GOV 385L: Network Analysis
Fall 2021
TH 9:30am-12:30pm, BAT 5.102

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Course Description

This course aims to provide students with an understanding of the theoretical motivations
behind network analysis in the social sciences and the methodological tools available to
scholars who wish to understand the interdependencies between observations. We will be-
gin with the basics of network analysis including working with network data, calculating
descriptive network statistics, and network visualization. We will then move on to the tools
necessary to analyze and interpret network data in a manner sufficient for contemporary
research questions that demand understanding of the complex dynamics of network pro-
cesses. Methodological research on inferential network analysis is an evolving field with
new advances continually being developed. We will focus on the most important of these
innovations and students will gain practical experiences with statistical models that utilize
networks as both independent and dependent variables. By the end of this course, students
will understand the theoretical basis for network analysis, be able to apply the most com-
monly used models for inferential network analysis, and have a working paper suitable for
submission to a conference.

Prerequisites

Knowledge of introductory statistics (including probability and hypothesis testing) and re-
gression modeling at the level of GOV 391J and GOV 391L.

Course Requirements and Grading

Your grade in this course will be based on four components as follows:

Assignments	40%
Participation	20%
Final Paper	30%
Final Presentation	10%

Assignments:

Over the course of the semester, you will be required to complete four assignments in which you to apply the concepts learned in class to your own network data. The assignments are intended to be building blocks for your final paper so it is important to find a dataset you want to work with as soon as possible. Also note that much of network analysis can be computationally intensive. You are responsible for ensuring you have allowed adequate time to estimate models that may take multiple hours to run. You may work with classmates on the assignments, but each submission must be your own.

Participation:

Participation is an integral part of the course. I expect you to come to each class having done the readings and ready to discuss the material with your classmates. You will be assigned one seminar over the course of the semester for which you will be responsible for leading the discussion on the applied readings. (The technical readings will be covered in lecture.) In addition to leading discussion, you must post a list of questions for the rest of the class by 12pm on the Wednesday before your chosen discussion date. Your participation grade will reflect both your preparation for the seminars that you lead and your participation in discussions led by your classmates.

Final Paper and Presentation:

For your final paper, you will be required to write an original 15-20 page research paper on a topic of your choice using one or more tools of inferential network analysis. You MAY coauthor this paper with up to two of your classmates. Following your submission of the first assignment, you must schedule a meeting with me to discuss your project. The last class meeting will be devoted to presentations of your final papers.

Required Texts

- Skyler J. Cranmer, Bruce A. Desmarais, and Jason W. Morgan. *Inferential Network Analysis*. Cambridge University Press, 2021

In addition to the required text, you will need R and R Studio installed on your computer. You should also download the `statnet`, `latentnet`, `amen`, `xergm`, and `ina` packages. (Note that `xergm` and `ina` are not currently available on CRAN. `xergm` can be downloaded from `https://github.com/leifeld/xergm` and `ina` can be downloaded from `https://github.com/jason-morgan/ina`.)

Journal articles will also be assigned throughout the semester to provide examples of network analysis and discussions of best practices.

Administrative Issues

Academic Dishonesty

All violations of university academic conduct guidelines, including plagiarism, will be referred to the Dean of Students and will result in a zero on the assignment or exam in question. Plagiarism is the use of others' ideas or work without credit and/or presenting derivative work as one's own. This includes, but is not limited to, cutting and pasting from someone else's work or an internet source, failing to identify exact quotes, failing to cite a source for information that is only available from that source, failing to cite a source for an idea or argument you borrowed from that source, and turning in work that is not your own.

Disability Accommodations

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities (512-471-6259, http://www.utexas.edu/diversity/ddce/ssd/).

Religious Holidays

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence.

Emergency Evacuation Policy

Occupants of buildings on the University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building. Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class. Information regarding emergency evacuation routes and emergency procedures can be found at: utexas.edu/emergency.

Course Outline

This is an approximate schedule that is subject to change depending on how quickly we move through the material.

