20-11:45

Reduction of White Spot Defects in CMOS Image Sensors Using CH₂P-Molecular-Ion-Implanted Epitaxial Silicon Wafers, Takeshi Kadono^{1,2}, Ryo Hirose¹, Ayumi Masada¹, Akihiro Suzuki¹, Kouji Kobayashi¹, Ryosuke Okuyama¹, Yoshihiro Koga¹, Atsuhiko Fukuyama² and Kazunari Kurita¹, ¹SUMCO Corp., ²University of Miyazaki

Room C

10:05-12:10 8C-MO3: Modeling and Simulation 3

Chairs: Chika Tanaka, KIOXIA Corp.
Lan Wei, University of Waterloo

8C-MO3-1 (Invited) 10:05-10:30

Self-Heating in Short-channel GaN HEMTs: Maximum Channel Temperature and Equivalent Channel Temperature, Xuesong Chen, Slim Boumaiza, and Lan Wei, University of Waterloo

8C-MO3-2 (Invited) 10:30-10:55

A Turnkey Large-Signal Model for Amplifier Design in 5G Spectra using AlGaIn/GaN HEMTs, Yogesh S. Chauhan¹, Ahtisham Pampori¹, Raghvendra Dangji¹, Pragya Kushwaha², Ekta Yadav², and Santanu Sinha², ¹Indian Institute of Technology Kanpur, ²Indian Space Research Organisation

8C-MO3-3 10:55-11:20

Physics-Based Compact Model for CAAC In-Ga-Zn Oxide Multi-Gate FETs with Free Shape of Fin, M. Watanabe¹, S. Mijalkovic¹, B. Tudor¹, K. Tsuda², H. Kunitake², and S. Yamazaki², ¹Silvaco, Inc., ²Semiconductor Energy Laboratory Co., Ltd.

8C-MO3-4 11:20-11:45

Heteroscedastic Gaussian Process Regression for ReRAM Device Modeling, Imtiaz Hossen¹, Yi Zang¹, Mark A. Anders², Lin Wang¹ and Gina C. Adam¹, ¹George Washington University, ²National Institution of Standards and Technology

8C-MO3-5 11:45-12:10

Real-Time-Scale 3D Kinetic Monte Carlo Simulation for Hafnium Oxide Based RRAM in 1T1R Cell, Yuyao Lu, Bin Gao, Feng Xu, Jianshi Tang, He Qian, and Huaqiang Wu, Tsinghua University

Room D

10:05-12:10 8D-RE2: Emerging Memory Reliability

Chairs: Zakariae Chbili, Intel Corp.
Stanislav Tyaginov, imec

8D-RE2-1 (Invited) 10:05-10:30

STT-MRAM Product Reliability and Cross-Talk, V. B. Naik, K. Yamane, J. Kwon, J.H. Lim, N. Balasankaran, N.L. Chung, L.Y. Hau, R. Chao, C. Chiang, Y. Huang, L. Pu, L. Ma, C. Meng, Y. Otani, L. Zhang, S.H. Jang, T. Ling, J.W. Ting, H. Yoon, J. Mueller, B. Pfefferling, O. Kallensee, T. Merbeth, C.S. Seet, J. Wong, Y.S. You, S. Soss, T.H. Chan, and S.Y. Siah, GLOBALFOUNDRIES, Inc.

8D-RE2-2 (Invited) 10:30-10:55

Reliability and Prospects of Logic-in-Memory Circuits, Tommaso Zanotti, Università degli Studi di Modena and Reggio Emilia

8D-RE2-3 10:55-11:20

Investigation of Read Voltage Impact on Foundry BEOL RRAM for Core Integration, Qishen Wang, Zongwei Wang, Lin Bao, Shengyu Bao, Yaotian Ling, Yimao Cai, and Ru Huang, Peking University

8D-RE2-4 (Invited) 11:20-11:45

Carrier Profile Mapping in a 3D Flash Memory Cell using Scanning Nonlinear Dielectric Microscopy, Jun Hirota ¹, Ken Hoshino¹, Kohei Yamasue², and Yasuo Cho², ¹KIOXIA Corp., ²Tohoku University

