

## 2020 Device Research Conference Program (June 21-24, Eastern Daylight Time)

<b>Sunday Afternoon Short Course</b> <b>Devices for IoT – Device Opportunities in the Emerging Era of Internet of Things</b> (Organizers: Saptarshi Das, Michael Goldflam)	
1:00PM	Introduction
13:05PM—14:05PM	<b>Younghyun Kim (University of Wisconsin - Madison)</b> <a href="#">IoT Power</a>
14:05PM—15:05PM	<b>Shreyas Sen (Purdue University)</b> <a href="#">IoT Sensors</a>
<b>Coffee Break</b>	
15:20PM—16:20PM	<b>Swaroop Ghosh (Pennsylvania State University)</b> <a href="#">IoT Security</a>
16:20PM—16:40PM	<b>Discussions and Conclusion</b>

Monday Plenary Session (Chair: Zhihong Chen, Siddharth Rajan)	
8:30AM	Opening Remarks and Introduction
8:50AM—9:50AM	<b>Hideo Ohno (Tohoku University, Japan)</b> <a href="#">Plenary: Spintronics Device—Scaling to Single Digit nm and More</a>
<b>Coffee Break</b>	
10:00AM—11:00AM	<b>Robert Chau (Intel Corporation)</b> <a href="#">Plenary: Process and Packaging Technology R&amp;D for Moore’s Law Continuation and Beyond</a>
<b>Lunch Break &amp; Gather Town Hangout</b>	

Monday Afternoon Session I – Spintronics (Chair: Tony Low)	
12:00PM—12:20PM	<b>Ryosho Nakane (University of Tokyo, Japan)</b> <a href="#">Spin-flip Mechanism in a Si Inversion Layer of Spin MOSFETs</a>
12:20PM—13:00PM	<b>Joerg Appenzeller (Purdue University)</b> <a href="#">Invited: Probabilistic Spin Logic Using Probabilistic Bits – p-bits</a>
13:00PM—13:40PM	<b>Jian-Ping Wang (University of Minnesota)</b> <a href="#">Invited: Computational Random Access Memory (CRAM)</a>
13:40PM—14:00PM	<b>Karam Cho (Purdue University)</b> <a href="#">Utilizing Valley-Spin Hall Effect in WSe<sub>2</sub> for Low Power Non-Volatile Flip-Flop Design</a>
<b>Coffee Break</b>	

Monday afternoon Session II – Power Devices I (Chair: Huili (Grace) Xing)	
14:10PM—14:30PM	<b>Eldad Bahat Treidel (Ferdinand Braun Institut, Germany)</b> The influence of the gate trench orientation to the crystal plane on the conduction properties of vertical GaN MISFETs for laser driving applications
14:30PM—15:10PM	<b>Kelson Chabak (Air Force Research Laboratory)</b> <b>Invited:</b> Lateral Gallium Oxide Transistors Towards Fast Power Switching
15:10PM—15:30PM	<b>Nidhin Kurian Kalarickal (Ohio State University)</b> Electrostatic Engineering in BaTiO <sub>3</sub> /β-Ga <sub>2</sub> O <sub>3</sub> Heterostructure Field Effect Transistors
15:30PM—15:50PM	<b>Chenhao Ren (University of California, Davis)</b> Hydrogen-terminated diamond FET and GaN HEMT delivering CMOS inverter operation at high-temperature
15:50PM—16:10PM	<b>Saurav Roy (University of Utah)</b> Design and simulation of β-Ga <sub>2</sub> O <sub>3</sub> vertical Schottky barrier diode with p-type III-Nitride guard ring for enhanced breakdown
<b>Coffe Break</b>	

Monday Afternoon Session III – Memory Devices I (Chair: Asif Khan)	
16:20PM—16:40PM	<b>Furqan Mehmood (NamLab gGmbH, Germany)</b> Reliability improvement of ferroelectric Hf <sub>0.5</sub> Zr <sub>0.5</sub> O <sub>2</sub> thin films by Lanthanum doping for FeRAM application
16:40PM—17:20PM	<b>Shimeng Yu (Georgia Institute of Technology)</b> <b>Invited:</b> Ferroelectric Devices for Compute-in-Memory: Array-Level Operations
17:20PM—17:40PM	<b>Ava Tan (University of California, Berkeley)</b> Reliability of Ferroelectric HfO <sub>2</sub> -based Memories: From MOS Capacitor to FeFET
17:40PM—18:00PM	<b>Asir Intisar Khan (Stanford University)</b> Flexible Low-Power Superlattice-Like Phase Change Memory
<b>Dinner Break &amp; Gather Town Hangout</b>	
19:00PM—21:00PM	<b>Poster Session I</b>

