

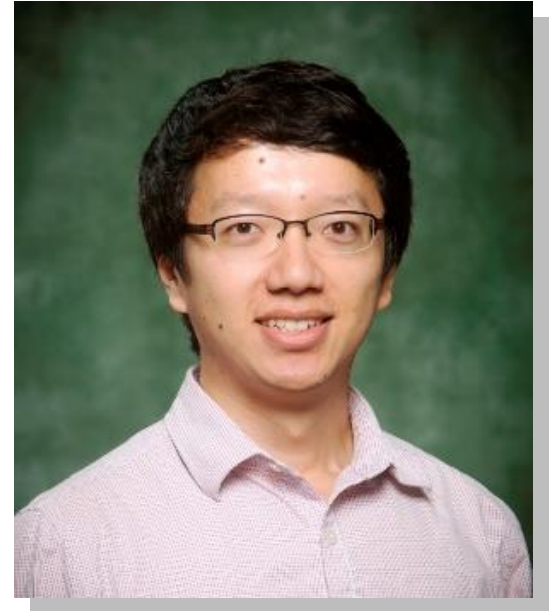


CoCo Seminar Series Spring 2021

From Coupled Pendulums to Networked Inverters: How to Keep the Future Power Grid Stable?

Dr. Ziang (John) Zhang
Associate Professor, Electrical and Computer
Engineering, Binghamton University

Wednesday April 7, 2021 11:00am-12:00pm
Online (Zoom meeting link available on
<http://coco.binghamton.edu/>)



*** This webinar is co-hosted by the IEEE Power and Energy Society Binghamton Chapter.**

In 1665, Dutch scholar Christiaan Huygens hangs two of his newly invented pendulum clocks on a wooden beam supported by two chairs. Then he observed that the two pendulums synchronized their oscillation after 30 minutes. This was probably the first-time humans study the curious phenomena of coupled oscillators. Although this general idea of coupled oscillators was recognized hundreds of years ago, how to maintain a group of nonlinear oscillators remain synchronism is still an open question that puzzles today's scholars.

Coupled oscillators can be observed in our daily life, such as the heartbeats generated by cardiac pacemakers, the synchronized flash pattern generated by a special kind of fireflies, or our power system – which are thousands of synchronous generators coupled by transmission lines.

With more renewable energy resources and energy storage devices entering the power system, the conventional generators will gradually phase out over time and the penetration of inverter-interfaced energy resources will increase. Our power system will operate in the "hybrid model" with a mix of synchronous generators and inverters for a long period. In this talk, we will discuss how to maintain the stability of future power systems.

Dr. Ziang (John) Zhang is an Associate Professor of Electrical and Computer Engineering at Binghamton University. He received his Ph.D. degree in Electrical Engineering from North Carolina State University, Raleigh, NC, in 2013. He is an Associate Editor of IEEE Access, a member of the R&D Advisory Group of the National Offshore Wind R&D Consortium, the Vice-Chair of IEEE Binghamton Section, and a member of the Center for Collective Dynamics of Complex Systems at Binghamton University. His current research interests include renewable energy integration, transient stability analysis, and battery systems operations.

For more information, contact Hiroki Sayama (sayama@binghamton.edu). <http://coco.binghamton.edu/>