August 26: Introduction to Network Analysis

September 2: Network Theory and Hypotheses
- Cranmer, Desmarais, and Morgan (CDM), Chapter 1 (also note the Notations and Acronyms page in the preface)
- David Lazer. Networks in political science: Back to the future. *PS: Political Science and Politics*, 44(01):61–68, 2011

- Michael D. Ward, Katherine Stovel, and Audrey Sacks. Network analysis and political science. *Annual Review of Political Science*, 14(1):245–264, 2011
- Skyler J. Cranmer, Philip Leifeld, Scott D. McClurg, and Meredith Rolfe. Navigating the range of statistical tools for inferential network analysis. *American Journal of Political Science*, 61(1):237–251, 2017

September 9: Measurement I

- Phillip Bonacich. Power and centrality: A family of measures. *American Journal of Sociology*, 92(5):1170–1182, 1987
- Stephen P. Borgatti. Centrality and network flow. *Social Networks*, 27:55–71, 2005

Applications:

- James H. Fowler. Connecting the Congress: A study of cosponsorship networks. *Political Analysis*, 14(4):456–487, 2006
- August Hämmerli, Regula Gattiker, and Reto Weyermann. Conflict and cooperation in an actors' network of Chechnya based on event data. *Journal of Conflict Resolution*, 50(2):159–175, 2006
- Janet M. Box-Steffensmeier, Dino P. Christenson, and Alison W. Craig. Cue-taking in congress: Interest group signals from dear colleague letters. *American Journal of Political Science*, 63(1):163–180, 2019

September 16: Measurement II

- Mark S. Granovetter. The strength of weak ties. *American Journal of Sociology*, 78(6):1360–1380, 1973
- James Moody and Douglas R. White. Structural cohesion and embeddedness: A hierarchical concept of social groups. *American Sociological Review*, 68(1):103–127, 2003

Applications:

- Daniel P. Carpenter, Kevin M. Esterling, and David Lazer. Friends, brokers, and transitivity: Who informs whom in Washington politics? *Journal of Politics*, 66:224–246, 2004
- Zeev Maoz, Lesley G. Terris, Ranan D. Kuperman, and Ilan Talmud. What is the enemy of my enemy? Causes and consequences of imbalanced international relations, 1816-2001. *Journal of Politics*, 69(1):100–115, 2007
- Dotan A. Haim. Alliance networks and trade: The effect of indirect political alliances on bilateral trade flows. *Journal of Peace Research*, 53(3):472–490, 2016

September 23: NO CLASS

September 30: Homophily and Influence - ZOOM

- Miller McPherson, Lynn Smith-Lovin, and James M. Cook. Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27:415–44, 2001
- Cosma Rohilla Shalizi and Andrew C. Thomas. Homophily and contagion are generally confounded in observational social network studies. *Sociological Methods and Research*, 40(2):211–239, 2011

Applications:

- Gregory A. Huber and Neil Malhotra. Political homophily in social relationships: Evidence from online dating behavior. *Journal of Politics*, 79(1):270–283, 2017
- Jennifer M. Larson and Janet I. Lewis. Ethnic networks. *American Journal of Political Science*, 61(2):350–364, 2017,
- Taylor N. Carlson, Marisa Abrajano, and Lisa Garcia Bedolla. Political discussion networks and political engagement among voters of color. *Political Research Quarterly*, 73(1):79–95, 2020

October 7: Network Autocorrelation Model

- Roger Th.A.J. Leenders. Modeling social influence through network autocorrelation: Constructing the weight matrix. *Social Networks*, 24:21–47, 2002
- Haomin Li and Daniel K. Sewell. A comparison of estimators for the network autocorrelation model based on observed social networks. *Social Networks*, 66:202–210, 2021

Applications:
- Wendy K. Tam Cho. Contagion effects and ethnic contribution networks. *American Journal of Political Science*, 47(2):368–387, 2003
- Brendan Nyhan and Jacob M. Montgomery. Connecting the candidates: Consultant networks and the diffusion of campaign strategy in American congressional elections. *American Journal of Political Science*, 59(2):292–308, 2015
- Marlene Kammerer and Chandreyee Namhata. What drives the adoption of climate change mitigation policy? a dynamic network approach to policy diffusion. *Policy Sciences*, 51:477–513, 2018

October 14: Quadratic Assignment Procedure

- CDM, Chapter 2
- David Dekker, David Krackhardt, and Tom A.B. Snijders. Sensitivity of MRQAP tests to collinearity and autocorrelation conditions. *Psychometrika*, 72(4):563–581, 2007

