Chicago Booth Econometrics and Statistics Colloquium Workshop on March 16, 2017

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Causal Inference in Networks of Interacting Processes

Abstract: One of the paramount challenges of this century is that of understanding complex, dynamic, large-scale networks. Such high-dimensional networks, including communication, social, financial, and biological networks, cover the planet and dominate modern life. In this talk, we propose novel approaches to inference in such networks that use timing as an underutilized degree of freedom that provides rich information. We present a framework for learning the structure of the directed information graphs. These graphs are a new type of probabilistic graphical model based on directed information that succinctly capture casual dynamics among random processes in stochastic networks. In the presence of large data, we propose algorithms that identify optimal or near-optimal approximations to the topology of the network.

Bio:
Negar Kiyavash is Willett Faculty Scholar at the University of Illinois and a joint Associate Professor of Industrial and Enterprise Engineering and Electrical and Computer Engineering. Her research interests are in design and analysis of algorithms for network inference with an emphasis on causality. She is a recipient of NSF CAREER and AFOSR YIP awards and the Illinois College of Engineering Dean's Award for Excellence in Research.