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, 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)*

Wednesday, Feb. 26

NC State University Club

8-8:30 AM	**Sign In/Coffee and Light Breakfast**
8:30-9 AM	**Welcome and Opening Remarks** *Victor Veliadis* *Executive Director and CTO, PowerAmerica*
9-9:30 AM	**Keynote Address** *Hans Stork, ON Semiconductor, Senior Vice President and Chief Technology Officer*
9:30-10:30 AM	**Industry Panel #1 – Technology Update from the WBG Ecosystem** • Philippe Roussel, Mersen, *High Performance Cooling and Low-inductance Busbar-capacitor Solutions for SiC Inverters* • Rick Eddins, GE Aviation • Doug Lange, GaN Systems
10:30 - 11AM	**Networking Break – Posters & Hardware**
11 AM to Noon	**Industry Panel #2 – Business Update from the WBG Ecosystem** • Howard Sin, SOITEC

- Primit Parikh, Transphorm, *High Voltage GaN Solutions - from Adapters to Automotive and Aviation*
- John Palmour, Cree/Wolfspeed

Noon – 1 PM	**Lunch and Networking**
1-3 PM	**Final Report: Round 1 Member-Initiated Projects –** *PowerAmerica Membership and Industry Relations Manager Jim LeMunyon* • Short-Circuit Behavior and Protection of Next Generation SiC Modules, *Jin Wang, The Ohio State University* • Integrated High Voltage APM/OBCM Converter for Future Use in Autonomous Vehicles, *Qiang Lee, Virginia Tech* • Reliability Analysis of Wide Bandgap Semiconductor Devices, *Stephen Bayne, Texas Tech University/Group NIRE* • Quantifying Power Device Reliability Due to Terrestrial and Other Radiation Sources, *Akin Akturk, CoolCAD Electronics*
3 – 3:30 PM	**Networking Break**
3:30-4:15	**Mid-Year Project Summaries: Education and Workforce Development Projects –** *Victor Veliadis* High Bandwidth, Flexible SiC Testbed for Education and EV Industry Workforce Training, *NCSU/Yu* Power electronics teaching lab incorporating WBG switches and circuits, *UNCC/Parkideh* Development of a Short Course for WBG Power Devices in NCSU Core Facilities, *NCSU/Barletta* 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** (*Chair TBD)*
4:15-4:25	SiC Production in a high volume, low cost 150 mm fab, *Microchip* Productization of 3.3 KV & 700 V SiC MOSFETS, *Microsemi, NCSU/Yu*
4:25-4:35	Manufacturable 10kV/300mOhm SiC MOSFET Fabricated on 150 mm 4HN-SiC Wafers Along With Reliability Qualification, *Wolfspeed/Durham*
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

5:45-7:45 PM	Reception at NC State Carter Finley Football Stadium, 4600 Trinity Rd, Raleigh, NC 27607

Thursday, Feb. 27

NC State University Club

8-8:30 AM	**Sign In/Coffee and Light Breakfast**
8:30-9 AM	**Keynote Address** *To Be Announced*
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 –** *Chair TBD*
11-11:10	Removing Customer Concerns to Support Industry Adoption of MV SiC Power Modules, *Wolfspeed/Fayetteville, Univ. of Alabama*
11:10-11:20	SiC Device Reliability and Yield, and Control of Enhanced Carrier Lifetime, *Naval Research Lab*
11:20-11-30	Design And Manufacture of Advanced Reliable WBG Power Modules, *GE, National Renewable Energy Lab*
11:30-11:40	200 kW 1050 V DC Bus SiC Converters for Heavy-Duty All-Electric Vehicles, *John Deere, NREL*
11:40-11:50	High power density, high efficiency, and wide range GaN-based 48V-1V, 300A single-stage LLC converter, *ABB, VA Tech/Lee*
11:50-12:00	Commercialization of 1MW SiC Based High Speed MV Motor Drive with Redundant Operation, *Toshiba, Ohio State/Xu*
12-12:10	100 kW SiC-Based Generator Rectifier Unit for Variable Frequency Airborne Applications, *VA Tech/Burgos, GE, Raytheon*
12:10-12-20	Shore-to-Ship MV SiC Converter System; Application of Asynchronous Microgrid PCS, *NCSU/Bhattacharya, Wolfspeed/Durham*
12:20-12:30	High Efficiency Multiport Power Conversion for a Hybrid Electric Propulsion System, *United Technologies*
12:30-1:30	**Lunch and Networking** **Concurrent Prospect Lunch for Non-Members *(Wolfpack Club Conf. Rm.)***
1:30-1:40	High Density Bidirectional SiC/GaN based Soft-switched DC-DC Charger for a Hybrid Propulsion System, *VA Tech/Dong*
1:40-1:50	High Efficiency Multiport Power Conversion for a Hybrid Propulsion System: Integrated Converter-Generator Design, *NCSU/Yu, Lukic*
1:50-2:00	Multi-functional High-efficiency High-density MV SiC Based Asynchronous Microgrid PCS, *Univ. of TN-Knoxville/Wang*

2-2:10	Modular Hybrid SiC based battery inverter for energy storage integration, *Univ. of NC Charlotte/Zhao, LE Energy* **Adjourn**
	Private discussions with DoE & PA