



**THE CHINESE UNIVERSITY OF HONG KONG**  
**Department of Electronic Engineering**

**Seminar**

**Community Detection on the Weighted Stochastic Block Model**

**Dr. Min Xu**  
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**Date:** 21 December 2016 (Wednesday)  
**Time:** 10:30 a.m.  
**Place:** Rm 222, Ho Sin Hang Engineering Building, CUHK

**Abstract**

Real world networks often have communities, which are clusters of nodes such that nodes in the same community are more likely to be connected to each other than nodes across different communities. Finding the communities in a network is an important problem in social science, marketing, cyber-security, gene analysis, and more. Community recovery has received much attention in the past decade and Stochastic Block Model (SBM) has emerged as the most well-studied and well-understood statistical model for this problem. Yet SBM has a limitation: it assumes that each network edge is Bernoulli--either 0 or 1; this is restrictive because weighted edges are ubiquitous and, when edge weights are present, it may be important to incorporate them into a community recovery algorithm. In this talk, we study the weighted generalization of the Stochastic Block Model in which an edge-weight random variable can have a general mixed distribution rather than Bernoulli; we propose and analyze an algorithm for the weighted SBM based on discretization. We show that this procedure has a rate of convergence that depends on an information divergence that also governs the threshold behavior of the unweighted Stochastic Block Model--a rate that in many cases has matching lower bounds. Our result gives a principled and tractable way of incorporating edge weights into the analysis of network data. Joint work with Varun Jog and Po-Ling Loh from University of Wisconsin Madison.

**Biography**

Min Xu is a postdoctoral researcher in the Statistics Department of the Wharton School at the University of Pennsylvania. He received his Bachelor's degree with High Honors from Electrical Engineering and Computer Science at the University of California, Berkeley, and his PhD in machine learning from the School of Computer Science at Carnegie Mellon University, where he was advised by Prof. John Lafferty. Min has worked on statistical machine learning with emphasis on nonparametric and structured statistical models. Min has also worked on analysis of education data as part of the Eric & Wendy Schmidt Data Science for Social Good Fellowship.

**\*\*\* ALL ARE WELCOME \*\*\***

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