HBSC 7400: Social Network Analysis[*]
Spring 2016
Student Commons Building 2504, Tu 3.30pm – 6.20pm

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Office: North Classroom, 3025C
Office Hours: MT 1:45-3:00pm, or by appointment (http://jimiadams.youcanbook.me)
Course Folder: http://bit.ly/UCD_SNA

Course Description & Aims

> "[A]s usually practiced, using random sampling of individuals, the survey is a sociological
> meatgrinder, tearing the individual from his social context and guaranteeing that nobody in
> the study interacts with anyone else in it…If our aim is to understand people's behavior
> rather than simply to record it, we want to know about primary groups, neighborhoods,
> organizations, social circles, and communities; about interaction, communication, role
> expectations and social control."   (Allen Barton 1968)

This course lays the groundwork of social network analysis (SNA) from a conceptual, mathematical and
computational perspective. SNA differs from other analytic perspectives in requirements for data
collection, storage, and descriptive/statistical analyses. The course will address these by sampling from
the most commonly used classes of analytic concepts, demonstrating for each their implementation in
primary data collection efforts, empirical basis and computational implementation (in R).

We will address these concepts around two organizing principles: (1) the two primary theoretical
frameworks capturing reasons networks "matter"; and (2) how each class of measures can be applied
across different units of analysis: individuals, groups and "whole" networks. While by no means
exhaustive, this course will develop students' beginning toolkit for SNA. SNA is a rapidly advancing
field, and these tools are intended to provide the orienting frameworks that can guide further study of
SNA on your own.

Objectives
By the end of the course, participants will be able to:
- **Understand** the primary theoretical & analytic **frameworks** that underpin SNA;
- **Transform** between the primary strategies for gathering & storing social network **data**;
- **Compute** & **interpret** several primary classes of **measures**, for varying analytic levels;
- **Describe** & **visualize** some of the most common patterns in **empirical** networks;
- **Run** descriptive & statistical **analyses** (in R) to identify these patterns in real data.

Required Books
- Kadushin, Charles. 2012. *Understanding Social Networks: Theories, Concepts, and Findings*.
  Oxford University Press.
- Additional readings are listed on the course calendar and are either (a) readily available online
  (e.g., JSTOR, EBSCO, etc.) or (b) will be posted to Canvas as noted (**C**).

Course Structure & Requirements

This is a seminar that will be approximately equal parts conceptual, empirical, mathematical and
computational. As such, it will be a healthy mix of lecture, discussion and tutorial. To make the most of
this structure, you need should show up to each class fully prepared to participate. The course

[*] This course benefited from syllabi/materials for similar courses taught by Jim Moody (Duke), Ryan Light (Oregon),
David Schaefer (Arizona State), Omar Lizardo (Notre Dame), Ann McCranie and Bernice Pescosolido (Indiana). I
gratefully acknowledge their influence in developing the course.

requirements are composed of in-class participation, a series of homework assignments and a final paper. Additional details for each follow below.

Course Calendar Overview
(Those days marked with an asterisk (*) have a corresponding homework assignment, due the next week.)
19 Jan - 1. Introduction
26 Jan - 2. Theoretical Perspectives, Data Structures & Basics of Visualization *
02 Feb - 3. Collecting Social Network Data
09 Feb - 4. Network Composition *
16 Feb - 5. Small Worlds & Distance *
23 Feb - 6. Social Balance *
01 Mar - 7. Centralities *
08 Mar - 8. Two-Mode Networks *
15 Mar - 9. Cohesion & Clustering *
22 Mar - NO CLASS – Spring Break
29 Mar - 10. Equivalence & Roles *
05 Apr - 11. Network Dynamics
12 Apr - 12. Influence & Diffusion *
19 Apr - 13. Precursors to Statistical Models
26 Apr - 14. Statistical Models I – Exponential Random Graph Models
03 May - 15. Statistical Models II – Stochastic Actor Based Models
10 May - Final Paper Due by 7pm

Requirements
I - Participation:
The seminar structure of this course requires that you contribute to class meetings. Doing so will require keeping up with the assigned readings and homework assignments. As *part of* this, you will be asked at times to introduce the key ideas from one (or more) of the assigned readings for a given class meeting.

II - Homework Assignments (9 total):
A series of homework problem sets are designed to develop familiarity with the concepts introduced in class, and your capacity to use available software to apply analytic techniques to estimate their computation. Problem sets will only be graded for completion, with solutions to be posted to Canvas *after* they are due. Two homework assignments can be dropped/missed with no penalty.

III - Final Paper:
The primary product of this course will be a research paper that applies SNA to a question of your choosing. This can be a new idea or a revision of a previous paper, but any revisions must demonstrate how SNA alters the papers central idea(s). For this paper, you can collaborate with one additional student. You should plan to meet with the instructor to confirm your topic and to devise an appropriate project for your skills/interests/background.

Grading
Final Grade Computation:
In this class, all grades will be recorded as letter grades or equivalents (i.e., A=4, B+=3.3, etc.). Final grades will be computed as a weighted average over each of the required components:
- Participation   (10%)
- Problem Sets   (35%)
- Paper   (55%)

Grading Expectations:
Participation, presentation, and paper grades you earn will reflect how thoroughly your work demonstrates the particular assignment requirements *and* overall course aims, which will correspond to the following sets of expectations:

F   Work that **fails to address** an assignment's **minimum requirements** will earn grades in the F range.

D   Work that **incompletely addresses** an assignment's **minimum requirements** will earn grades in the D range.

C   Work that **addresses only** an assignment's **minimum requirements** will earn grades in the C range.

B   Work that, **in addition to** meeting an assignment's **minimum requirements**, also *occasionally* reflects **engagement** with other material from the course where appropriate, in ways that **meet course objectives** will earn grades in the B range.

A   Work that, **in addition to** meeting an assignment's **minimum requirements**, also *consistently* reflects **engagement** with other material from the course where appropriate & in ways that **exceed course objectives** will earn grades in the A range.

A Note about Grading:
If you haven't figured it out by now – grades in grad school should not matter. If you do well on all of the components described above, you will earn an A in the course. If you do not contribute to in-class discussion, or write a poor proposal, you will not earn an A. I do NOT discuss individual student's grades in class or over email; that should be reserved for office hours.

Course and College Policies

Turning in Assignments, Due Dates & Late Work Policy:
In this course, all assignments are to be submitted via Canvas. Due Dates are as follows:
- Homework assignments are due before class on the days listed in the syllabus (one class period after the material they address was covered in class).
- Final papers are due by 7:20 pm on Tuesday, 10 May.

