Network Analysis: Statistical Approaches
Instructor: John Skvoretz
ICPSR Summer Program, 15 May 2017 – 19 May 2017

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**