

# Table of Content

## **Session J1: Joint Plenary Session**

J1-1 Logic Technology Scaling: Present and Future

## **Session J2: Joint Special Session - In-Memory Computing (All Invited)**

J2-1 Challenges of Computation-in-Memory Circuits for AI Edge Applications

J2-2 Introduction of 3D AND-type Flash Memory and It's Applications to Computing-in-Memory (CIM)

J2-3 Neurocomputing and Neurooptimization with Stochastic Memristive Networks

## **Session J3: Joint Plenary Session**

J3-2 Finding a Needle in a Haystack: Success Stories of Data Mining and Machine Learning for Electronic Materials Selection

## **Session J4-1: Joint Special Session - Design-Technology Co-Optimization and Advanced Packaging (I) (All invited)**

J4-1-1 Design/System Technology Co-Optimization for 3nm Node and Beyond

## **Session J4-2: Joint Special Session - Design-Technology Co-Optimization and Advanced Packaging (II) (All invited)**

J4-2-1 From Design to System-Technology Optimization for CMOS

J4-2-2 Active Silicon Chiplet-Based Interposer for Exascale High Performance Computing

## **Session J6: Joint Plenary Session**

J6-2 Domain-specific In-memory Computing Architecture: CMOS Annealing Machine to Solve Combinatorial Optimization Problems

## **Session T1: Advanced CMOS Technology**

T1-1 FinFET Plus: A Scalable FinFET Architecture with 3D Air-Gap and Air-Spacer Toward the 3nm Generation and Beyond

T1-2 The First Ge Nanosheets GAAFET CMOS Inverters Fabricated by 2D Ge/Si Multilayer Epitaxy, Ge/Si Selective Etching

T1-3 Sub-60 mV/dec Germanium Nanowire Field-Effect Transistors with 2-nm-thick Ferroelectric  $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$

T1-4 The Powerful Methods of Flicker Noise Improvement in 22nm Technology

T1-5 Si Cryo-CMOS and Quantum Dots for Quantum Computing Applications

## Session T2: Special Session-Heterogeneous Integration (All Invited)

- T2-1 3D Integration of Memories Including Heterogeneous Integration
- T2-2 Silicon Photonic Integrated Circuit Technology with Wafer Level Integrated Lasers
- T2-3 New Directions in Silicon Photonics: From Optical Communications to the Brain

## Session T3: Poster Session

- T3-1 A 500V SOI-LIGBT With Multiple Deep-Oxide Trenches For Fast Turn-OFF
- T3-2 Back-Gate Network Extraction Free from Dynamic Self-Heating in FD SOI
- T3-3 Suppressed Source-to-Drain Tunneling and Short-Channel Effects for MFIS-type InGaAs and Si Negative-Capacitance FinFETs
- T3-4 Benchmarking the Performance of Heterogeneous Stacked RRAM with CFETS RAM and MRAM for Deep Neural Network Application Amidst Variation and Noise
- T3-5 Transfer Characteristics of CMOS Inverter Using “Steep SS PN-Body Tied SOI-FET”
- T3-6 Analysis of Drain Current Enhancement in “PN-Body Tied SOI-FET” -Bulk vs Surface Conduction Mode and Low V<sub>ds</sub> Saturation Effect-
- T3-7 Calculation of Field Dependent Mobility in MoS<sub>2</sub> and WS<sub>2</sub> with Multi-Valley Monte Carlo Method
- T3-8 Improved Switching Time in Negative Capacitance Junctionless Transistors
- T3-9 Machine Learning Approach to Predicting Tunnel Field-Effect Transistors
- T3-10 A Precise Debugging Method and Defect Diagnosis with Mass Big-Data Analysis in the Designed High-Dense Array for Rapid Yield Improvement in a Logic Platform
- T3-11 A Novel Design of Ferroelectric Nanowire Tunnel Field Effect Transistors
- T3-12 Ferroelectric Characterization in Ultrathin Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> MFIS Capacitors by Piezoresponse Force Microscopy (PFM) in Vacuum
- T3-13 Selective Area Epitaxy of Axial Wurtzite -InAs Nanowire on InGaAs NW by MOCVD
- T3-14 Impact of Interfacial Layer on the Switching Characteristics of HZO-Based Ferroelectric Tunnel Junction
- T3-15 Alleviation of Charge Trapping and Flicker Noise in HfZrO<sub>2</sub>-Based Ferroelectric Capacitors by Thermal Engineering
- T3-16 Improvement of Nanotwinned Copper Thermal Stability for High Temperature Heterogeneous Integration
- T3-17 TCAD Validation of an Intercept-at-Zero-Gate-Length MOSFET Series Resistance Extraction Method

T3-18 Design of a Low Power Approximate Adder Based on Magnetic Tunnel Junction for Image Processing Applications

