Panel Title: Intelligent power electronics for future power and energy system

Panel Organizer: Zheyu Zhang, Warren H. Owen – Duke Energy Assistant Professor of Engineering, Clemson University

When: Wednesday, March 11th, 2020 – 4.00 pm – 5.30 pm

Where: Bellsouth Auditorium

Abstract: Introduction: 40% of the energy in the U.S. is consumed by electric energy in 2011, which was more than 13 times greater than the electricity use in 1950. As the issues of natural resource depletion, booming of population, and environmental conservation have gained greater visibility, the usage of electricity will be growing continuously, and to efficiently converter, control and use electrical energy is critical. Power electronics, as an enabling technology to achieve high-efficiency power conversion, becomes more and more popular. In 2005, 30% of the electricity flowed through power electronics converters. Furthermore, as expected based on the report of Annual Energy Review DOE/EIA in 2012, 80% of electricity could flow through power converters in 2030. As a result, power electronics converters are key components for future power and energy system. This panel will consist of presentations and discussions by academia and industry experts to give a broad coverage of opportunities, challenges, benefits, and implementations of power electronics technology in power system, such as next-generation wide-bandgap power semiconductor and application, medium-voltage high-efficiency grid-friendly power electronics converters, power electronics based power system in distribution and micro-grids, power conversion system for integrated renewables and energy storage systems, etc.

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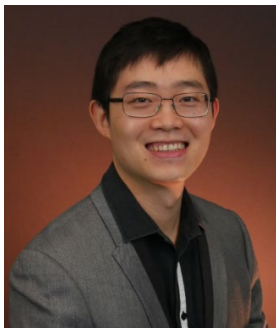
Dr. Zheyu Zhang is the Warren H. Owen – Duke Energy Assistant Professor of Engineering at Clemson University. He received Ph.D. degree from The University of Tennessee, Knoxville, TN, in 2015. He was a Research Assistant Professor in the Department of Electrical Engineering and Computer Science at the University of Tennessee, Knoxville from 2015 to 2018. Afterward, he joined General Electric Research as the Lead Power Electronics Engineer at Niskayuna, NY, USA from 2018 to 2019. His research interests include power electronics and applications on electric propulsion, electrified transportation, renewables, energy storage, and grid applications.

Panelist:

Presentation title: The Future of Power Electronic Systems with focus on the grid (co-presented with Dr. Sheng Zheng)

Michael Starke, Senior R&D Staff Member, Oak Ridge National Laboratory

Dr. Michael Starke is a Senior R&D Staff Member and Electrical Engineering System Integrator at the Oak Ridge National Laboratory. He has been at ORNL for over 10 years performing research in different areas of optimization, control, and communications in power systems. He received his Ph.D. in electrical and computer engineering at The University of Tennessee in 2009. His research areas have been primarily focused on energy storage, load control, and microgrids but he has been actively engaged in wind and solar generation research as well.

Sheng Zheng, R&D Staff Member, Oak Ridge National Laboratory
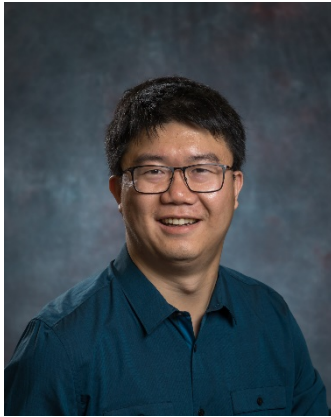
Dr. Sheng Zheng is the R&D Staff Member with Electric Energy Systems Integration Group at Oak Ridge National Laboratory, Oak Ridge, TN, USA. He received the B.E. and Ph.D. degrees in electrical engineering from Zhejiang University, Hangzhou, China, in 2007 and 2013, respectively. From 2013 to 2017 he was a Post-doctoral research associate with the Department of Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN, USA. His current research interests include high voltage wide bandgap semiconductors and its application, gate driver technology and design, high power interfacing converters for FACT devices, renewable generation systems and microgrids, hardware-in-the-loop real-time test.

Presentation title: Medium voltage high frequency power conversion for power system applications

Dong Dong, Assistant Professor, Virginia Tech

Dr. Dong Dong is an Assistant Professor with the Bradley Department of Electrical and Computer Engineering, Virginia Tech. He received the B.S. degree in electrical engineering from Tsinghua University, Beijing, China, in 2007, and the M.S. and Ph.D. degrees in electrical engineering from Virginia Tech, Blacksburg, VA, USA, in 2009 and 2012, respectively. From 2012 to 2018, Dr. Dong was an Electrical Engineer with the GE Global Research Center (GRC), Niskayuna, NY, USA. His current research interests include modeling and design of single-phase to multiphase power converters, silicon carbide (SiC)-based high-frequency power conversion, and power conversion system for grid, renewable, and transportation applications.

Presentation title: Standard Development and Testing of Energy Storage and Converter-Based Generation

Johan Enslin, Duke Energy Endowed Chaired Professor in Smart Grid, Clemson University

Dr. Johan H Enslin is the Duke Energy Endowed Chaired Professor at Clemson University in North Charleston SC and Executive Director for the Energy Systems Program at the Zucker Family Graduate Education Center. He is also a Distinguished Visiting Professor at University of Johannesburg in South Africa. He has combined a balanced industry and academic career with 39-year leadership experience in industry and academia throughout the USA, Europe and South Africa. Dr. Enslin's current research focusses mainly in the area of building a smarter, modern integrated power grid with high penetration of converter-based generation. He is a registered Professional Engineer in South Africa, Fellow of the SAIEE and Fellow of the IEEE. He is currently serving as VP Standards and AdCom member for the IEEE PELS Society.