

# POSTER SESSION

MONDAY, 6:00 pm – 9:00 pm | Performance Hall

Paper	Title (Presenter)
P.1	Superconducting Josephson Junction FET-based Cryogenic Voltage Sense Amplifier (Alam)
P.2	Pulsed Current-Voltage Protocol to Reveal Polarization-Continuation in Ferroelectric Memory: Implications for Partial State Storage (Hossain)
P.3	Controllable Defect Engineering in 2D-MoS <sub>2</sub> for high-performance, threshold switching memristive devices (Thool)
P.4	Ultrathin Ferroelectric Nondoped HfO <sub>2</sub> for MFSFET with High-speed and Low-voltage Operation (Shin)
P.5	Experimental demonstration of sub-nanosecond switching in 2D hexagonal Boron Nitride resistive memory devices (Nibhanupudi)
P.6	MFSFET with Ferroelectric HfN for Analog Memory Application (Ohmi)
P.7	Cryogenic Memory Array based on Ferroelectric SQUID and Heater Cryotron (Alam)
P.8	Cryo-TRAM: Gated Thyristor based Capacitor-less DRAM for Cryogenic Computing (Chakraborty)
P.9	Impact of Corner Rounding on Quantum Confinement in GAA Nanosheet FETs for Advanced Technology Nodes (Kar)
P.10	Revisiting Gate-Induced Drain-Leakage in Nanowire FETs for 1T-DRAM (Jaiswal)
P.11	Self-Heating characterization and modeling of 5nm technology node FinFETs (Parihar)
P.12	Artificial Neural Network Surrogate Models for Efficient Design Space Exploration of 14-nm FinFETs (Guglani)
P.13	Compact Model for Trap Assisted Tunneling based GIDL (Dabhi)
P.14	A width-scalable SPICE compact model for GaN HEMTs including self-heating effect (Dangi)
P.15	Multi-Active Region AlGaIn Ultraviolet Light Emitting Diodes with Transparent Tunnel Junctions (Dominic Merwin)
P.16	The Cascaded Multiplier Avalanche Photodiode (McArthur)
P.17	Impact of InGaN-based underlayers on the performance of InGaN-based red-emitting LEDs (Xue)
P.18	Graphene waveguide-integrated thermal infrared emitter (Negm)
P.19	Near sensor security based on multifunctional monolayer MoS <sub>2</sub> FETs (Dodda)
P.20	An insect-inspired, spike-based, in-sensor, collision detector based on atomically thin, light-sensitive memtransistors (Das)
P.21	Fin PCNR: Laterally Actuating Phase Change Nanoelectromechanical Relay for Nonvolatile Memory Application (Masud)
P.22	Non-Volatile Resistive Switching in PtSe <sub>2</sub> -Based Crosspoint Memristors (Braun)
P.23	Tunneling transport in WSe <sub>2</sub> -MoS <sub>2</sub> heterojunction transistor enabled by a two-dimensional device architecture (Chava)
P.24	MoS <sub>2</sub> /Quantum Dot Hybrid Photodetectors on Flexible Substrates (Yakar)
P.25	Biomimetic Spiking Neuron Enabled by Subthreshold Operation of 2D Material-Based Transistor with ~500 Picojoules/Spike (Thakar)
P.26	Equivalent electrical circuit modelling of a TaO/HfO <sub>2</sub> based RRAM with optimized resistance window and multilevel states (Stecconi)
P.27	Detection Frequency Tuning in Tunable Antenna-Coupled Intersubband Terahertz (TACIT) Detector (Yoo)
P.28	CVD-GFETs with Record-small Hysteresis Owing to 2nm Epitaxial CaF <sub>2</sub> Insulators (Illarionov)
P.29	Bias Stress Stability of ITO Transistors and its Dependence on Dielectric Properties (Hoang)
P.30	High-performance TiO <sub>2</sub> thin film transistors using TiO <sub>2</sub> as both channel and dielectric (Zhang)
P.32	Demonstration and Analysis of Ambipolar SnO Inverter with High Gain (Mashooq)
P.33	Breakdown Voltage Enhancement of GaN diodes with High-k Dielectric (Talesara)

