

STANFORD UNIVERSITY
DEPARTMENT OF STATISTICS
DEPARTMENTAL SEMINAR

4:15 p.m., Thursday, April 17, 2003
Sequoia Hall Room 200
(Cookies at 3:45 in 1st Floor Lounge)
Reception to follow at 5:30

Adrian Raftery
Center for Statistics and the Social Sciences
University of Washington

Latent Space Approaches to Social Network Analysis

Network models are widely used to represent relational information among interacting units. In studies of social networks, recent emphasis has been placed on random graph models where the nodes usually represent individual social actors and the edges represent the presence of a specified relation between actors. We develop a class of models where the probability of a relation between actors depends on the positions of individuals in an unobserved “social space.” Inference for the social space is developed within a maximum likelihood and Bayesian framework, and Markov chain Monte Carlo procedures are proposed for making inference on latent positions and the effects of observed covariates. We present analyses of three standard datasets from the social networks literature, and compare the method to an alternative stochastic blockmodeling approach. In addition to improving upon model fit, our method provides a visual and interpretable model-based spatial representation of social relationships, and improves upon existing methods by allowing the statistical uncertainty in the social space to be quantified and graphically represented.

This is joint work with Peter Hoff and Mark Handcock.

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