



POWERAMERICA

Next Generation Power
Electronics Manufacturing
Innovation Institute

**Annual Meeting
February 25-27, 2020
North Carolina State University Club
4200 Hillsborough St, Raleigh, NC 27606**

Tuesday, Feb. 25

NC State University Club

1-4:15 PM

Tutorial/Technical Training

- SiC Device Reliability – *Don Gajewski, Wolfspeed*
- GaN Power Device Applications and Reliability – *Dong Seup Lee, Texas Instruments*
- Most Frequently Asked Questions Regarding SiC MOSFETS – *David Levett, Infineon*

4:30-5:30 PM

Membership Advisory Committee (*PowerAmerica Members Only*)
FREEDM Lab Tour (*Non-Members*)

5:30-7:30 PM

Networking Session w/ Refreshments and Appetizers (*Open to All Attendees*)
Sponsored by Wolfspeed

Wednesday, Feb. 26

NC State University Club

8-8:30 AM	Sign In/Coffee and Light Breakfast – Sponsored by SiCamore Semi
8:30-9 AM	Welcome and Opening Remarks Victor Veliadis - <i>Executive Director and CTO, PowerAmerica</i> Alex Fitzsimmons - <i>Acting Deputy Assistant Secretary for Energy Efficiency, US Department of Energy</i>
9-9:30 AM	Keynote Address Hans Stork, <i>ON Semiconductor, Senior Vice President and Chief Technology Officer</i>
9:30-10:30 AM	Industry Panel #1 – Technology Update from the WBG Ecosystem <ul style="list-style-type: none">• High Performance Cooling and Low-inductance Busbar-capacitor Solutions for SiC Inverters - <i>Philippe Roussel, Mersen</i>• Low Inductance Packaging for High Voltage Modules - <i>Rick Eddins, GE Aviation</i>• New Developments in GaN Technology - <i>Doug Lange, GaN Systems</i>
10:30 - 11AM	Networking Break – Posters & Hardware
11 AM to Noon	Industry Panel #2 – Business Update from the WBG Ecosystem <ul style="list-style-type: none">• <i>Howard Sin, SOITEC</i>• High Voltage GaN Solutions - from Adapters to Automotive and Aviation <i>Primit Parikh, Transphorm</i>• Ramping SiC Capacity to Meet Demand - <i>John Palmour - Cree/Wolfspeed</i>
Noon – 1 PM	Lunch and Networking
1-3 PM	Final Report: Round 1 Member-Initiated Projects – PowerAmerica Membership and Industry Relations Manager Jim LeMunyon <ul style="list-style-type: none">• Short-Circuit Behavior and Protection of Next Generation SiC Modules, <i>Jin Wang, The Ohio State University</i>• Integrated High Voltage APM/OBCM Converter for Future Use in Autonomous Vehicles, <i>Qiang Lee, Virginia Tech</i>• Reliability Analysis of Wide Bandgap Semiconductor Devices, <i>Joshua MacFie, Stephen Bayne, Texas Tech University/Group NIRE</i>• Quantifying Power Device Reliability Due to Terrestrial and Other Radiation Sources, <i>Akin Akturk, CoolCAD Electronics</i>
3 – 3:30 PM	Networking Break - Sponsored by SiCamore Semi
3:30-4:15	Mid-Year Project Summaries: Education and Workforce Development Projects – <i>Victor Veliadis</i> High Bandwidth, Flexible SiC Testbed for Education and EV Industry Workforce Training, <i>NCSU/Yu</i> Power electronics teaching lab incorporating WBG switches and circuits, <i>UNCC/Parkideh</i> Development of a Short Course for WBG Power Devices in NCSU Core Facilities, <i>NCSU/Barletta</i>

Short Course Module for HV SiC Device based MV Power Converters for PE Engineers and Students, *NCSU/Bhattacharya*
Development of Low-Cost Graduate Course with Virtual Fab and Hands-on Circuit Lab Experience, *San Jose State Univ./Wong*
Texas Tech and X-FAB Education Partnership *Texas Tech Univ./Bayne, X-FAB*

