



TEXAS A&M UNIVERSITY

Department of Electrical & Computer Engineering



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12:00 PM CT

Join Zoom Meeting

<https://tamu.zoom.us/j/95311587379>

Meeting ID: 953 1158 7379

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Enabling Scalable and Sustainable Grids with Grid-forming Power Electronics

Abstract: As the adoption of renewable and storage technologies continue their upward trend, power electronics are playing an increasingly prominent role in grids. This evolution will continue as we work towards a 100% sustainably-powered grid that will likely be dominated by power electronics. To usher in this new age, we will introduce the notion of a grid-forming inverter to describe a power electronics interface that can help sustain system integrity via localized voltage and frequency regulation. Such a strategy also gives communication-free power sharing, synchronization, and an ultra resilient decentralized architecture that can work under any arbitrary mix of conventional machines and inverters. In this talk, we give an overview of state-of-the-art grid-forming control methods, their models, and experiments that showcase their operation. To underscore the promise of this technology, we will close by highlighting the newly formed Universal Interoperability for Grid-forming Inverters (UNIFI) Consortium which launched in 2022. The UNIFI Consortium, which includes 12 universities, 4 national labs, and 20 industry members, is co-led by Dr. Johnson.

Bio: Brian Johnson obtained his M.S. and Ph.D. degrees in Electrical and Computer Engineering from the University of Illinois at Urbana-Champaign, Urbana, in 2010 and 2013, respectively. He is the Washington Research Foundation Innovation Assistant Professor within the Department of Electrical and Computer Engineering at the University of Washington. Prior to joining the University of Washington in 2018, he was an engineer with the National Renewable Energy Laboratory in Golden, CO. He currently serves as an Associate Editor for the IEEE Transactions on Energy Conversion. He is also co-leading the multi-institutional DOE-funded Universal Interoperability for Grid-forming Inverters (UNIFI) Consortium. His research interests are in renewable energy systems, power electronics, and control systems.