



THE WSU-PNNL ADVANCED GRID INSTITUTE

Energy Systems Innovation Center

## HELICS-BASED CO-SIMULATION WITH TRANSACTIVE MICROGRIDS USING GRID-EDGE DEVICES

~ by ~

DR. TREVOR HARDY, PACIFIC NORTHWEST NATIONAL LAB &  
MONISH MUKHERJEE, WASHINGTON STATE UNIVERSITY

Tuesday, December 1 • 11:00 AM – Noon (PT) • **TEAMS ONLY**

[Click here to join Seminar](#)

### OVERVIEW

---

Co-simulation is a technique to allow simulators to exchange information during runtime in ways that allow for the construction of larger and more complex system models. HELICS is DOE's co-simulation platform and will be discussed in terms of its design and the common methods by which it is used to construct a co-simulation. A specific application of HELICS will be presented wherein a transactive energy mechanism is developed that allows prosumers arranged in microgrids to exchange energy and load curtailment with their neighbors in response to energy pricing signals. The price discovery mechanism that will be demonstrated is a distributed mechanism that allows microgrid managers to iteratively negotiate the price of energy while limiting disclosure of pricing information and preserving their prosumers privacy.

### BIOS

---

**Dr. Trevor Hardy** is a Research Engineer for Pacific Northwest National Laboratory where his core research areas are co-simulation tool develop and analysis along with transactive energy simulation and analysis. He leads the PNNL team alongside teams from other national labs to develop HELICS, the co-simulation platform funded by DOE. He also leads the development of the Transactive Energy Simulation Platform, a software platform designed to help evaluate new transactive mechanisms and use cases.



**Monish Mukherjee** received his bachelor's degree in Electrical Engineering from Jadavpur University, Kolkata, India in 2016. He is currently pursuing the Ph.D. degree with the School of Electrical Engineering and Computer Science, Washington State University, Pullman, WA, USA. He worked with Pacific Northwest National Laboratory (PNNL) as a Ph.D. Intern from May - December 2018. Currently, he is working with PNNL as a PNNL-WSU distinguished graduate research fellow. His research interests include transactive energy system, distribution system planning and operation, and condition monitoring of high voltage power equipment.