Applications:
- Michael T. Heaney, Seth E. Masket, Joanne M. Miller, and Dara Z. Strolovitch. Polarized networks: The organizational affiliations of national party convention delegates. *American Behavioral Scientist*, 56(12):1654–1676, 2012
- In-Won Lee, Richard C. Feiock, and Youngmi Lee. Competitors and cooperators: A micro-level analysis of regional economic development collaboration networks. *Public Administration Review*, 72(2):253–262, 2012
- Bruce A. Desmarais, Vincent G. Moscardelli, Brian F. Schaffner, and Michael S. Kowal. Measuring legislative collaboration: The Senate press events network. *Social Networks*, 40:43–54, 2015

October 21: Latent Variable Models I

- CDM, Chapters 8 and 9
- Peter D. Hoff, Adrian E. Raftery, and Mark S. Handcock. Latent space approaches to social network analysis. *Journal of the American Statistical Association*, 97(460):1090–1098, 2002

Applications:

- Michael D. Ward, Randolph M. Siverson, and Xun Cao. Disputes, democracies, and dependencies: A reexamination of the Kantian peace. *American Journal of Political Science*, 51(3):583–601, 2007
- Pablo Barberá, John T. Jost, Jonathan Nagler, Joshua A. Tucker, and Richard Bonneau. Tweeting from left to right: Is online political communication more than an echo chamber? *Psychological Science*, 26(10):1531–1542, 2015
- Taishi Muraoka. The cosponsorship patterns of reserved seat legislators. *Legislative Studies Quarterly*, 45(4):555–580, 2020

October 28: Latent Variable Models II
- CDM, Chapter 10
- Shahryar Minhas, Peter D. Hoff, and Michael D. Ward. Inferential approaches for network analysis: AMEN for latent factor models. *Political Analysis*, 2018

Applications:
- Christian Breunig, Xun Cao, and Adam Luedtke. Global migration and political regime type: A democratic disadvantage. *British Journal of Political Science*, 42(4):825–854, 2012
- Simon Weschle. The impact of economic crises on political representation in public communication: Evidence from the eurozone. *British Journal of Political Science*, 49(3):1097–1116, 2019
- Cassy Dorff, Max Gallop, and Shahryar Minhas. Networks of violence: Predicting conflict in Nigeria. *Journal of Politics*, 82(2):476–493, 2020

November 4: Exponential Random Graph Model I
- CDM, Chapter 3
- Skyler J. Cranmer and Bruce A. Desmarais. Inferential network analysis with exponential random graph models. *Political Analysis*, 19:66–86, 2011

Applications:
- Kathleen A. Bratton and Stella M. Rouse. Networks in the legislative arena: How group dynamics affect cosponsorship. *Legislative Studies Quarterly*, 36(3):423–460, 2011
- Elisabeth R. Gerber, Adam Douglas Henry, and Mark Lubell. Political homophily and collaboration in regional planning networks. *American Journal of Political Science*, 57(3):598–610, 2013
- Janet M. Box-Steffensmeier and Dino P. Christenson. The evolution and formation of amicus curiae networks. *Social Networks*, 36:82–96, 2014

November 11: Exponential Random Graph Model II
- CDM, Chapters 4 and 5
- David R. Hunter. Curved exponential family models for social networks. *Social Networks*, 29(2):216–230, 2007

Applications:
- Manuel Fischer and Pascal Sciarini. Drivers of collaboration in political decision making: A cross-sector perspective. *Journal of Politics*, 78(1):63–74, 2016
- Anja Osei and Thomas Malang. Party, ethnicity, or region? Determinants of informal political exchange in the parliament of Ghana. *Party Politics*, 24(4):410–420, 2018

- Florence Metz, Philip Leifeld, and Karin Ingold. Interdependent policy instrument preferences: A two-mode network approach. *Journal of Public Policy*, 39(4):609–636, 2018

November 18: ERGM Extensions
- CDM, Chapters 6 and 7
- Pavel N. Krivitsky. Exponential-family random graph models for valued networks. *Electronic Journal of Statistics*, 6:1100–1128, 2012

Applications:
- Brandon J. Kinne. Network dynamics and the evolution of international cooperation. *American Political Science Review*, 107(4):766–785, 2013
- Marina G. Duque. Recognizing international status: A relational approach. *International Studies Quarterly*, 62:577–592, 2018
- Nicola Ulibarri and Tyler A. Scott. Linking network structure to collaborative governance. *Journal of Public Administration Research and Theory*, 27(1):163–181, 2017

December 2: Presentations