



## SMALL- AND LARGE-SIGNAL STABILITY ANALYSIS, AND MODELING OF GRID-FORMING INVERTER FOR THEIR ROLE IN POWER SYSTEMS

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**WEI DU**

Pacific Northwest National Lab

Tuesday, September 12 • 11:00 AM – Noon (PT) • EME 26

### OVERVIEW

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This presentation will utilize a bottom-up approach to discuss how grid-forming inverters (GFMs) will impact power systems in different ways. First, an in-depth comparative study will be presented to provide insights into how different device-level controls can impact the system small signal stability. Second, transient stability analysis will be performed on a single-GFM infinite-bus system to explain how different current limiting controls influence the system critical clearing time. Finally, simulation studies performed on an integrated transmission and distribution system with 10,000+ inverters leveraging open-source tools developed at PNNL will be presented to showcase how grid-forming inverters will impact the system frequency response.

### BIO

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**Dr. Wei Du** received the Ph.D. in Electrical Engineering from Tsinghua University, Beijing, China in 2014. His main areas of research are control design, modeling, and simulation of power systems with high penetration of power electronics devices. He is currently a staff research engineer at the Pacific Northwest National Laboratory and serves as the Principal Investigator for multiple projects funded by U.S Department of Energy (DOE) that focus on studying the impacts of high penetration of inverter-based resources on the dynamic behaviors of power systems. He is the technical lead of the Modeling and Simulation Area of the Universal Interoperability for Grid-Forming Inverters (unifi) Consortium co-funded by U. S DOE solar and wind offices. He serves as an Associate Editor of IEEE Transactions on Smart Grid.

