



**THE CHINESE UNIVERSITY OF HONG KONG**  
Department of Information Engineering  
*Seminar*

**Towards Closing the Electricity-Transportation-Human Loop via  
Control and Market**

by

**Prof. Junjie Qin**  
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**Date : 16 August 2023 (Wednesday)**

**Time : 10:30am – 11:30am**

**Venue : Rm 801, Ho Sin Hang Engineering Building, CUHK**

*Abstract*

Electric power systems and transportation systems become deeply interconnected due to transportation electrification. The couplings between these systems can be leveraged to optimize the performance of both systems. In this talk, we will go through two such examples. In the first example, we consider the design of workplace electric vehicle (EV) charging tariffs in a morning commute setting. We demonstrate that a time-varying charging tariff can play the role of a dynamic toll to improve the traffic or nudge the EV arrival times to optimize electricity system costs. In the second example, we introduce a business model where EVs are shared for joint provision of transportation and electricity services. We justify using shared EVs to provide a particular electricity service (i.e., demand charge reduction) by exploring the statistics of load data of large electricity users and analyze the optimal spatial pricing problem for joint service provision with a shared EV fleet. Impacts of the proposed operation is simulated using real transportation network company data and electric load data for the city of San Francisco.

*Biography*

Junjie Qin is an Assistant Professor in the Elmore Family School of Electrical and Computer Engineering at Purdue University. Before joining Purdue, he was a postdoctoral researcher at University of California, Berkeley. He obtained a Ph.D. degree in Computational and Mathematical Engineering from Stanford University, where he also received an M.S. degree in Civil and Environmental Engineering and an M.S. degree in Statistics. He received his bachelor's degrees from Tsinghua University, Beijing, China. He has been awarded the Google Research Scholar Award in 2022, the 2020 O. Hugo Schuck Best Paper Award by the American Automatic Control Council, the Best Student Paper Award at the 23rd IEEE International Conference on Intelligent Transportation Systems, the Best Student Paper Finalist at the 55th IEEE Conference on Decision and Control, and the Satre family fellowship on energy and sustainability.

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