*Late proposal/paper elements are deducted **10% per day**, and will **NOT** be accepted after 5 days.*

Two notes on reading:
1- Occasionally in this class, the assigned readings will constitute more than you can reasonably complete in the time allotted. As you continue in your career, you will find that this is often the case. Again, this course is not meant to comprehensively cover any of the covered topics, but to be an introduction to each. As such, you should develop a strategy for extracting the key elements of each reading *as it pertains to the aims of this class*. For students enrolled in 496, cover *at least* the required readings marked with an asterisk ([*]); if enrolled in 696, cover *all* required readings.
2- There is no assigned textbook for this class. If you find something more comprehensive helpful, I recommend the following:
   • Scott, John & Peter Carrington. 2011. *The SAGE Handbook of Social Network Analysis*. SAGE.
   • Wasserman, Stanley & Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge.

Writing:
The majority of a practicing researcher's job is spent writing. One of your primary aims in graduate school should therefore be to develop your writing skills. As such, all written work should be edited and *carefully* proofread. If necessary, please make use of University writing services and/or writing style guides. Some examples worth having on your shelf are:
- Becker, Howard S. 1983. Writing for Social Scientists: How to Start and Finish Your Thesis, Book or Article. University of Chicago Press

- Strunk & White. 2000. The Elements of Style. Allyn & Bacon
- Thomas & Turner. 1994. Clear and Simple as the Truth: Writing Classic Prose. Princeton University Press
- Zinsser, William. 1990. On Writing Well: An Informal Guide to Writing Nonfiction. Harper

Course Communication:
- *Course Folder* to facilitate the sharing files for this course's tutorials, home work assignments and solutions, etc. I have created a shared drive space (http://bit.ly/UCD_SNA - note the underscore in that address) where I will post all material related to the course. You can find a copy of the syllabus, additional assigned readings, and all assignments there. I will also post any lecture notes after each class. You should rely on material in this folder as the most up to date information about the course.
- *The Syllabus* has answers to the most common questions pertaining to the course. Be sure check the syllabus first, before asking me about due-dates, assignment requirements, etc.
- *Canvas* will *only* be used in this course for the submission of your homework assignments and final paper.
- *E-mail* should be used for quick communications (things that can be responded to in no more than a few sentences); use office hours for anything requiring more depth. You should only use your UCD email account for communication related to this course; I will not read/reply to emails from your personal accounts (e.g., Yahoo!, Hotmail, etc). Please consider e-mail as subject to the same standards of communication as you would all other forms written material in this course (i.e., you should use complete sentences, proper punctuation, etc.). I will typically respond to email within *48 hours*. I will *NOT*, *under any circumstances* discuss grades over email.
- *Office Hours* are available to add to your experience in this course. Please make use of them. These are meant to supplement required course work and in-class elements. As such, while I am happy to discuss course materials or other aspects of sociology/academia in general with you during this time, they should not be viewed as an opportunity to ask, "What did I miss in class?" (You should find peers in the class with whom you can share notes for that purpose.)

Electronic Devices:
You are welcome to use laptops/tablets in this course **for class purposes only**. Any other uses will lead you to lose this privilege. All other devices (phones, etc.) should be silenced for the duration of class.

Academic Dishonesty
This is a graduate course. As such, standards of academic honesty should be abundantly clear to you by now. Any documented Academic Dishonesty will result in **failure for the course**. Don't risk it. Cite your sources, etc. Be sure you have read and understand the CLAS policy below. If you have questions, ask.

CLAS Academic Dishonesty Policy: Students are required to know, understand, and comply with the CU Denver Academic Dishonesty Policy as detailed in the Catalog and on the CLAS website. A university's reputation is built on a standing tradition of excellence and scholastic integrity. As members of the University of Colorado Denver academic community, faculty and students accept the responsibility to maintain the highest standards of intellectual honesty and ethical conduct. Academic dishonesty consists of plagiarism, cheating, fabrication and falsification, multiple submission of the same work, misuse of academic materials, and complicity in academic dishonesty. If you are not familiar with the definitions of these offenses, go to http://www.ucdenver.edu/academics/colleges/CLAS/faculty-staff/policies/HandlingAcademicDishonesty/Pages/Definition-of-Academic-Dishonesty.aspx .

Disability Services Information:
The University of Colorado Denver is committed to providing reasonable accommodation and access to programs and services to persons with disabilities. Students with disabilities who want academic accommodations must register with Disability Resources and Services (DRS) in Academic Building 1,

#2116, Phone: 303-315-3510, Fax: 303-315-3515. Website: http://www.ucdenver.edu/student-services/resources/disability-resources-services/Pages/disability-resources-services.aspx. I will be happy to provide approved accommodations, once you provide me with a copy of DRS's letter.

Tentative Course Schedule
Please note that this is subject to change; any changes will be announced in class AND posted to Canvas.
NOTE: Readings marked with **[C]** are posted to the Course Folder. All other *Required* readings should be readily available online (given Institutional Access).

19 Jan - Introduction
Required Readings
- Borgatti, Stephen P. 1994. "A Quorum of Graph Theoretic Concepts." *Connections* 17:47-49.
- Kadushin, chapter 1

Assignment
- None

Additional/Background Readings
- Butts CT. "Social Network Analysis: A Methodological Introduction." *Asian Journal of Social Psychology* 2008;11:13-41.
- Christakis, Nicholas A. & James H Fowler. 2009. *Connected: The Surprising Power of Our Social Networks and How they Shape Our Lives*. Little, Brown & Co.
- Freeman, Linton C. 2004. *The Development of Social Network Analysis: A Study in the Sociology of Science*. Vancouver, BC: Empirical Press.
- Hanneman, Robert, and Mark Riddle. 2005. "Introduction to Social Network Methods." Riverside, CA. Available for download from: http://faculty.ucr.edu/~hanneman/nettext/Introduction_to_Social_Network_Methods.pdf.
- Knoke David & Song Yang. 2007. *Social Network Analysis* Volume 2. (Quantitative Applications in the Social Sciences Series #154). Sage.
- Scott, John. 2000. *Social Network Analysis: A Handbook*. Sage.
- Valente, Thomas W. 2010. *Social Networks and Health: Models, Methods and Applications*. Oxford University Press.

26 Jan - Theoretical Perspectives, Data Structures & Basics of Visualization
Required Readings
- Emirbayer, Mustafa. 1997. "Manifesto for a Relational Sociology." *American Journal of Sociology* 103(2): 281-317.
- Borgatti, Stephen P., Ajay Mehra, Daniel J. Brass, and Giuseppe Labianca. 2009. "Network Analysis in the Social Sciences." *Science* 323:892-895.
- Bender-deMoll, Skye & Daniel A. McFarland. 2006. "The Art and Science of Dynamic Network Visualization." *Journal of Social Structure* 7(2).
- Erikson, Emily. 2013. "Formalist and Relationalist Theory in Social Network Analysis." *Sociological Theory* 31(3):219-42.
- Olgnyanova, Katherine. 2015. "Network Visualization with R." POLNET Workshop. Available from: http://bit.ly/1QoWF8v.

