

# Learning and Optimization in Power Transmission Systems: Paving the Road to Sustainable Energy



Date: 3 August 2022 (Wednesday)

Time: 10:00am - 11:00am

Seminar link: <https://cityu.zoom.us/j/91688745717>

## ABSTRACT

With a continuous growth in green energy investments and renewable plant deployments, EIA & FERC estimated by 2030 1/3 of U.S. energy sources would solely be coming from renewables. Some analysts even further forecasted a 50% renewable mix within the next 10 years. While increasing the portion of sustainable energy is beneficial to combat climate change, how the bulk power transmission systems & energy clearing markets should handle the forecasted high renewable mix is still a major challenging question to the energy industry.

This seminar will summarize recent advancements in using Data Science techniques to tackle challenging industrial problems arising from energy changes within the power system industry. The first part of the talk will summarize recent efforts in building fast, scalable, and practical learning oracles for predicting the AC Optimal Power Flow problem --- a core building block for many useful market & grid operations. Enhancing the deep learning framework with Lagrangian constraints as well as studies on load embedding schemes will be presented. The second part of the talk will focus on privacy issues on data/benchmark release operations, a crucial yet largely underexplored step in the power community. Recent efforts in applying differential privacy for building AC Optimal Power Flow benchmarks will be presented. The last part of the talk will summarize various other interesting research directions & community services conducted recently.



## Dr Terrence W.K. MAK GUEST SPEAKER'S PROFILE

Dr Terrence W.K. Mak is currently a postdoctoral fellow at Georgia Tech, funded by ARPA-E of the U.S. Department of Energy. He obtained his PhD in 2018 at the Australian National University, with a thesis on applying optimization techniques to nonlinear dynamics in energy systems. He has broad experience over multiple optimization & learning paradigms, with publications spanning over several engineering domains, including Artificial Intelligence, Operations Research, and Electrical Engineering. He is currently focusing on smart grid & power system applications for clean energy and climate change. He was an awardee for the 2020 IEEE Transactions on Power Systems Best Paper Award.