4:15-5:25 PM Mid-Year Project Summaries: Foundry & Device Development

- 4:15-4:25** SiC Production in a high volume, low cost 150 mm fab, *Microchip/Odekirk*
Productization of 3.3 kV & 700 V SiC MOSFETS, *Microsemi/Odekirk, NCSU/Yu*
- 4:25-4:35** Manufacturable 10kV/300mOhm SiC MOSFET Fabricated on 150 mm 4HN-SiC Wafers
Along With Reliability Qualification, *Wolfspeed-Durham/Grider*
- 4:35-4:45** 3.3 kV SiC Power MOSFET and Diode Commercialization, *GeneSiC, NCSU/Hopkins, The Ohio State Univ./Wang*
- 4:45-4:55** Switching and Dynamic Ruggedness Characterization of Gen3 10kV/300mOhm SiC
MOSFETS, *NCSU/Bhattacharya*
- 4:55-5:05** Development of a SiC-Based Resonant Converter for EV Charger Using 3.3 kV & 700 V SiC
MOSFETS, *NCSU/Yu*
- 5:05-5:15** 1.2 kV SiC Trench-Gate Power MOSFETS with P+ Shielding Region at Trench Bottom,
NCSU/Baliga
- 5:15-5:25** Implementation of SiC Block Process Steps to Aid Transition of SiC Technology
Developments, *NCSU/Barletta*

Evening Reception

- 5:30-5:45 PM** Travel to Reception
- 6:00 - 8:00 PM** Reception at NC State Vaughn Towers: Dail Plaza West, 5400 Trinity Rd, Raleigh, NC
27607 (located in Carter Finley Football Stadium)

Thursday, Feb. 27

NC State University Club

8-8:30 AM	Sign In/Coffee and Light Breakfast
8:30-9 AM	Keynote Address <i>ARL Device Packaging Overview, Bruce Geil, Chief Power Integration and Architecture Branch - Army Research Lab</i>
9-10:30 AM	2020 PowerAmerica Technology Roadmap: Defining Future Projects - Jim LeMunyon This is a break-out session for groups to define future PA-funded projects on a one-to three-year time horizon that will benefit PowerAmerica members and build a portfolio of intellectual property for members' use.
10:30-11AM	Networking Break
11 AM-2:20 PM	Mid-Year Project Summaries: Module Manufacturing and Reliability, WBG Commercialization Applications
11-11:10	<i>Removing Customer Concerns to Support Industry Adoption of MV SiC Power Modules, Wolfspeed-Fayetteville/McNutt, Univ. of Alabama/Lemmon</i>
11:10-11:20	<i>SiC Device Reliability and Yield, and Control of Enhanced Carrier Lifetime, Naval Research Lab/Stahlbush</i>
11:20-11-30	<i>Design And Manufacture of Advanced Reliable WBG Power Modules, GE/Eddins, National Renewable Energy Lab/Narumanchi</i>
11:30-11:40	<i>200 kW 1050 V DC Bus SiC Converters for Heavy-Duty All-Electric Vehicles, John Deere/Singh, NREL/Bennion</i>
11:40-11:50	<i>High power density, high efficiency, and wide range GaN-based 48V-1V, 300A single-stage LLC converter, ABB/Shi, VA Tech/Lee</i>
11:50-12:00	<i>Commercialization of 1MW SiC Based High Speed MV Motor Drive with Redundant Operation, Toshiba/Jiao, Ohio State/Wang</i>
12-12:10	<i>100 kW SiC-Based Generator Rectifier Unit for Variable Frequency Airborne Applications, VA Tech/Burgos, GE, Raytheon</i>
12:10-12-20	<i>Shore-to-Ship MV SiC Converter System; Application of Asynchronous Microgrid PCS, NCSU/Bhattacharya, Wolfspeed-Durham</i>
12:20-12:30	<i>High Efficiency Multiport Power Conversion for a Hybrid Electric Propulsion System, United Technologies/Blasko</i>
12:30-1:30	Lunch and Networking Concurrent Prospect Lunch for Non-Members (Wolfpack Club Conf. Rm.)
1:30-1:40	<i>High Density Bidirectional SiC/GaN based Soft-switched DC-DC Charger for a Hybrid Propulsion System, VA Tech/Dong</i>
1:40-1:50	<i>High Efficiency Multiport Power Conversion for a Hybrid Propulsion System: Integrated Converter-Generator Design, NCSU/Lukic</i>
1:50-2:00	<i>Multi-functional High-efficiency High-density MV SiC Based Asynchronous Microgrid PCS, Univ. of TN-Knoxville/Wang</i>
2-2:10	<i>Modular Hybrid SiC based battery inverter for energy storage integration, Univ. of NC Charlotte/Zhao, LE Energy</i>

Save the date: PowerAmerica's WBG Summer Workshop – August 3-5, 2020