PSC 506
Advanced Topics in Methods

Harkness Hall
Office Hours: By Appointment
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PURPOSE: This course covers topics that one might encounter in advanced political methodology research, but which are not yet standard fare in introductory methods courses: e.g., Bayesian methods, network models, ideal point estimation, semiparametric methods, machine learning, etc. As a research workshop, this course will also allow students to pursue areas of individual interest in more depth. The course content, therefore, depends not only on what I want to cover, but also on what students want to cover. Finally, since students taking 506 are assumed to be interested in political methodology as a major field, they will be required (1) to solve "unsolved" problems during the semester and (2) to write a research paper that makes a contribution to the methods literature.

PREREQUISITES: Students must have taken PSC 404, 405, and 505. Students who would like to waive these courses based on courses previously taken must have those courses approved by me.

COURSE REQUIREMENTS:

* **Participation and Weekly Assignments (40%)**. Each week, s

- Students should be familiar with methods literature on linear models, MLE, duration models, grouped binary duration models, selection models, and strategic models.

2. Bayesian Inference and MCMC

- Bayesian inference
- MCMC, Gibbs sampler, Convergence
- Jags

Jackman, Simon. 2000. "Estimation and Inference via Bayesian Simulation." *AJPS*.

Efron, B. 1986. "Why Isn't Everyone Bayesian?" *The American Statistician*.

Brooks, Stephen P. 1998. "Markov Chain Monte Carlo and Its Application." *The Statistician*.

Casella, George and Edward I. George. 1992. "Explaining the Gibbs Sampler."

Blackwell, Matthew, James Honaker, and Gary King. 2012. "Multiple Overimputation: A Unified

Networks: An Introduction to Markov Graphs and p*." *Psychometrika*. 61:401-425.

Snijders, Tom. A. B. 2001. "The Statistical Evaluation of Social Network Dynamics." *Sociological Methodology*. 31:361-395.

Hoff, Peter D. Hoff, and Michael D. Ward. 2004. "Modeling Dependencies in International Relations Networks." *Political Analysis* 12(2):160-175.

Handcock, Mark S., Adrian E. Raftery, and Jeremy M. Tantrum. 2007. "Model-Based Clustering for Social Networks." *Journal of the Royal Statistical Society*. 170(2):301-354.

Cranmer, Skyler J. and Bruce A. Desmarais. 2011. "Inferential Network Analysis with Exponential Random Graph Models." *Political Analysis*. 19:66-86.

Ramanna, Karthik and Ewa Sletten. 2014. "Network Effects of Countries' Adoption in IFRS." *The Accounting Review*. 89:1517-1543.

HW: Replicate a published network analysis.

5. Ideal Point Estimation

Poole, Keith T. and Howard Rosenthal. 1985. "A Spatial Model for Legislative Roll Call Analysis." *AJPS*. 29:357-384.

Poole, Keith T. and Howard Rosenthal. 1991. "Patterns of Congressional Voting."

- Neural networks, deep learning

7. Topic Models

8. Student Project Presentations