ISSUE 01
DECEMBER 2020

QUARTERLY NEWSLETTER OF THE IEEE EASTERN TN PELS/PES JOINT CHAPTER

PowerBytes

In this Issue

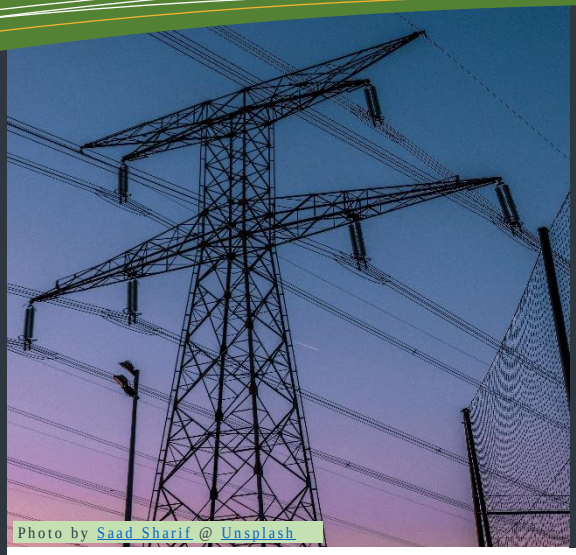


Photo by Saad Sharif @ Unsplash

Message from the Chair

Despite numerous restrictions and challenges arising from COVID-19 in 2020, I am happy to note the continued enthusiasm in our chapter's members that has resulted in several highlights and many firsts this year. From hosting our first virtual lecture (or "technotainment" started as a means to engage our members in these tough times) to our first newsletter, we have been blessed by the passion displayed by our Executive Committee members to grow our chapter's engagement.

This year, we have had several speakers from around the world (Europe, Australia, New Zealand, to name a few) giving talks on a wide range of engrossing topics from grid reliability and inverter-based grid operations to power electronics applications like neutron source and wireless power transfer. Among other achievements and highlights, we also have our first newsletter, an **updated website**, and many members in our region being recognized by the IEEE.

Suman Debnath

Chair, IEEE ET PELS/PES Jt. Chapter

Awarded High-Performance Chapter World-wide by IEEE PES for Our Activities in 2019

CHAPTER ACHIEVEMENTS

Bruce Webb PE is now an IEEE-PES Transformers Committee member. A graduate of the University of Tennessee, he began his professional career with Westinghouse in 1989. He now works for the Knoxville Utilities Board in their Planning & Programs group, is an IEEE Senior Member, and continues to support the IEEE after joining his UT student chapter thirty-five years ago.

Burak Ozpineci, from Oak Ridge National Laboratory (ORNL), has been elevated as a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). The IEEE has cited his "contributions to transportation electrification and wireless charging of electric vehicles." Learn more here.

The following researchers from ORNL have been elevated to the grade of Senior Member of the IEEE

Suman Debnath (Learn more)

Rafal Wojda (Learn more)

Emre Gurpinar

Mostak Mohammad

Emilio C. Piesciorovsky

EAST T.N. TECH TREND

On Real-Time Simulations

*Contributed by **Shilpa Marti, ORNL***

With power electronics significantly changing the course of evolution for the power grid, we are looking to transform its electromechanical systems into fast controllable power electronics systems. While enabling higher penetration of sustainable energy resources in a futuristic grid, it creates many new questions about such a grid's stability, reliability, and interoperability interconnecting power electronics. Testing to answer these questions on a real grid is not easy. Real-time (RT) simulations play a crucial role in validating and testing the equipment or control algorithms in a realistic environment. In RT simulations, a simulator solves the dynamic model's equations at predefined discrete sample times. A small sampling time is an enabler to capture the fast transients associated with power electronics. However, smaller sample times and scalability of the systems mean a high computational burden on the simulator. Thus, there is a need for continued research on advanced simulation and high-performance computing algorithms to optimize the trade-off between fidelity, accuracy, sampling time, and computational burden in RT simulations as studied in articles **like this**.

★★★

Bidirectional Wireless Power Transfer Demo'ed on a UPS Truck

On February 27, 2020, ORNL researchers demonstrated a 20kW bidirectional wireless charging system on a plug-in hybrid electric vehicle truck with an efficiency of 92%. Learn more about this exciting demo and its significance in ***this article from ORNL Today***.

