

## INTRODUCTION TO FREEDM

The Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center is a National Science Foundation Engineering Research Center founded in 2008 with a grand challenge to modernize the distribution grid. We apply new research in power electronics and controls to connect more distributed energy resources to the grid.



## WHO WE ARE

We are university faculty and students from NC State, Arizona State, Florida State, Florida A&M and Missouri S&T. We are dozens of corporate members and hundreds of individual supporters. We are a partnership of faculty, students and industry leveraging our resources together.

## INDUSTRY RELEVANT RESEARCH

Our industry members help direct our research, contributing to discussions about selection and prioritization of projects on power electronics, solid-state transformers, distributed energy storage, distributed controls, and system-level integration. In 2011, MIT Technology Review named our smart solid-state transformer one of the world's 10 most innovative emerging technologies. Recently, we developed a silicon carbide based inverter for motor drives rated at 99 percent efficiency.

## PEOPLE

Center members gain early access to our inventions and early access to our best product: our graduates. They study the fundamentals of power electronics and power engineering and apply those principles in the context of complex systems. Once they've been immersed in our approach, our graduates emerge as energy leaders and engineers who see the big picture — and shape it.

## LOCATION

Our headquarters on NC State's Centennial Campus boasts multiple labs including high bay space with a 12 kV, 1 MVA loop feeder, a real-time digital simulation lab, and 3D printed power electronics packaging capabilities. FSU hosts one of the largest RTDS installations in the world.

## CONTACT

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### FREEDM Members



## APEC 2018 FREEDM Speaker Schedule

Day/Time	Session/Presenter	Topic
<b>Saturday</b>	PSMA and PELS Sponsored Capacitor and Magnetics Workshops	
10:10am- 12:00pm	Byron Beddingfield	Technical Session- Core Losses Part 2
12:00pm- 2:00pm	Byron Beddingfield	Technology Demonstrations
<b>Monday- Thursday</b>	Applied Power Electronics Conference	FREEDM Exhibit Booth #439
<b>Tuesday 3/67</b>		
11:00am-11:20am	Session T03.7- Jehyuk Won	Auxiliary Power Supply for Medium Voltage Power Electronics System
<b>Wednesday 3/7</b>		
8:30am- 12:00pm	Session T06- Suyash Shah	Control of Active Component of Current in Dual Active Bridge Converter
8:30am- 10:10am	Session T15- Vishnu Iyer	Extreme Fast Charging Station Architecture for Electric Vehicles with Partial Power Processing
2:00pm- 5:30pm	Session T22- Vishnu Iyer	Stationary Reference Frame Based Current Control Structure with Improved Disturbance Rejection for Grid Connected Converters
<b>Thursday</b>		
8:30am- 11:20am	Session T30- Hui Yu	A Passivity- Based Decentralized Control Strategy for Current Controlled Inverters in AC Microgrids
11:30- 2:00pm	Sesson T27- Bo Gao, Adam Morgan	6.0kV, 100A, 175kHz Super Cascode Power Module for Medium Voltage, High Power Applications
11:30- 2:00pm	Session D09- Ashish Kumar & Sanket Parashar	Single Shot Avalanche Energy Characterization of 10kV, 10A 4H-SiC MOSFETs
11:30- 2:00pm	Session D05- Mohammed Alharbi	Scale-up Methodology of a Modular Multilevel Converter for HVDC Applications
11:30- 2:00pm	Session D15.2- Hao Tu	A Hybrid Communication Topology for Modular Multilevel Converter
11:30- 2:00pm	Session D16- Alireza Dayerizadeh	Saturable Inductors For Superior Reflexive Field Containment in Inductive Power Transfer Systems
2:00pm- 5:30pm	Session T34- Vishnu Iyer	Proportional Integral - Resonant and Dual Loop Current Control Structure Comparison for Grid Connected Converters in the Rotating Frame
2:00pm- 5:30pm	Session T36- Anup Anurag and Sayan Acharya	An Accurate Calorimetric Method for Measurement of Switching Losses in Silicon Carbide (SiC) MOSFETs
2:00pm- 5:30pm	Session T37- Bryce Aberg	Estimation and Minimization of Power Loop Inductance for a 135 kW SiC Traction Inverter