Assignment Due
- None

Additional/Background Readings
- Berkowitz, Steven D. 1982. *An Introduction to Structural Analysis: The Network Approach to Social Research*. Toronto: Butterworths.
- Coleman, James S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94:S95-S120.
- Freeman, Linton C. 2000. "Visualizing Social Networks." *Journal of Social Structure* 1(1).
- Freeman, Linton C. 2004. *The Development of Social Network Analysis: A Study in the Sociology of Science*. Vancouver, BC: Empirical Press.

- Freeman, Linton C. 1972. "Segregation in Social Networks." *Sociological Methods and Research* 6:411-30.
- Handcock, Mark S., David R. Hunter, Carter T. Butts, Steven M. Goodreau, and Martina Morris. 2008. "statnet: Software Tools for the Representation, Visualization, Analysis and Simulation of Network Data." *Journal of Statistical Software* 24(1):1-11.
- Krempel, Lothar. 2011. Network Visualization. In: Carrington, Peter and John Scott (ed) *Handbook of Social Network Analysis.* London: Sage.
- Martin, John Levi. 2011. *Social Structures.* Princeton University Press.
- Moody, James, Daniel A. McFarland, and Skye Bender-DeMoll. 2005. "Dynamic network visualization." *American Journal of Sociology* 110(4):1206-41.
- Wellman, Barry. 1988. "Structural Analysis: From method and metaphor to theory and substance." Chapter 2 in Barry Wellman, and S. D. Berkowitz (eds). *Social Structures: A Network Approach.* Cambridge: Cambridge University Press.
- White, Harrison C. 1966 [2007]. "Catnets." Pp. 171-82 in *Contemporary Sociological Theory*, edited by Craig Calhoun, Joseph Gerteis, James Moody, Steven Pfaff, and Indermohan Virk. Blackwell Publishing.
- White, Harrison C. 1992. *Identity and Control: a Structural Theory of Social Action.* Princeton, NJ: Princeton University Press.

02 Feb - Collecting Social Network Data

Required Readings
- **(C)** Marsden, Peter V. 2011. "Survey Methods for Network Data." Chapter 25 in John Scott and Peter J. Carrington (Eds.). *The Sage Handbook of Social Network Analysis*. Sage
- Kadushin, chapter 11
- Hogan, Bernie, Juan Antonio Carrasco, and Barry Wellman. 2007. "Visualizing Personal Networks: Working with Participant-Aided Sociograms." *Field Methods* 19(2):116-44.
- **(C)** Morris, Martina. 2004. "Editor's Introduction" and "Overview of Network Survey Designs." Pp. 1-21 in *Network Epidemiology: A Handbook for Survey Design and Data Collection*. Oxford University Press.
- Brashears, Matthew E. 2013. "Humans use Compression Heuristics to Improve the Recall of Social Networks." *Nature Scientific Reports*, 3: 1513. doi:10.1038/srep01513

Assignment Due
   1   – Visualization

Additional/Background Readings
- adams, jimi, and James Moody. 2007. "To Tell the Truth? Measuring Concordance in Multiply-Reported Network Data." *Social Networks* 29:44-58.
- adams, jimi, James Moody, Stephen Q. Muth, and Martina Morris. 2012. "Quantifying the Benefits of Link-Tracing Designs for Partnership Network Studies." *Field Methods* 24(2):175-93.
- Bearman, Peter and Paolo Parigi. 2004. "Cloning Headless Frogs and Other Important Matters: Conversation Topics and Network Structure." *Social Forces* 83:535-557.
- Breiger, Ronald L. (Ed.). 2005. Special Issue on Ethical Dilemmas in Social Network Research. *Social Networks* 27(2).
- Eagle, Nathan, Alex (Sandy) Pentland, and David Lazer. 2009. "Inferring Friendship Network Structure by Using Mobile Phone Data." *Proceedings of the National Academy of Science* 106(36):15274-78.
- Gile, Krista J., and Mark S. Handcock. 2010. "Respondent Driven Sampling: An Assessment of Current Methodology." *Sociological Methodology* 40:285-327.
- Goel, Sharad, and Matthew Salganik. 2010. "Assessing Respondent-Driven Sampling." *Proceedings of the National Academy of Science* 107(15):6743-47.
- Handcock, Mark S., and Krista Gile. 2010. "Modeling Social Networks with Sampled Data." *Annals of Applied Statistics* 4:5-25.
- Heckathorn, Douglas D. 1997. "Respondent-Driven Sampling: A New Approach to the Study of Hidden Populations." *Social Problems* 44(2):174-99.
- Krackhardt, David. 1987. "Cognitive Social Structures." *Social Networks* 9:109-34.
- Laumann, Edward O., Peter V. Marsden, and David Prensky. 1994. "The Boundary Specification Problem in Network Analysis." in *Research Methods in Social Network Analysis*, edited by Linton C. Freeman, Douglas R. White, and A. Kimball Romney. New Brunswick, NJ: Transaction Publishers.
- Lewis, Kevin, Jason Kaufman, Marco Gonzalez, Andreas Wimmer & Nicholas Christakis. 2008. "Tastes, Ties and Time: A New Social Network Dataset Using Facebook.com." *Social Networks* 30(4):330-42.

- Marin, Alexandra. 2004. "Are respondents more likely to list alters with certain characteristics?: Implications for name generator data." *Social Networks* 26:289-307.
- Marin, Alexandra, and Keith N. Hampton. 2007. "Simplifying the Personal Network Name Generator: Alternatives to Traditional Multiple and Single Name Generators." *Field Methods* 19(2):163-93.
- Matzat, Uwe, and Chris Snijders. 2010. "Does the Online Collection of Ego-Centered Network Data Reduce Data-Quality? An Experimental Comparison." *Social Networks* 32(2):105-111.
- McCarty, Christopher, Peter D. Killworth, and James Rennell. 2007. "Impact of methods for reducing respondent burden on personal network structural measures." *Social Networks* 29:300-315.
- McCarty, Christopher, and Amber Wutich. 2005. "Conceptual and Empirical Arguments for Including or Excluding Ego from Structural Analyses of Personal Networks." *Connections* 26(2):82-88.
- Mikolajczyk RT, Kretzchmar M. Collecting Social Contact Data in the Context of Disease Transmission: Prospective and Retrospective Study Designs. *Social Networks* 2008;30(3):127-135.
- Morris, Martina. 2004. *Network Epidemiology: A Handbook for survey design and Data Collection*. London: Oxford University Press.
- Salganik, Matthew J., and Douglas D. Heckathorn. 2004. "Sampling and Estimation in Hidden Populations using Respondent Driven Sampling." *Sociological Methodology* 34:193-240.