ROUNDING UP THIS YEAR'S CALENDAR OF EVENTS

2020 has seen a remarkable line-up of distinguished guest lectures featuring eminent scholars from around the world exercising their domain expertise in varied areas of research. The 10 events, which together have garnered more than 200 participants, tackled subject matters that are of relevance to new and existing researchers in power electronics, artificial intelligence, renewable integration, electric vehicles, and professional engagement. The wide-ranging topics shed light on the changing tides of research and innovation in the fields of power and energy, and showcase the increase appetite for interdisciplinary research in the academia and the industry. In our efforts to align with this paradigm shift, we hope to enlist researchers in 2021 that strive to advance the state-of-the-art through more interdisciplinary research that involve cybersecurity, communications, optimization, and other career-advancing opportunities.

GRID MODERNIZATION: TECHNOLOGICAL ADVANCEMENTS BEYOND SMART GRID
John McDonald on May 12, 2020

GRID RELIABILITY AND ITS VITAL SIGNS
Jessica Bian on May 28, 2020

IMPACT OF INVERTER BASED GENERATION ON BULK POWER SYSTEM DYNAMICS AND SHORT-CIRCUIT PERFORMANCE
Gary Kobet on June 04, 2020

ENGAGEMENT OPPORTUNITIES IN IEEE AND ASSOCIATED CAREER ADVANCEMENT: PERSPECTIVE
Burak Ozpineci on June 25, 2020

MODERN GRID AND HYBRID SYSTEMS RESILIENCE, SUSTAINABILITY, PROTECTION AND OPERATION
Vahid Madani on July 14, 2020

MODULATOR POWER ELECTRONICS AT THE SPALLATION NEUTRON SOURCE (SNS) – CURRENT AND FUTURE
David E. Anderson on September 15, 2020

MICROGRIDS
Josep M. Guerrero on October 07, 2020

MODEL PREDICTIVE CONTROL IN POWER ELECTRONICS: A CRITICAL REVIEW AND RECENT INDUSTRIAL PRODUCTS
Tobias Geyer on October 20, 2020

INFRASTRUCTURE DEVELOPMENT AND RESEARCH FOR A RENEWABLE GRID POWER PLANT
Arif I. Sarwat on November 10, 2020

WIRELESS GRID INTEGRATION OF EVs FOR V2G APPLICATIONS
Udaya K. Madawala on December 02, 2020

BECOME OUR MEMBER TODAY!

Recognized as one of the high-performance chapters in 2019, our chapter's 90+ members are industry leaders and practitioners, students, and academics with professional interest in power, energy, power electronics, and related interdisciplinary areas of AI and cybersecurity. We offer webinars and distinguished lectures on the above topics and organize tours to Summit (the world's smartest supercomputer) and Spallation Neutron Source (world's most sensitive high resolution high-speed neutron source). We synchronize with standards development activities and PELS/PES committees through our dedicated members! Additional benefits are listed below. If you are interested in becoming a member, please email **Suman Debnath**.

Leverage networking opportunities

Increase your professional visibility

Stay updated on the latest developments

Build your resume by engaging as a volunteer

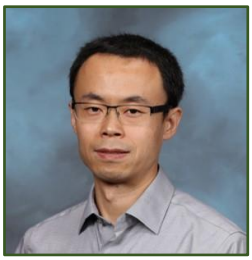
MEET THE EXECUTIVE COMMITTEE OFFICERS

Suman Debnath
Chapter Chair

Rafal Wojda
Chapter Secretary

Shilpa Marti
Chapter Secretary

Shajjad Chowdhury
Chapter Treasurer



Zhi Li
Chapter Vice Chair (PELS)

Sudarshan Harave
Website Coordinator

Pankaj Bhowmik
IEEE Certification Liaison

Mostak Mohammad
Events Coordinator

Anup Thapa
Outreach Coordinator

Aditya Sundararajan
Newsletter Coordinator

Olufemi Omitaomu
Local Community Coordinator

Olivera Kotevska
IEEE PES CAMS Coordinator

IEEE East Tennessee PES pels Joint Chapter

For inquires related to IEEE PELS/PES Chapters, email **Suman Debnath** or **Rafal Wojda**

For inquiries related to IEEE PELS/PES Committees, email **Olivera Kotevska** or **Suman Debnath**