# Scalable control and observability: Power grids and other large-scale networks

Adilson Motter[1], Arthur Montanari[1], Chao Duan[1,2], Luis Aguirre[3], Takashi Nishikawa[1]
*[1]Department of Physics and Astronomy, Northwestern University, Evanston,, USA, [2]School of Electrical Engineering, Xi'an Jiaotong University, Xi'an, China, [3]Department of Electronic Engineering, Federal University of Minas Gerais, Belo Horizonte, Brazil*

A major challenge in the current study of power grids and other large-scale networks is the lack of scalability of most existing control approaches. In this presentation, I will introduce a notion of network locality that can be exploited to make the control of networks scalable even when the dynamics are nonlinear. I will also present a graph-based theory and scalable computational approach for functional observability, the important scenario in which only a subset of state variables needs to be reconstructed. Example applications will include the control of synchronization dynamics and the detection of cyberattacks in power-grid networks. These results enhance our ability to explore otherwise inaccessible dynamical processes and show how large networks can be controlled with computation and communication costs comparable to those for small networks.

References:

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