09 Feb - Network Composition

Required Readings
- McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27:415-44.
- DiPrete, Thomas A., Andrew Gelman, Tyler McCormick, Julien Teitler, and T. Zheng. 2011. "Segregation in Social Networks based on Acquaintanceship and Trust." *American Journal of Sociology* 116(4):1234-83.
- Kohler, Hans-Peter, Jere R. Behrman, and Susan C. Watkins. 2001. "The Density of Social Networks and Fertility Decisions: Evidence from South Nyanza District, Kenya." *Demography* 38(1):43-58.
- Feld, Scott L. 1991. "Why Your Friends have More Friends than you do." *American Journal of Sociology* 96:1464-1477.
- Haynie, Dana. 2001. "Delinquent peers Revisited: Does Network Structure Matter?" *American Journal of Sociology* 106:1013-57.

Assignment Due
- None

Additional/Background Readings
- adams, jimi, James Moody & Martina Morris. "Sex, Drugs and Race: How Behaviors Differentially Contribute to STI-Risk Network Structure." *American Journal of Public Health* 103(2): 322-329.
- Amaral, L. A. N., A. Scala, M. Barthelemy, and H. E. Stanley. 2000. "Classes of Small World Networks." *Proceedings of the National Academy of Science* 97(21):11149-52.
- Bailey, Stefanie, and Peter V. Marsden. 1999. "Interpretation and interview context: examining the General Social Survey name generator using cognitive methods." *Social Networks* 21:287-309.
- Barabasi, Albert-Laszlo. 2009. "Scale-Free Networks: A Decade and Beyond." *Science* 325:412-13.
- Fischer, Claude S. 1982. *To Dwell Among Friends: Personal Networks in Town and City*. Chicago: University of Chicago Press.
- Helleringer, Stephane, Hans-Peter Kohler, Linda Kalilani-Phiri, James Mkandawire, and Benjamin Armbruster. 2011. "The Reliability of Sexual Partnership Histories: Implications for the Measurement of Partnership Concurrency During Surveys." *AIDS* 25(4):503-11.
- Kalmijn, Matthijs. 2003. "Shared Friendship Networks and the Life Course: An Analysis of Survey Data on Married and Cohabiting Couples." *Social Networks* 25:231-49.
- Kandel, D. B. 1978. "Homophily, Selection, and Socialization in Adolescent Friendships." *American Journal of Sociology* 84:427-36.
- Marsden, Peter V. 1987. "Core Discussion Networks of Americans." *American Sociological Review* 52:122-31.
- McPherson, Miller, Lynn Smith-Lovin, and Matthew E. Brashears. 2006. "Social Isolation in America: Changes in Core Discussion Networks over Two Decades." *American Sociological Review* 71:353-75. (see discussion in *ASR* - 74(4): 657-9, 670-81)
- Moody, James. 2001. "Race, school integration, and friendship segregation in America." *American Journal of Sociology* 107(3):679-716.

- Moore, Gwen. 1990. "Structural Determinants of Men's and Women's Personal Networks." *American Sociological Review* 55:726-35.
- Morris, Martina, Ann E. Kurth, Deven T. Hamilton, James Moody, and Steve Wakefield. 2009. "Concurrent Partnerships and HIV Prevalence Disparities by Race: Linking Science and Public Health Practice." *American Journal of Public Health* 99:1023-31.
- Wellman, Barry, and S. Wortley. 1990. "Different Strokes from Different Folks: Community Ties and Social Support." *American Journal of Sociology* 96:558-88.
- Zheng, Tian, Matthew J. Salganik, and Andrew Gelman. 2006. "How Many People do You Know in Prison?: Using Overdispersion in Count Data to Estimate Social Structure in Networks." *Journal of the American Statistical Association* 101(474):409-23.

16 Feb - Small Worlds & Distance

Required Readings
- Kadushin, chapter 8
- Granovetter, Mark. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78(6):1360-80.
- **(C)** Burt, Ronald S. 2001. "Structural Holes versus Network Closure as Social Capital." Pp. 31-56 in in N. Lin, K. Cook and R. S. Burt. *Social Capital: Theory and Research.* Sociology and Economics: Controversy and Integration series. New York: Aldine de Gruyter. Accessed from http://faculty.chicagobooth.edu/ronald.burt/research/SHNC.pdf on 27Dec2009.
- Watts, Duncan J. 1999. "Networks, Dynamics, and the Small-World phenomenon." *American Journal of Sociology* 105:493-527.
- Killworth, Peter D., Chrisopher McCarty, H. Russel Bernard, and Mark House. 2006. "The Accuracy of Small World Chains in Social Networks." *Social Networks* 28:85-96.

Assignment Due
2   – Personal Network Composition

Additional/Background Readings
- Adamic, Lada, and Eytan Adar. 2005. "How to search a social network." *Social Networks* 27(3):187-203.
- Aral, Sinan, and Marshall Van Alstyne. 2011. "The Diversity-Bandwidth Tradeoff." *American Journal of Sociology* 117(1):90-171.
- Burt, Ronald S. 1992. *Structural Holes: The social structure of competition*. Cambridge, Massachusetts: Harvard University Press.
- Grannis, Rick. 2010. "Six Degrees of "Who Cares?"." *American Journal of Sociology* 115(4):991-1017.
- Milgram, Stanley. 1967. "The Small World Problem." *Psychology Today* 1:61-67.
- Robins, Garry, Philippa Pattison, and Jodie Woolcock. 2005. "Small and Other Worlds: Global Network Structures from Local Processes." *American Journal of Sociology* 110(4):894-936.
- Rodan, Simon. 2010. "Structural Holes and Managerial Performance: Identifying the Underlying Mechanisms." *Social Networks* 32:168-79.
- Schnettler, Sebastian. 2009. "A Structured Overview of 50 Years of Small-World Research." *Social Networks* 31(3):165-78.
- Stoebenau K, Valente TW. "Using Network Analysis to Understand Community-Based Programs: A Case Study from Highland Madagascar." *International Family Planning Perspectives* 2003;29(4):167-173.
- Uzzi, Brian, and Spiro. 2005. "Collaboration and Creativity: The Small World Problem." *American Journal of Sociology* 111(2):447-504.
- Watts, Duncan J. 2004. "The "New" Science of Networks." *Annual Review of Sociology* 30:243-70.
- Watts, Duncan J., and Steven H. Strogatz. 1998. "Collective Dynamics of 'Small-World' Networks." *Nature* 393:440-42.

23 Feb - Social Balance

Required Readings
- Kadushin, chapter 2
- Chase, Ivan D. 1980. "Social Process and Hierarchy Formation in Small Groups: A Comparative Perspective." *American Sociological Review* 45:905-24.
- Bearman, Peter S., James Moody, and Katherine Stovel. 2004. "Chains of affection: The structure of adolescent romantic and sexual networks." *American Journal of Sociology* 110:44-91.

