



TEXAS A&M UNIVERSITY

Department of Electrical  
& Computer Engineering

Friday, October 29, 2021 | 11:30 – 12:30 p.m. Central

Meeting Location: ETB 1020

## Future Power Systems 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 today. This evolution will continue as we work towards a 100% sustainably-powered grid where one day we might have a grid dominated almost entirely by 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 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 that was recently selected for funding by the DOE. The UNIFI Consortium, which is set to launch in 2022, will be co-led by the University of Washington, National Renewable Energy Laboratory, and the Electric Power Research Institute, and will include 12 universities, 4 national labs, 20 industry members.

### Brian Johnson

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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. His research interests are in renewable energy systems, power electronics, and control systems.