Paper	Title (Presenter)
P.34	Demonstration of Patterned GaN RF MIS-HEMTs Growing on Hybrid Oriented Silicon-on-Insulator (SOI) Substrates (Wu)
P.35	Trapping Phenomena in GaN HEMTs with Fe- and C-doped Buffer (Li)
P.36	Late News - An Ultra-steep Slope Two-dimensional Strain Effect Transistor (Das)
P.37	Late News - Memcapacitive optoelectronic synapses with MoS <sub>2</sub> /Al <sub>2</sub> O <sub>3</sub> /PtTe <sub>2</sub> transistors (Martinez-Martinez)
P.38	Late News - Infrared-sensitive optoelectronic synapses with 2D materials (Islam)
P.39	Late News - Fully Epitaxial Ferroelectric III-Nitride Semiconductors: From Materials to Devices (Wang)
P.40	Late News - Are Argon and Nitrogen Gases Really Inert to Graphene Devices (Kumar)

## SPECIAL THANKS

### CONFERENCE SUPPORT

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- ▶ Materials Research Society

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- ▶ IEEE Electron Devices Society

## EXHIBITS

### SUNDAY

6:00 pm – 8:00 pm Welcome Reception  
Performance Hall

### MONDAY

3:00 pm – 9:00 pm Exhibit Open  
3:00 pm – 3:20 pm Afternoon Break  
6:00 pm – 9:00 pm Poster Session

### TUESDAY

10:00 am – 4:00 pm Exhibit Open  
10:00 am – 10:20 am Morning Break  
3:00 pm – 3:20 pm Afternoon Break

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### GOLD



### SILVER



### BRONZE



## SUNDAY

<b>12:00 pm–5:00 pm</b>	<b>Registration</b>	<b>Great Hall Foyer</b>
<b>1:00 pm–5:00 pm</b>	<b>Short Course</b> Cryogenic Computing Devices	<b>U.S. Bank Conference Theater</b>
<b>6:00 pm–8:00 pm</b>	<b>Welcome Reception</b>	<b>Performance Hall</b>

## MONDAY

<b>8:00 am–5:00 pm</b>	<b>Registration</b>	<b>Great Hall Foyer</b>
9:00 am	Introduction and Awards	
<b>9:20 am</b>	<b>Plenary</b> Rediscovering Semiconductor Materials for Quantum Photonic Devices (Hu)	<b>U.S. Bank Conference Theater</b>
10:20 am	Coffee Break	Performance Hall
<b>10:40 am</b>	<b>Plenary</b> Unleashing the Potential of Integrated Ferroelectric Devices with Hafnium Oxide (Mikolajick)	<b>U.S. Bank Conference Theater</b>
11:40 am	Lunch (On your own)	

### Session 1-Wide Bandgap I - Lateral Ga2O3 Devices

U.S. Bank Conference Theater

1:00 pm	<b>INVITED</b> High Performance Homoepitaxial Gallium Oxide Power Devices on Bulk and Composite Substrates (Krishnamoorthy)	
1:40 pm	Low dispersion MOCVD $\beta$ -Ga <sub>2</sub> O <sub>3</sub> $\delta$ -doped MESFET with a Mg-doped Buffer (McGlone)	
2:00 pm	Thermal stability of ALD-grown SiO <sub>2</sub> and Al <sub>2</sub> O <sub>3</sub> on (010) $\beta$ -Ga <sub>2</sub> O <sub>3</sub> substrates (Islam)	
2:20 pm	High-temperature operation of $\beta$ -Ga <sub>2</sub> O <sub>3</sub> MOSFET with TiW refractory metal gate (Sepelak)	
2:40 pm	Comparison of lateral field-plated MOSFETs with and without Mg-doped buffer layer in MOCVD grown $\beta$ -Ga <sub>2</sub> O <sub>3</sub> (Sharma)	

### Session 2: Cryogenic Devices

Great Hall Meeting Room 1 & 2

1:00 pm	Design Space Analysis of Superconducting Nanowire-based Cryogenic Oscillators (Islam)	
1:20 pm	Scalable Cryogenic InGaAs Quantum Well Switches for Signal Routing (Ferraris)	
1:40 pm	Enhanced Drain Current in Transient Mode due to Long Ionization Time of Shallow Impurities at 4 K in 65-nm bulk Cryo CMOS Transistors (Miyao)	
2:00 pm	Interface Engineering for Steep Slope Cryogenic MOSFETs (Richstein)	
2:20 pm	<b>INVITED</b> Cryogenic Device Requirements for Qubit Control and Readout (Sushil Subramanian)	
3:00 pm	Coffee Break	Performance Hall

