

# SCMS & SDS Joint Seminar

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### *ESTIMATING NETWORK EDGE PROBABILITIES BY NEIGHBORHOOD SMOOTHING*

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mathematical sciences**

#### **Lecture**

**Time:** 10:30-11:30 am., Thursday, Nov. 16, 2017

**Venue:** Room 2201, East Main Guanghua Tower, Handan Campus

**Abstract:** The problem of estimating probabilities of network edges from the observed adjacency matrix has important applications to predicting missing links and network denoising. It has usually been addressed by estimating the graphon, a function that determines the matrix of edge probabilities, but is ill-defined without strong assumptions on the network structure. Here we propose a novel computationally efficient method based on neighborhood smoothing to estimate the expectation of the adjacency matrix directly, without making the strong structural assumptions graphon estimation requires. The neighborhood smoothing method requires little tuning, has a competitive mean-squared error rate, and outperforms many benchmark methods on the task of link prediction in both simulated and real networks. This is joint work with Yuan Zhang and Elizaveta Levina.