
Electrical & Computer Engineering
S E M I N A R
Louisiana State University

**Learning-Enabled Decision-Making
in Power and Energy Systems**

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Abstract—Modern power and energy systems are undergoing a fundamental transformation driven by the large-scale integration of renewable generation, energy storage, and increasing climate resilience requirements. Ensuring reliable and efficient operation under these evolving conditions requires converting massive streams of sensor and operational data into real-time control and planning decisions that rigorously respect physical laws and operational constraints.

Conventional optimization techniques, which rely on iterative and computationally intensive solvers, struggle to meet the speed and scalability demands of today’s highly interconnected energy systems. Although artificial intelligence and machine learning offer the promise of rapid decision-making, their deployment in critical infrastructure introduces fundamental challenges related to physics integration, sustainability, and interdependence, collectively referred to as the PSI challenges.

This seminar presents machine learningdriven optimization frameworks that explicitly embed domain knowledge into learning architectures to address these challenges. In particular, the Learning-to-Optimize the Optimization Process (LOOP) family of models is introduced, integrating physical constraints, risk awareness, and emissions considerations directly into neural surrogate models. By preserving system physics, adapting to uncertainty, and enabling coordinated multi-agent decision-making, these frameworks transform machine learning from a black-box predictor into a principled, safe, and sustainable decision engine for next-generation power and energy systems.

Bio—Meiyi Li is a Ph.D. candidate in the Fariborz Maseeh Department of Civil, Architectural, and Environmental Engineering at The University of Texas at Austin, where she is advised by Professor Javad Mohammadi. Prior to UT Austin, she was a Ph.D. student in Electrical and Computer Engineering at Carnegie Mellon University under the advisement of Professors Soumya Kar and Javad Mohammadi. She received her B.S. and M.S. degrees in Electrical Engineering from Shanghai Jiao Tong University, graduating from the Outstanding Engineers Honor Class.

Her research focuses on the integration of machine learning and optimization for next-generation power and energy systems. She has co-authored 20 peer-reviewed publications, and her work has been recognized with several prestigious honors, including the MIT EECS Rising Star distinction, the Chevron Energy Graduate Fellowship, and the Best of the Best Paper Award from the IEEE Power and Energy Society. In addition to her scholarly contributions, her research played a key role in her team achieving the highest university ranking in the ARPA-E Grid Optimization Competition.

When: Wednesday, 21 January 2026, 10:30 - 11:30
Where: Room 3316E Patrick F. Taylor Hall
Info: <https://www.lsu.edu/eng/ece/seminar>
Food: *Refreshments will be served.*

