TEXAS A&M UNIVERSITY
Department of Electrical & Computer Engineering

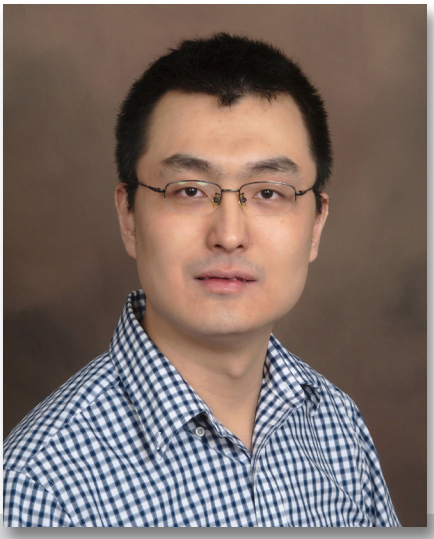
TRANSFORMING ENGINEERING EDUCATION

ENERGY & POWER GROUP SEMINAR

Power Electronics Intensive Power Systems: Modeling, Control, and Real-World Applications

Abstract

Modern power electronic systems with enhanced observability and controllability serve as the backbone for bridging bulk power systems and individual customers. As reported by the U.S. Department of Energy (DOE), approximately 80% of the electricity used in the U.S. is expected to flow through power electronic equipment by 2030, which depicts the trend and the future of energy evolution driven by advanced power electronics. It is noteworthy that power electronics as versatile techniques provide solutions in various areas and applications, ranging from power generation and distribution in modern smart grids to intelligent electronics for end-users. This presentation will focus on the modeling, control, and real-world applications of grid-interactive power electronic inverters and how emerging modeling and control technologies could be utilized to advance the state-of-the-art of power electronics intensive power systems, emphasizing resiliency, stability, and sustainability enhancement in the areas of reconfigurable energy systems with dynamic microgrids, renewable energy integration through resilient power electronic interfaces, among others.



Xiaonan Lu
Associate Professor
Electrical Engineering Technology
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Friday, September 20
11:30 am
241 ZACH

Biography

Xiaonan Lu received his B.E. and Ph.D. degrees in electrical engineering from Tsinghua University, Beijing, China, in 2008 and 2013, respectively. From October 2013 to December 2014, he was a Postdoc Research Associate at the University of Tennessee, Knoxville. From January 2015 to July 2018, he was with Argonne National Laboratory, first as a Postdoc Appointee and then as an Energy Systems Scientist. From July 2018 to July 2022, he was at Temple University as an Assistant Professor. In August 2022, he joined Purdue University as an Associate Professor. His research interests include modeling and control of power electronic inverters, hybrid AC and DC microgrids, and large-scale power electronics intensive power systems. Dr. Lu is the Associate Editor of IEEE Transactions on Industrial Electronics, the Associate Editor of IEEE Transactions on Industry Applications, and the Associate Editor of IEEE Journal of Emerging and Selected Topics in Power Electronics. He serves as the Chair of the Conference Development Committee (CDC) at the IEEE-IAS Industrial Power Conversion Systems Department (IPCSD) and the Vice Chair of the IEEE-PELS Technical Committee on Modeling and Control of Power Electronics. He serves as the Purdue University site Principal Investigator of the UNIFI (universal interoperability for grid-forming inverters) consortium, emphasizing the cross-cut topics of scalable modeling and control of grid-forming inverters. He is also the recipient of the 2020 Young Engineer of the Year Award from the IEEE Philadelphia Section and the 2024 Outstanding Faculty Awards in Discovery (Research) from Purdue University.

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