### Session 3: RF Devices

U.S. Bank Conference Theater

3:20 pm	<b>INVITED</b> Polarization-Engineering of III-N mm-Wave Transistors for High Efficiency and Linearity (Fay)	
4:00 pm	D-band frequency memristor switch based on monolayer boron nitride (Yang)	
4:20 pm	Free-Standing High Power GaN Multi-Fin Camel Diode Varactors (Chen)	
4:40 pm	Record RF Performance of Ultra-thin Indium Oxide Transistors with Buried-gate Structure (Charnas)	
5:00 pm	<b>LATE NEWS:</b> N-polar GaN-on-Sapphire MIS HEMTs with high power and record >40% efficiency at 94GHz (Li)	

### Session 4: Memory I

Great Hall Meeting Room 1 & 2

3:20 pm	Sub-Nanosecond Switching of Si:HfO <sub>2</sub> Ferroelectric Field-Effect Transistor (Dahan)	
3:40 pm	Buried-Channel Ferroelectric FET as Energy Efficient and Reliable 1T-1VM (Chakraborty)	
4:00 pm	Improved Endurance with Electron-Only Switching in Ferroelectric Devices (Wang)	
4:20 pm	Interface-Controlled Ultralow Resistance Drift and Its Origin in Superlattice Phase Change Memory (Wu)	
4:40 pm	Statistical Analysis of 2T1R Gain-Cell RRAM Bitcell for Area Efficient, High-Performance, and Reliable Multi-level Cell Operation (Mehra)	

### 6:00 pm–9:00 pm Poster Session

Performance Hall

## TUESDAY

<b>8:00 am–5:00 pm</b>	<b>Registration</b>	<b>Great Hall Foyer</b>
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<b>9:00 am</b>	<b>Plenary</b> The Path Towards Realistic ASIC Electronics Deployment Into Previously Impractical Extreme Application Environments (Neudeck)	<b>U.S. Bank Conference Theater</b>
10:00 am	Coffee Break	Performance Hall

### Session 5: Wide Bandgap II - Vertical Devices

U.S. Bank Conference Center

10:20 am	Ga <sub>2</sub> O <sub>3</sub> Trench Schottky Diodes by Novel Low-Damage Ga-Flux Etching (Dhara)	
10:40 am	Movement of Current Filaments and its Impact on Avalanche Robustness in Vertical GaN P-N diode Under UIS stress (Shankar)	
11:00 am	A Composite TE-TFE-FE Model for Schottky Barrier Reverse Current over the Entire Electric-Field Range (Li, Wenshen)	
11:20 am	<b>INVITED</b> $\beta$ -Ga <sub>2</sub> O <sub>3</sub> FinFETs by MacEtch: high aspect ratio and ultra-low hysteresis (Li, Xiuling)	

### Session 6: Memory II

Great Hall Meeting Room 1 & 2

10:20 am	<b>INVITED</b> Nanoscale HfO <sub>2</sub> -based memristive devices for neuromorphic computing (Hoffmann-Eifert)	
11:00 am	Ambient Effects on Reprogrammable Read-only Selector-free Memory for the Embedded NVM Applications (Chen)	
11:20 am	An Experimentally Validated, Universal Memristor Model Enabling Temporal Neuromorphic Computation (Zivasatienraj)	
11:40 am	Robust Reconfigurable Field Effect Transistors Process Route Enabling Multi-VT Devices Fabrication for Hardware Security Applications (Galderisi)	
12:00 pm	Lunch (On your own)	

### Session 7: Thin Film Transistors

U.S. Bank Conference Center

1:20 pm	First Demonstration of Top-Gated ITO Transistors: Effect of Channel Passivation (Wahid)	
1:40 pm	Vertically Stacked Multilayer Atomic-Layer-Deposited Sub-1-Nanometer In <sub>2</sub> O <sub>3</sub> Field-Effect Transistors with BEOL Compatibility (Zhang)	
2:00 pm	N:Cu <sub>2</sub> O S/D for low contact resistance p-type Cu <sub>2</sub> O thin film transistor (Jo)	
2:20 pm	Photonic Curing: Rapid Thermal Processing of Oxide Thin-film Transistors on Plastic (Chatterjee)	
2:40 pm	Atomically-thin atomic-layer-deposited In <sub>2</sub> O <sub>3</sub> transistors with BEOL compatibility (Zheng)	