- Gould, Rodger. 2002. "The Origins of Status Hierarchies: A formal theory and Empirical Test." *American Journal of Sociology* 107:1143-78.
- Faust, Katherine. 2007. "Very Local Structure In Social Networks." *Sociological Methodology* 37(1):209-56.

Assignment Due
3   – Distance & Density

Additional/Background Readings
- Brewer, Devon D. 2000. "Forgetting in the Recall-Based Elicitation of Person and Social Networks." *Social Networks* 22:29-43.
- Davis, James A. 1963. "Structural Balance, Mechanical Solidarity, and Interpersonal Relations." *American Journal of Sociology* 68:444-62.
- Doreian, Patrick, Roman Kapuscinski, David Krackhardt, and Janusz Szczypula. 1996. "A Brief History of Balance Through Time." *Journal of Mathematical Sociology* 21(1-2):113-31.
- Faust, Katherine. 2008. "Triadic configurations in limited choice sociometric networks: Empirical and theoretical results." *Social Networks* 30(4):273-82.
- Heider, Fritz. 1946. "Attitudes and Cognitive Organization." *Journal of Psychology* 21:107-12.
- Holland, Paul W., and Samuel Leinhardt. 1970. "A Method for Detecting Structure in Sociometric data." *American Journal of Sociology* 70:492-513.
- Hummon, Norman P., and Patrick Doreian. 2003. "Some Dynamics of Socail Balance Processes: Bringing Heider Back Into Balance Theory." *Social Networks* 25:17-49.
- Moody, James. 1998. "Matrix methods for calculating the triad census." *Social Networks* 20(4):291-99.
- Verbrugge, Lois M. 1979. "Multiplexity in Adult Friendships." *Social Forces* 57: 1286-1309

01 Mar - Centralities

Required Readings
- Kadushin, chapter 3
- Borgatti, Stephen P., and Martin G. Everett. 2006. "A Graph-theoretic perspective on centrality." *Social Networks* 28:466-84.
- Bell, David C., John S. Atkinson, and Jerry W. Carlson. 1999. "Centrality measures for disease transmission networks." *Social Networks* 21:1-21.
- Friedkin, Noah E. 1991. "Theoretical Foundations for Centrality Measures." *American Journal of Sociology* 96:1478-504.
- Costenbader, Elizabeth, and Thomas W. Valente. 2003. "The Stability of Centrality Measures when Networks are Sampled." *Social Networks* 25:283-307.

Assignment Due
4   – Social Balance

Additional/Background Readings
- Barabasi, Albert-Laszlo, and Reka Albert. 1999. "Emergence of Scaling in Random Networks." *Science* 286:509-12.
- Bolland, John M. 1988. "Sorting out centrality: An analysis of the performance of four centrality models in real and simulated networks." *Social Networks* 10:233-53.
- Bonacich, Phillip. 1987. "Power and Centrality: A Family of Measures." *American Journal of Sociology* 92:1170-82.
- Cornwell, Benjamin. 2005. "A complement-derived centrality index for disconnected graphs." *Connections* 26(2):70-81.
- Faust, Katherine. 1997. "Centrality in Affiliation Networks." *Social Networks* 19:157-91.
- Freeman, Linton C. 1979. "Centrality in social networks: Conceptual Clarification." *Social Networks* 1:215-39.
- Freeman, Linton. C., Stephen P. Borgatti, and Douglas R. White. 1991. "Centrality In Valued Graphs - A Measure Of Betweenness Based On Network Flow." *Social Networks* 13(2):141-54.
- Marsden, Peter V. 2002. "Egocentric and Sociocentric Measures of Network Centrality." *Social Networks* 24:407-22.
- Rossman, Gabriel, Nicole Esparza, and Phillip Bonacich. 2010. "I'd Like to Thank the Academy: Team Spillovers and Network Centrality." *American Sociological Review* 75:31-51.

- Rothenberg, R. B., J. J. Potterat, D. E. Woodhouse, W. W. Darrow, S. Q. Muth, and A. S. Klovdahl. 1995. "Choosing a Centrality Measure: Epidemiologic Correlates in the Colorado Springs Study of Social Networks." *Social Networks* 17:273-97.
- Zemljic, Barbara, and Valentina Hlebec. 2005. "Reliability of Measures of Centrality and Prominence." *Social Networks* 27(1):73-88.

08 Mar - Two-Mode Networks

Required Readings
- Breiger, Ronald L. 1974. "The Duality of Persons and Groups." *Social Forces* 53:181-90.
- Kadushin, chapter 6
- Latapy, Matthieu, Clemence Magnien, and Nathalie Del Vecchio. 2008. "Basic Notions for the Analysis of Large Two-mode Networks." *Social Networks* 30:31-48.
- Klovdahl, A. S., E. A. Graviss, A. Yaganehdoost, M. W. Ross, A. Wanger, G. J. Adams, and J. M. Musser. 2001. "Networks and Tuberculosis: An Undetected Community Outbreak Involving Public Places." *Social Science & Medicine* 52:681-94.
- Borgatti, Stephen P., and Martin G. Everett. 1997. "Network Analysis of 2-Mode Data." *Social Networks* 19:243-269.

Assignment Due
   5   – Centralities

Additional/Background Readings
- Burris, Val. 2005. "Interlocking Directorates and Political Cohesion among Corporate Elites." *American Journal of Sociology* 111(249-283).
- Feld, Scott L. 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86:1015-35.
- Field, Sam, Kenneth A. Frank, Kathryn Schiller, and Catherine Riegle-Crumb. 2006. "Identifying Positions from Affiliation Networks: Preserving the Duality of People and Events." *Social Networks* 28(2):97-123.
- Frank, Kenneth A., Chandra Muller, Kathryn Schiller, Catherine Riegle-Crumb, Ann Strassmann Mueller, Robert Crosnoe, and Jennifer Pearson. 2008. "The Social Dynamics of Mathematics Coursetaking in High School." *American Journal of Sociology* 113(6):1645-96.
- Freeman, L. C., and Douglas R. White. 1993. "Using Galois Lattices To Represent Network Data." *Sociological Methodology* 23(1):127-46.
- Mizruchi, Mark S. 1996. "What Do Interlocks Do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates." *Annual Review of Sociology* 22:271-98.
- Moody, James. 2004. "The structure of a social science collaboration network: Disciplinary cohesion from 1963 to 1999." *American Sociological Review* 69(2):213-38.
- Opshal, Tore. 2013. "Triadic Closure in Two-mode Networks: Redefining the Global and Local Clustering Coefficients." *Social Networks* 35:159-67.
- Pescosolido, Bernice A., and Beth A. Rubin. 2000. "The Web of Group Affiliations Revisited: Social Life, Postmodernism, and Sociology." *American Sociological Review* 65:52-76.