Tuesday Morning Session I – RF Devices I (Chair: Hans-Joachim Würfl)	
8:30AM—9:10AM	<b>Yutaro Yamaguchi (Mitsubishi Electric, Japan)</b> <b>Invited:</b> Millimeter-wave GaN-HEMT Modeling for Power Amplifiers
9:10AM—9:30AM	<b>Takafumi Kamimura (NICT, Japan)</b> RF small-signal characteristics and delay time analysis of submicron Ga <sub>2</sub> O <sub>3</sub> MOSFETs
9:30AM—9:50AM	<b>Junao Cheng (The Ohio State University)</b> Breakdown Voltage Enhancement in ScAlN/GaN High-Electron-Mobility Transistors with High-k Passivation using Bi <sub>1.5</sub> Zn <sub>1.0</sub> Nb <sub>1.5</sub> O <sub>7</sub>
9:50AM—10:30AM	<b>Josephine Chang (Northrop Grumman Corporation)</b> <b>Invited:</b> Advances in the Super-Lattice Castellated Field Effect Transistor (SLCFET) for High Power Density, Energy Efficient RF Amplification
<b>Coffee Break</b>	

Tuesday Plenary Session (Chair: Becky Peterson)	
10:35AM—11:35AM	<b>James Speck (University of California, Santa Barbara)</b> <b>Plenary:</b> Revealing the Inner Working of GaN LEDs: Understanding Nonradiative Processes and Towards 100% Efficiency
<b>Lunch Break &amp; Gather Town Hangout</b>	

Tuesday Afternoon Session I – 2D Devices (Chair: Saptarshi Das)	
12:30PM—12:50PM	<b>Taro Sasaki (The University of Tokyo, Japan)</b> Understanding the Device Operation of Ambipolar Channel Based 2D Memory Devices by Trajectory of Floating Gate Voltage
12:50PM—13:10PM	<b>Yury Yu. Illarionov (TU Wien, Austria)</b> Crystalline Calcium Fluoride: A Record-Thin Insulator for Nanoscale 2D Electronics
13:10PM—13:30PM	<b>Peng Wu (Purdue University)</b> Contact Resistance Model for WSe <sub>2</sub> Schottky-Barrier FET
13:30PM—13:50PM	<b>Md Hasibul Alam (The University of Texas at Austin)</b> Solid Electrolytic Substrates for High Performance TMD Transistors and Circuits
13:50PM—14:10PM	<b>Theresia Knobloch (TU Wien, Austria)</b> Analysis of Single Electron Traps in Nano-scaled MoS <sub>2</sub> FETs at Cryogenic Temperatures
Coffee Break	

Tuesday afternoon Session II – Emerging Devices (Chair: Michael Goldflam)	
14:20PM—15:00PM	<b>Jeewan Kim (MIT)</b> <b>Invited:</b> Strategies to Precisely Control Synaptic Weights for Neuromorphic Computing Arrays
15:00PM—15:20PM	<b>Girish Rughoobur (MIT)</b> Enabling Atmospheric Operation of Nanoscale Vacuum Channel Transistors
15:20PM—15:40PM	<b>Eunseong Moon (University of Michigan)</b> Monolithically Integrated Microscale LED and Photovoltaic Module for Energy Harvesting and Data Communication in Bio-implantable Devices
15:40PM—16:00PM	<b>Darsith Jayachandran (Pennsylvania State University)</b> An Ultra-low Power Biomimetic Collision Detector
Coffee Break	

