THE UNIVERSITY OF CHICAGO

Department of Statistics

STATISTICS COLLOQUIUM

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Statistical Analysis of Network Data: (Re)visiting the Foundations

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Refreshments following the seminar in Eckhart 110

ABSTRACT

It has been roughly 15 years now since what might be described as a revolution in complex networks arguably began. With dozens of disciplines engaged in doing "network science," the impact of this revolution on science in general has been profound. Of course, with most of this work being data-centric, statistical methods and modeling have been central to these efforts. But how well do we truly understand the implications of having network-structured data on statistical principles and tasks of a foundational nature? In this talk I will argue that there is still a long way to go in this direction and present recent and ongoing work of ours that aims to lay some of the necessary groundwork for moving forward. In particular, I will present three vignettes, touching on the problems of (i) adjusting for bias inherent in network sampling, (ii) propagation of uncertainty to summary statistics of "noisy" networks, and (iii) estimation and testing for large collections of network data objects. In each case I will present a formalization of a certain class of problems encountered frequently in practice, describe our work in addressing the core aspects of these problems, and point to some of the many outstanding challenges remaining.
