

Data Science Seminar  
Hosted by Department of Mathematical Sciences

- Date: Tuesday, October 9, 2018
- Time: 12:00pm - 1:00pm
- Room: Old Champlain Atrium **(unusual location)**
- Speaker: Sidney Resnick (Cornell University)
- Title: Fitting the Linear Preferential Attachment Model for Social Network Growth

**Abstract**

Preferential attachment is a mechanism for modeling power-law behavior of the degree distributions in directed edge social networks. We consider methods for fitting a 5-parameter linear preferential model to network data under two data scenarios. In the case where full history of the network formation is given, we give the maximum likelihood estimator of the parameters and show that they are strongly consistent and asymptotically normal. In the case where only a {single-time} snapshot of the network is available, we propose an estimation method which combines method of moments with an approximation to the likelihood. The resulting estimator is also strongly consistent and performs well compared to the MLE estimator. We illustrate both estimation procedures using simulated data, and explore the usage of this model in a real data example. When data has corruption or there is significant model error, a competing asymptotic extreme value method is also useful. We will end the talk with comments on why the Hill estimator is widely used for tail index estimation in this context without justification and what can be done about this. (Joint with P. Wan, R. Davis, T. Wang)

This seminar is part of the Dean's Speaker Series in Statistics and Data Science

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