Network Analysis: Statistical Approaches  
Instructor: John Skvoretz  
ICPSR Summer Program, 23 May 2016 – 27 May 2016

COURSE DESCRIPTION

The workshop covers advanced statistical methods for analyzing social network data, focusing on testing hypotheses about network structure (e.g. reciprocity, transitivity, and closure), the formation of ties based on attributes (e.g. homophily), and network effects on individual attributes (social influence or contagion models), beginning with statistical models for the local structure of dyads and triads, then moving to statistical models based on the assumption of dyadic independence, and then covering recent advances in statistical models that permit structured forms of dependence between dyads. Topics include random graph distributions, statistical models for local structure (dyads and triads), biased net models for complete networks and for aggregated tie count data, autocorrelation influence models, and exponential random graph models. Each session divides into lecture/discussion of methods and a lab using those methods. This workshop assumes that participants have already taken a first course in network analysis, such as the ICPSR Summer Program workshop "Network Analysis: An Introduction."

READINGS


Various additional articles as listed under topics.

SOFTWARE


TOPICS

Session 1 -- Random baseline networks, distributions, probabilities, and statistical testing

Session 2 – Analysis of dyads and triads

Session 3 – Density, degree, centralization, clustering coefficient and other graph-level indices

Session 4 – Biased net models for aggregate tie data: Homophily

Session 5 – Biased net models for complete network data: Dyadic and triadic forces

Session 6 – Regression based analyses and social influence models

Session 7 – Foundations of ergms and some simple models

Session 8 – Building useful ergms with PNet and statnet

Session 9 – Topics and applications in ergm modeling

Session 10 – Open mike and tying up loose ends