Modeling Power System Operations and Resilience with Uncertainties

BIOGRAPHY

Dr. Chaoyue Zhao is an Associate Professor in Industrial and Systems Engineering, University of Washington. She obtained her PhD degree at the University of Florida and B.S. degree in Fudan University in China. Dr. Zhao works on data-driven optimization and reinforcement learning methodologies to support strategic and operational planning in power systems management. She has received multiple grants from the federal agencies such as the National Science Foundation, Department of Transportation, and a few national laboratories. She is the recipient of awards including Career Award and Energy Systems Division Outstanding Young Investigator Award in IISE.

ABSTRACT

The power grid disruptions caused by extreme weather, although rare, can bring catastrophic impacts to the power industry and the society in general. The evaluation and mitigation of disruption-related risks and impacts are often computationally prohibitive due to the complexity of the power system, uncertainty of weather conditions, and the combinatorial nature of component failures. In addition, the intermittent nature of renewable energy brings another challenge for the independent system operators to maintain a reliable power system. In this talk, we propose a few optimization models to assist power system operations and enhance the power system resilience in face of uncertain renewable energy output and extreme weather conditions. The proposed approach integrates statistical and optimization methods to derive innovative decision-making under uncertainty models for power system problems