Tuesday Afternoon Session III – RF Devices II (Chair: Keisuke Shinohara)	
16:10PM—16:30PM	<b>Arkka Bhattacharyya (University of Utah)</b> High-Density Electron Gas $\beta$ -Ga <sub>2</sub> O <sub>3</sub> Field Effect Transistors with Metalorganic Vapor Phase Epitaxy-Regrown Ohmic Contacts
16:30PM—16:50PM	<b>Pawana Shrestha (UCSB)</b> A Novel Concept using Derivative Superposition at the Device-Level to Reduce Linearity Sensitivity to Bias in N-polar GaN MISHEMT
16:50PM—17:10PM	<b>Brian P. Downey (US Naval Research Lab)</b> Micro-transfer Printing of GaN HEMTs for Heterogeneous Integration and Flexible RF Circuit Design
17:10PM—17:30PM	<b>Woojin Choi (University of California, San Diego)</b> Linearity by Synthesis: An Intrinsically Linear AlGa <sub>N</sub> /Ga <sub>N</sub> -on-Si Transistor with OIP <sub>3</sub> /(F-1)P <sub>DC</sub> of 10.1 at 30 GHz
<b>Dinner Break &amp; Gather Town Hangout</b>	

Rump Session	
18:30PM—20:00PM	<p><i>The Race to Non-Volatility: Which technologies will cross the finish line?</i></p> <p>Moderators: <b>Sumeet Gupta, Mona Ebrish, Huili (Grace) Xing</b></p> <p>Panelists: <b>Wei Lu (University of Michigan)</b> <b>Matthew Marinella (Sandia National Laboratories)</b> <b>Kaushik Roy (Purdue University)</b> <b>Gurtej Sandhu (Micron Technology, Inc.)</b></p>

<b>Wednesday Morning Session I – Memory Devices II (Chair: Tuo-Hung (Alex) Hou)</b>	
8:30AM—8:50AM	<b>Sourav De (National Cheng Kung University, Taiwan)</b> Tri-Gate Ferroelectric FET Characterization and Modelling for Online Training of Neural Networks at Room Temperature and 233K
8:50AM—9:10AM	<b>Jayatika Sakhuja (IIT BOMBAY)</b> Thermal Engineering of Volatile Switching in PrMnO <sub>3</sub> RRAM: Non-Linearity in DC IV Characteristics and Transient Switching Speed
9:10AM—9:30AM	<b>Xiwen Liu (University of Pennsylvania)</b> Demonstration of a CMOS Compatible Ferroelectric Field Effect Transistor with AlScN Dielectric and a 2D Material Channel
9:30AM—10:10AM	<b>Joshua Yang (University of Massachusetts Amherst)</b> <u>Invited</u> : Memresistive Materials and Devices for Unconventional Computing
<b>Coffee Break</b>	
<b>Wednesday Morning Session II – Power Devices II (Chair: Gregg Jessen)</b>	
10:20AM—10:40AM	<b>Pao-Chuan Shih (MIT)</b> GaN Nanowire Field Emitters with a Self-Aligned Gate Process
10:40AM—11:00AM	<b>Hyunsoo Lee (The Ohio State University)</b> Demonstration of Vertical GaN PN Diode with Step-etched Triple zone JTE
11:00AM—11:40AM	<b>Tomas Palacios (MIT)</b> <u>Invited</u> : Materials and Technology Issues for the Next Generation of Power Electronic Devices
11:40AM—12:00PM	<b>Devansh Saraswat (Cornell University)</b> Very High Parallel-Plane Surface Electric Field of 4.3 MV/cm in Ga <sub>2</sub> O <sub>3</sub> Schottky Barrier Diodes with PtO <sub>x</sub> Contacts
12:00PM—12:20PM	<b>Aditi Agarwal (North Carolina State University)</b> 2.3 kV 4H-SiC Accumulation-channel JBSFETs: Experimental Comparison of Linear, Hexagonal and Octagonal Cell Topologies
12:20PM—12:40PM	<b>Dolar Khachariya (North Carolina State University)</b> 1 kV GaN-on-GaN PN Diode using Mg Implantation
12:40PM—13:00PM	<b>Ahmad Zubair (MIT)</b> First Demonstration of GaN Vertical Power FinFETs on Engineered Substrate

**Lunch Break & Gather Town Hangout**

**Wednesday Afternoon Poster Session**

**14:00PM—16:00PM**

**Poster Session II**