### Session 8: Quantum I - Spin

Great Hall Meeting Room 1 & 2

1:20 pm	<b>INVITED</b> Quantum-Ready Germanium and Silicon (Scappucci)	
2:00 pm	Controlling the Spin and Valley Hall Effect in Monolayer WSe <sub>2</sub> at Elevated Temperatures (Li)	
2:20 pm	Electrically Triggered Spin-State Phase Transition in LaCoO <sub>3</sub> (Islam)	
2:40 pm	<b>LATE NEWS</b> High Voltage $\beta$ -Ga <sub>2</sub> O <sub>3</sub> Lateral Schottky barrier diode with High Permittivity Dielectric RESURF demonstrating > 1 GW/cm <sup>2</sup> Power Figure of Merit (Roy)	
3:00 pm	Coffee Break	Performance Hall

### Session 9: 2-D Devices

U.S. Bank Conference Center

3:20 pm	<b>INVITED</b> Nanoscale Devices Based on Two-dimensional and Ferroelectric Materials (Zhu)	
4:00 pm	Mobility Enhancement of Monolayer MoS <sub>2</sub> Transistors using Tensile-Stressed Silicon Nitride Capping Layers (Jaikissoon)	
4:20 pm	Gate-Tunable Resonant Tunneling in a Dual-Gated Twist-Controlled Double Monolayer Graphene-hBN Heterostructure (Lin)	
4:40 pm	Analysis of BTI in 300 nm integrated dual-gate WS <sub>2</sub> FETs (Panarella)	
5:00 pm	<b>LATE NEWS</b> A Gate-All-Around Single-Channel In <sub>2</sub> O <sub>3</sub> Nanoribbon FET with Near 20 mA/ $\mu$ m Drain Current (Zhang)	

### Session 10: Quantum II - Photonics

Great Hall Meeting Room 1 & 2

3:20 pm	<b>INVITED</b> SiGeSn Technology for All-Group-IV Photonics (Yu)	
4:00 pm	<b>INVITED</b> Ge-based Mid-infrared integrated photonics platform for Sensing (Kim)	
4:40 pm	<b>LATE NEWS</b> Monolithic integration of III-nitride LED with NbN superconductor on a single epitaxial platform (Chlipala)	

### 6:00 pm Conference Dinner Reception

The Faculty Club

### 8:30 pm Rump Session I

Great Hall Meeting Room 1 & 2

What is the Role of Computational Physics and Modeling in Emerging Devices?

### 8:30 pm Rump Session II

Great Hall Meeting Room 3

The Intersection of Industry and Academia: Training Future Researchers

## WEDNESDAY

<b>7:30 am–5:00 pm</b>	<b>Registration</b>	<b>Great Hall Foyer</b>
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<b>8:20 am</b>	<b>EMC Plenary*</b> New Materials for Three Dimensional Ferroelectric Microelectronics <i>*EMC Plenary is open to DRC attendees who agree on-site to the EMC COVID Duty of Care statement. Please see EMC website for details.</i>	<b>Archie M. Griffin West Ballroom</b>
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9:20 am	Coffee Break	Performance Hall
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### Session 11: Heterogeneous Integration

U.S. Bank Conference Theater

10:00 am	<b>INVITED</b> Hybrid 2D/CMOS Microchips (Lanza)	
10:40 am	<b>INVITED</b> Large-Scale Heterogeneous Device Integration (Radosavljevic)	
11:20 am	Monolithic and Heterogeneous Integration of Atomically Thin Semiconductors for non-von Neumann CMOS (Pendurthi)	
11:40 am	<b>LATE NEWS</b> AlN-capped $\beta$ -(Al <sub>1-x</sub> Ga <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> /Ga <sub>2</sub> O <sub>3</sub> heterostructure field-effect transistors for near-junction thermal management of next generation power devices (Lundh)	
12:00 pm	Lunch (On your own)	

### Session 12: Wide Bandgap III - III-N HEMTs

U.S. Bank Conference Theater

1:20 pm	<b>INVITED</b> Ultra-Wide Bandgap Semiconductor Transistors for mm-wave Applications (Rajan)	
2:00 pm	Modeling of the Charge-Voltage Characteristics of AlScN/AlN/GaN Heterostructures (Wu)	
2:20 pm	Improved On/Off Current Ratio of TiO <sub>2</sub> /AlGaIn/GaN MIS-HEMTs with N <sub>2</sub> O Surface Treatment on TiO <sub>2</sub> Layer (Zhama)	
2:40 pm	First demonstration of N-polar GaN/AlGaIn/AlN HEMT on Single Crystal AlN Substrates (Kim)	