#### **Session T4: Non-Volatile Memories**

- T4-1 The Pursuit of Atomistic Switching and Cross Point Memory (Invited)
- T4-2 An 8kb Spin-Orbit-Torque Magnetic Random-Access Memory
- T4-3 Ultrahigh Spin-Orbit Torque Efficiency at Spin Reorientation Transition State in Pt/Co Multilayer
- T4-4 Multi-Bit Cryogenic Flash Memory on Si/SiGe and Ge/GeSi Heterostructures
- T4-5 Bandgap-Engineered Tunneling Layer on Operation Characteristics of Poly-Ge Charge-Trapping Flash Memory Devices
- T4-6 A Twin Bit AND-Type Multiple-Time-Programming Memory Cell by Nano-scaled High- $\kappa$  Metal Gate Process

#### **Session T5: Oxide Transistors and BEOL/Process Technology**

- T5-1 BEOL Compatible Indium-Tin-Oxide Transistors: Switching of Ultra-High-Density 2D Electron Gas over  $0.8 \times 10^{14} / \text{cm}^2$  by Ferroelectric Polarization
- T5-2 Double-Layer Amorphous InGaZnO Thin Film Transistors with High Mobility and High Reliability
- T5-3 Grain Structure – Resistivity Relationship of Ru ALD Precursors
- T5-4 Asymmetric Low Temperature Cu-Polymer Hybrid Bonding with Au Passivation Layer
- T5-5 On-Wafer Electronic Layer Detectors Array (ELDA) for e-beam Imaging in Advanced Lithographic Systems

#### **Session T6: Special Session-Low Temperature Electronics (All Invited)**

- T6-1 Cryo-CMOS Interfaces for Large-Scale Quantum Computers
- T6-2 Cryogenic Electronics and Materials for the Quantum Era
- T6-3 Cool-CMOS Technology for Next Generation High Performance Computing
- T6-4 Development of FD-SOI Cryogenic Amplifier for Application to STJ Readout in COBAND Project

#### **Session T7: Power and RF Devices**

- T7-1 High Voltage Gain 4H-SiC CMOS Technology Featuring Local Oxidation of SiC (LOCOSiC) Isolation and Balanced Gate Dielectric
- T7-2 CMOS-Compatible GaN HEMT on 200mm Si-substrate for RF application

- T7-3 Superior High-Frequency Performance of T-Gated Poly-Si TFTs
- T7-4 FD-SOI mm-Wave Differential Single-Pole Switches with Ultra-High Isolation

### **Session T8: Special Session- Low Dimensional Materials and Devices (All Invited)**

- T8-1 Carbon Nanotube Transistors for Future Technology Nodes
- T8-2 Uncovering the Deformations in Two-Dimensional Lateral Heterojunctions
- T8-3 2D Layered Semiconductor: Challenge & Perspective
- T8-4 Monolayer Optoelectronics and Their Excitonic Properties
- T8-5 Theoretical Study of Electronic Transport in Two-Dimensional Materials
- T8-6 Top-Gated Carbon Nanotube FETs from Quantum Simulations: Comparison with Experiments

### **Session T9: Special Session- Hardware Security (All Invited)**

- T9-1 Quantum Tunneling PUF: a Chip Fingerprint for Hardware Security
- T9-2 Proof of Authenticity of Logistics Information with Passive RFID Tags and Blockchain
- T9-3 Overview of Memory Security Technologies
- T9-4 Hardware Security - Back to the Future

### **Session T10: Ferroelectric FETs and Memories**

- T10-1 Ferroelectric and Antiferroelectric Hf/Zr Oxide Films: Past, Present and Future (Invited)
- T10-2 Current Percolation Path Impacting Switching Behavior of Ferroelectric FET
- T10-3 DFT Models of Ferroelectric Hafnium-Zirconium Oxide Stacks With and Without Dielectric Interlayers
- T10-4 Ultra-thin  $\text{Hf}_{0.5}\text{Zr}_{0.5}\text{O}_2$  Ferroelectric Tunnel Junction with High Current Density
- T10-5 Three-dimensional (3D) Non-volatile SRAM with IWO Transistor and HZO Ferroelectric Capacitor
- T10-6 Comparison of 2-T FeFET Nonvolatile Memory Cells: Gate Select vs. Drain Select

### **Session T11: Biomedical Sensors and Devices (All Invited)**

- T11-1 Internet of Medical Things for Diagnosing Musculoskeletal Injuries
- T11-2 Autopilot, Smart IoT Devices for Accelerating the Development of Bio-Electronic Medicine
- T11-3 New Horizons for Silicon Nanotechnology in Healthcare

## T11-4 How can Chip Technology Realize Electronic Sensing of Viruses?

**Organization**

**Author Index**