15 Mar - Cohesion & Clustering

Required Readings
- Kadushin, chapter 4
- Moody, James, and Douglas R. White. 2003. "Structural cohesion and embeddedness: A hierarchical concept of social groups." *American Sociological Review* 68(1):103-27.
- Salathe, Marcel, and James H. Jones. 2010. "Dynamics and Control of Diseases in Networks with Community Structure." *PLoS Computational Biology* 6(4):e1000736.
- Freeman, L. C. 1992. "The Sociological Concept of Group - An Empirical-Test Of 2 Models." *American Journal of Sociology* 98(1):152-66.
- Shwed, Uri, and Peter S. Bearman. 2010. "The Temporal Structure of Scientific Consensus Formation." *American Sociological Review* 75(6):817-40.

Assignment Due
   6   – Two-Mode Networks

Additional/Background Readings

- adams, jimi and Ryan Light. 2015. "Scientific Consensus, the Law and Same-Sex Parenting." *Social Science Research* 53: 300-310
- adams, jimi and Ryan Light. 2014. "Mapping Interdisciplinary Fields: Efficiencies, Gaps & Redundancies in HIV/AIDS Research." PLoS ONE 9(12): e115092
- Alba, R. D. 1973. "A Graph-theoretic Definition of a sociometric clique." *Journal of Mathematical Sociology* 3:113-26.
- Borgatti, Stephen P., Martin G. Everett, and Paul R. Shirey. 1990. "LS Sets, Lambda Sets, and Other Cohesive Subsets." *Social Networks* 12:337-57.
- Expert, Paul, Tim S. Evans, Vincent D. Blondel, and Renaud Lambiotte. 2011. "Uncovering space-independent communities in spatial networks." *Proceedings of the National Academy of Sciences* 108(19):7663-68.
- Frank, Kenneth A. 1995. "Identifying Cohesive Subgroups." *Social Networks* 17:27-56.
- Frank, Kenneth A. 1996. "Mapping Interactions within and between cohesive subgroups." *Social Networks* 18:93-119.
- Freeman, Linton C. 1972. "Segregation in Social Networks." *Sociological Methods and Research* 6:411-30.
- Friedkin, Noah E. 1984. "Structural cohesion and equivalence explanations of social homogeneity." *Sociological Methods and Research* 12:235-61.
- Gest, Scott D., James Moody, and Kelly L. Rullison. 2007. "Density or Distinction? The Roles of Data Structure and Group Detection Methods in Describing Adolescent Peer Groups." *Journal of Social Structure* 6(1).
- Moody, James, and Peter J. Mucha. 2013. "Portrait of Political Party Polarization." *Network Science* 1(1):119-21.
- Mucha, Peter J., Thomas Richardson, Kevin Macon, Mason A. Porter, and Jukka-Pekka Onnela. 2010. "Community Structure in Time-Dependent, Multiscale, and Multiplex Networks." *Science* 328(5980):876-78.
- Newman, Mark E. J. 2006. "Modularity and Community Structure in Networks." *Proceedings of the National Academy of Sciences* 103(23):8577-82.
- Palla, Gergely, Albert-Laszlo Barabasi, and Tamas Vicsek. 2007. "Quantifying social group evolution." *Nature* 446(7136):664-67.
- Porter, Mason A., Jukka-Pekka Onnela, and Peter J. Mucha. 2009. "Communities in Networks." *Notices of the AMS* 56(9):1082-97, 164-166.
- Vedres, Balázs, and David Stark. "Structural Folds: Generative Disruption in Overlapping Groups." *American Journal of Sociology* 115(4):1150-90.
- Youm, Yoosik, Mary Mackesy-Amiti, Chyvette Williams, and Lawrence Ouellet. 2009. "Identifying Hidden Sexual Bridging Communities in Chicago." *Journal of Urban Health* 86(0):107-20.
- Zachary W. W. 1977. "An information flow model for conflict and fission in small groups." *Journal of Anthropological Research* 33:452–473.
- Zhao, Yunpeng, Elizaveta Levina, and Ji Zhu. 2011. "Community extraction for social networks." *Proceedings of the National Academy of Sciences* 108(18):7321-26.

22 Mar – Spring Break – NO CLASS

29 Mar - Equivalence & Roles

Required Readings

- White, Harrison C., Scott A. Boorman, and Ronald L. Breiger. 1976. "Social Structure from Multiple Networks I." *American Journal of Sociology* 81:730-80.
- Borgatti, Stephen P., and Martin G. Everett. 1992. "Notions of Position in Social Network Analysis." *Sociological Methodology* 22:1-35.
- Fujimoto K, Valente TW. Social network influences on adolescent substance use: disentangling structural equivalence from cohesion. Social Science and Medicine 2012; 74(12):1952-60.
- Burt, Ronald S. 1987. "Social Contagion and Innovation: Cohesion versus Structural Equivalence." *American Journal of Sociology* 92:1287-335.
- Padgett, John F., and Christopher K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." *American Journal of Sociology* 98(6):1259-319.

Assignment Due
> 7 　– Cohesion & Clustering

Additional/Background Readings
- Alderson, Arthur S. and Jason Beckfield. 2004. "Power and Position in the World City System." *American Journal of Sociology* 109:811-851.
- Batagelj, Vladimir, and Anuška Ferligoj. 1992. "Direct and Indirect Methods for Structural Equivalence." *Social Networks* 14:63-90.
- Boorman, Scott A., and Harrison White. 1976. "Social Structure from Multiple Networks, II: Role Structures." *American Journal of Sociology* 81(6):1384-446.
- Borgatti, Stephen P., and Martin G. Everett. 1989. "The Class of all Regular Equivalences: Algebraic Structure and Computation." *Social Networks* 11:65-88.
- Borgatti, Stephen P. 1999. "Models of Core / periphery structures." *Social Networks* 21:375-95.
- Burt, Ronald S. 1990. "Detecting Role Equivalence." *Social Networks* 12:83-97.
- Doreian, Patrick, Vladimir Batagelj, and Anuška Ferligoj. 2004. "Generalized Blockmodeling of two-mode network data." *Social Networks* 26:29-53.
- Faust, Katherine, and Stanley Wasserman. 1992. "Blockmodels: Interpretation and Evaluation." *Social Networks* 14(1/2):5-61.
- Hsieh, Mo-Han, and Christopher L. Magee. 2008. "An algorithm and metric for network decomposition from similarity matrices: Application to positional analysis." *Social Networks* 30(2):146-58.
- Lorrain, F., and H. C. White. 1971. "Structural Equivalence of Individuals in Social Networks." *Journal of Mathematical Sociology* 1:49-80.
- Mahutga, Matthew C. 2006. "The Persistence of Structural Inequality? A network Analysis of International Trade, 1965-2000." *Social Forces* 84:1863-89.
- Mizruchi, Mark S. 1993. "Cohesion, equivalence and similarity of behavior: a theoretical and empirical assessment." *Social Networks* 15:275-307.
- Moody, James. 2001. "Peer influence groups: identifying dense clusters in large networks." *Social Networks* 23(4):261-83.
- Smith, David A., and Douglas R. White. 1992. "Structure and Dynamics of The Global Economy: Network Analysis of international Trade 1965- 1980." *Social Forces* 70:857-893.
- van Rossem, R. 1996. "The World System Paradigm As General Theory of Development: A Cross-National Test." *American Sociological Review* 61:508-27.