8D-RE2-5 11:45-12:10

Experimental Observations on C-V Measurement Caused Performance Degradations in Hf_{0.5}Zr_{0.5}O₂ Ferroelectric Film, Weiqiang Zhang, Bo Chen, Wei Wei, Lu Tai, Xuepeng Zhan, Fei Wang, and Jiezhi Chen, Shandong University

Room B

13:35-14:50 9B-DE4: MOSFET Physics and Process

Chairs: Kimihiko Kato, National Institute of Advanced Industrial Science and Technology
Zhigang Ji, Shanghai Jiao Tong University

9B-DE4-1 (Invited) 13:35-14:00

Effect of Random Potential Fluctuations on Threshold Voltage Variability in Bulk MOSFETs at Cryogenic Temperature, Toshiro Hiramoto¹, Tomoko Mizutani¹, Kiyoshi Takeuchi¹, Takuya Saraya¹, Hiroshi Oka², Takahiro Mori², and Masaharu Kobayashi¹, ¹The University of Tokyo, ²National Institute of Advanced Industrial Science and Technology

9B-DE4-2 14:00-14:25

An Investigation of Plasma Charging Effect on FinFET Front-End-of-Line Processes, Kai-Wei Yang, Yi-Jie Chao, Jiaw-Ren Shih, Chrong-Jung Lin and Ya-Chin King, National Tsing Hua University

9B-DE4-3 14:25-14:50

Effects of Gate Metal Work Function and Line Edge Roughness on the Variability of Junctionless Field-Effect Transistor, Xinhe Wang, Bin Gao, Jianshi Tang, Zhigang Zhang, Huaqiang Wu, and He Qian, Tsinghua University

Room B

15:15-16:30 10B-PO5: Ultra Wide Bandgap Devices and ESD

Chairs: Ray Hueting, University of Twente
Shu Yang, Zhejiang University

10B-PO5-1 (Invited) 15:15-15:40

Ga₂O₃ – Diamond For Next Generation Power Electronics, Abhishek Mishra, Zeina Abdallah, Hyun-Seop Kim, James W. Pomeroy, Michael J. Uren, and Martin Kuball, University of Bristol

10B-PO5-2 (Invited) 15:40-16:05

Ultrathin-Barrier AlGaIn/GaN Heterostructure: An AlGaIn-Recess-Free Technology for Fabrication of Lateral GaN-Based Power Devices, Sen Huang^{1,2}, Xinhua Wang^{1,2}, Qimeng Jiang¹, Fuqiang Guo¹, and Xinyu Liu^{1,2}, ¹Institute of Microelectronics of Chinese Academy of Sciences, ²University of Chinese Academy of Sciences

10B-PO5-3 (Invited) 16:05-16:30

Impact of ESD Strategy on EMC Performances in Automotive Integrated Circuits, Kamel Abouda, and Patrice Besse, NXP Semiconductors

Room C

15:15-16:30 10C-DI3: In-Memory Computing: From Devices to Systems

Chairs: Yuchao Yang, Peking University
Can Li, The University of Hong Kong

10C-DI3-1 (Invited) 15:15-15:40

Mitigating Non-Idealities Of Memristive-Based Artificial Neural Networks – An Algorithmic Approach, Adnan Mehonic¹, Dovydas Joksas¹, Nikolaos Bampatsalos¹, Wing H. Ng¹, Anthony J. Kenyon¹, Erwei Wang², and George Constantinides², ¹University College London, ²Imperial College London

10C-DI3-2 (Invited) 15:40-16:05

MemCore: Computing-in-Flash Design for Deep Neural Network Acceleration, Shaodi Wang, Beijing Zhicun (WITIN) Technology Co. Ltd.

10C-DI3-3 16:05-16:30

Graph Neural Network Based on RRAM Array, Longhao Yan¹, Yihang Zhu¹, Zhaokun Jing¹, Qingxi Duan¹, Ru Huang^{1,2}, and Yuchao Yang^{1,2}, ¹Peking University, ²Chinese Institute for Brain Research