05 Apr - Network Dynamics

Required Readings
- **(C)** Moody, James. 2009. "Network Dynamics." in *The Oxford Handbook of Analytical Sociology*, edited by Peter Hedstrom and Peter S. Bearman. New York: Oxford University Press.
- Kossinets, Gueorgi, and Duncan J. Watts. 2006. "Empirical Analysis of an Evolving Social Network." *Science* 311:88-90.
- Noel, Hans, and Brendan Nyhan. 2011. "The 'Unfriending' Problem: The consequences of homophily in friendship retention for causal estimates of social influence." *Social Networks* 33:211-218.
- Morris, Martina, and Mirjam Kretzchmar. 1997. "Concurrent Partnerships and the Spread of HIV." *AIDS* 11:641-48.
- Powell, Walter W., Douglas R. White, Kenneth W. Koput, and Jason Owen-Smith. 2005. "Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences." *American Journal of Sociology* 110(4):1132-205.

Assignment Due
> 8 　– Role Identification

Additional/Background Readings
- Bignami-Van Assche, Simona. 2005. "Network Stability in Longitudinal Data: A Case Study from Rural Malawi." *Social Networks* 27:231-47.
- Delvenne, J.-C., S. N. Yaliraki, and M. Barahona. 2010. "Stability of graph communities across time scales." *Proceedings of the National Academy of Sciences* 107(29):12755-60.
- Feld, Scott L., J. Jill Suitor, and Jordana Gartner Hoegh. 2007. "Describing Changes in Personal Networks over Time." *Field Methods* 19:218-236.

- Hallinan, Maureen T. 1978. "The process of friendship formation." *Social Networks* 1: 193–210.
- Moody, James. 2002. "The importance of relationship timing for diffusion." *Social Forces* 81(1):25-56.
- Suitor, Jill, and Shirley Keeton. 1997. "Once A Friend, Always A Friend? Effects of Homophily On Women's Support Networks Across A Decade." *Social Networks* 19:51-62
- Wellman, Barry, Renita Yuk-Lin Wong, David Tindall, and Nancy Nazer. 1997. "A Decade of Network Change: Turnover, Persistence and Stability in Personal Communities." *Social Networks* 19:27–50.

12 Apr – Influence & Diffusion
Required Readings
- Kadushin, chapter 9
- Christakis, Nicholas A. and James H. Fowler. 2007. "The Spread of Obesity in a Large Social Network over 32 Years." *New England Journal of Medicine* 357(4):370-379.
- **(C)** Friedkin, Noah E. and Karen S. Cook. 1990. "Peer Group Influence." *Sociological Methods & Research* 19: 122–143
- Aral, Sinan, Lev Muchnik, and Arun Sundararajan. 2009. "Distinguishing Influence-based Contagion from Homophily-driven Diffusion in Dynamic Networks." *Proceedings of the National Academy of Science* 106(51):21544-49.
- Valente, Thomas W. 1996. "Social network thresholds in the diffusion of innovations." *Social Networks* 18(1):69-89.

Assignment Due
- None

Additional/Background Readings
- Centola, Damon. "The Spread of Behavior in an Online Social Network Experiment." *Science* 329(5996):1194-97.
- Centola, Damon, and Michael Macy. 2007. "Complex Contagions and the Weakness of Long Ties." *American Journal of Sociology* 113(3):702-34.
- Chalizi, Cosma R., and Andrew C. Thomas. 2011. "Homophily and Contagion are Generally Confounded in Observational Network Studies." *Sociological Methods & Research* 40:211-39.
- Dezso, Zoltan, and A. L. Barabasi. 2002. "Halting Viruses in Scale-Free Networks." *Physical Review E* 65:055103.
- Fowler, James H., and Nicholas A. Christakis. 2010. "Cooperative Behavior Cascades in Human Social Networks." *Proceedings of the National Academy of Science* 107(12):5334-38.
- Friedkin, Noah E. 1998. *A Structural Theory of Social Influence*. Cambridge: Cambridge University Press.
- Friedkin, Noah E. 1993. "Structural basis of interpersonal influence in groups: A longitudinal case study." *American Sociological Review* 58:861-72.
- Granovetter, Mark. 1978. "Threshold models of collective action." *American Journal of Sociology* 83(6):1420-43.
- Klovdahl, Alden S. 1985. "Social Networks and the spread of infectious diseases: The AIDS example." *Social Science Medicine* 21:1203-16.
- Klovdahl, A. S., J. J. Potterat, D. E. Woodhouse, J. B. Muth, S. Q. Muth, and S. Q. Darrow. 1994. "Social Networks and Infectious Disease: The Colorado Springs Study." *Social Science & Medicine* 38(1):79-88.
- Lee, Nancy Howell. 1969. *The Search for an Abortionist*. Chicago: University of Chicago Press.
- Leenders, Roger Th A. J. 2002. "Modeling Social Influence through Network Autocorrelation: Constructing the Weight Matrix." *Social Networks* 24:21-47.
- Lizardo, Omar. 2006. "How Cultural Tastes Shape Personal Networks." *American Sociological Review* 71:778-807.
- Morris, Martina. 1993. "Epidemiology and Social Networks: Modeling Structured Diffusion." *Sociological Methods & Research* 22: 99-126
- Moody, James, Martina Morris, jimi adams, and Mark Handcock. 2007. "Epidemic Potential in Low Degree Networks." Unpublished manuscript. Duke University.
- Smilde, David. 2005. "A Qualitative Comparative Analysis of Conversion to Venezuelan Evangelicalism: How Networks Matter." *American Journal of Sociology* 111(3):757ñ96.
- Strang, David and Sarah A. Soule. 1998. "Diffusion in Organizations and Social Movements: From Hybrid Corn to Poison Pills." *Annual Review of Sociology* 24: 265-290.

- Wejnert, Barbara. 2005. "Diffusion, Development and Democracy, 1800-1999." *American Sociological Review* 70(1):53-81.

19 Apr - Introduction to Statistical Methods in SNA

Required Readings
- Snijders, Tom A. B. 2011. "Statistical Models for Social Networks." *Annual Review of Sociology* 37:129-51.
- Butts, Carter T. 2007. "Permutation Models for Relational Data." *Sociological Methodology* 37:257-281.
- Doreian, Patrick. 2001. "Causality in Social Network Analysis." *Sociological Methods & Research* 30(1):81-114.

Assignment Due
   9   – Diffusion

Additional/Background Readings
- Doreian, Patrick, Klaus Teuter, and Chi-Hsein Wang. 1984. "Network Autocorrelation models: Some monte Carlo Results." *Sociological Methods and Research* 13:155-200.
- Krackhardt, David. 1988. "Predicting with Networks: A multiple regression approach to analyzing dyadic data." *Social Networks* 10:359-81.
- Krackardt, David. 1987. "QAP partialling as a test of spuriousness." Social Networks 9:171-186.
- Newman, M. E. J., S. J. Strogatz, and D. J. Watts. 2001. "Random Graphs with arbitrary degree distributions and their applications." *Physical Review E* 026118.
- O'Malley, A. James, and Peter V. Marsden. 2008. "The Analysis of Social Networks." *Health Services and Outcomes Research Methodology* 8:222-69.

26 Apr - Statistical Models I - ERGM

Required Readings
- Robins, Garry, Philippa Pattison, Yuval Kalish, and Dean Lusher. 2007. "An Introduction to Exponential Random Graph (p*) Models for Social Networks." *Social Networks* 29(2):173-91.
- Goodreau, Steven M., James A. Kitts, and Martina Morris. 2009. "Birds of a Feather or Friend of a Friend? Using Exponential Random Graph Models to Investigate Adolescent Social Networks." *Demography* 46(1):103-25.
- adams, jimi. 2015. "Glee's McKinley High: Following Middle America's Sexual Taboos." *Network Science* 3(2): 293-295.
- Shalizi, Cosma Rohilla, and Andrew C. Thomas. 2011. "Homophily and Contagion Are Generically Confounded in Observational Social Network Studies." *Sociological Methods & Research* 40(2):211-39.
- Goodreau, Steven M., Mark S. Handcock, David R. Hunter, Carter T. Butts, and Martina Morris. 2008. "A statnet Tutorial." *Journal of Statistical Software* 24(9):1-26.

Assignment Due
- None

Additional/Background Readings
- Anderson, Carolyn J., Stanley Wasserman, and Bradley Crouch. 1999. "A p* primer: Logit models for social networks." *Social Networks* 21:37-66.
- Dijkstra, Jan Kornelis, Scott D. Gest, Siegwart Lindenberg, Rene Veenstra, and Antonius H. N. Cillessen. 2012. "Testing Three Explanations of the Emergence of Weapon Carrying in Peer Context: The Roles of Aggression, Victimization, and the Social Network." *Journal of Adolescent Health* 50(4):371-76.
- Koehly, Laura M., Steven M. Goodreau, and Martina Morris. 2004. "Exponential Family Models for Sampled and Census Network Data." *Sociological Methodology* 34: 241-271
- Lubbers, Miranda J. and Tom A.B. Snijders. 2007. "A Comparison of Various Approaches to the Exponential Random Graph Model: A Reanalysis of 102 Student Networks in School Classes." *Social Networks* 29:489-507
- Lusher, Dean, Johan Koskinen, and Garry Robins (Eds.). 2013. *Exponential Random Graph Models for Social Networks: Theory, Methods, and Applications*: Cambridge University Press.
- Pattison, Philippa, and Stanley Wasserman. 1999. "Logit Models and Logistic Regression for Social Networks: II. Multivariate Relations." *British Journal of Mathematical and Statistical Psychology* 52:169-93.

- Potter, Gail E., and Mark S. Handcock. "A description of within-family resource exchange networks in a Malawian village." *Demographic Research* 23(6):117-52.
- Robins, Garry, Philippa Pattison, and Stanley Wasserman. 1999. "Logit Models and Logistic Regressions for Social Networks: III. Valued Relations." *Psychometrika* 64(3):371-94.
- Robins, Garry, Tom A. B. Snijders, Peng Wang, Mark S. Handcock, and Philippa Pattison. 2007. "Recent Developments in Exponential Random Graph (p*) Models for Social Networks." *Social Networks* 29:192-215.
- Schaefer, David R., Sandra R. Simpkins, Andrea E. Vest, and Chara D. Price. 2011. "The Contribution of Extracurricular Activities to Adolescent Friendships: New Insights through Social Network Analysis." *Developmental Psychology* 47(4):1141-52.
- Snijders, Tom A. B., Philippa E. Pattison, Garry L. Robins, and Mark S. Handcock. 2005. "New Specifications for exponential Random Graph Models." *Sociological Methodology* 35:99-153.
- Wang, Peng, Ken Sharpe, Garry L. Robins, and Philippa E. Pattison. 2009. "Exponential random graph (p*) models for affiliation networks." *Social Networks* 31(1):12-25.
- Wimmer, Andreas, and Kevin Lewis. 2010. "Beyond and Below Racial Homophily: ERG Models of a Friendship Network Documented on Facebook." *American Journal of Sociology* 116(2):583-642.
- Wasserman, Stanley, and Philippa Pattison. 1996. "Logit Modles and Logitic Regressions for Social Networks: I. An Introduction to Markov Graphs and p*." *Psychometrika* 61:401-25.

26 Apr - Statistical Models II- SABM

Required Readings
- Snijders, Tom A. B., Gerhard van de Bunt, and Christian E. G. Steglich. 2010. "Introduction to Stochastic Actor-Based Models for Network Dynamics." *Social Networks* 32:44-60.
- Steglich, Christian, Tom A. B. Snijders, and Michael Pearson. 2010. "Dynamic Networks and Behavior: Separating Selection from Influence." *Sociological Methodology* 40(1):329-93.
- Schaefer, David R., Olga Kornienko, and Andrew M. Fox. 2011. "Misery Does Not Love Company: Network Selection Mechanisms and Depression Homophily." *American Sociological Review* 75(5):764-85.
- de la Haye, Kayla, Garry Robins, Philip Mohr, and Carlene Wilson. 2011. "How Physical Activity Shapes and is Shaped by, Adolescent Friendships." *Social Science and Medicine* 73(5):719-28.

Assignment
- None

Additional/Background Readings
- adams, jimi and David R. Schaefer. "How Initial Prevalence Moderates Network-Based Smoking Change: Estimating Contextual Effects with Stochastic Actor Oriented Models." *Journal of Health & Social Behavior* 57(1).
- Pearson, Michael, Christian Steglich, and Tom Snijders. 2006. "Homophily and Assilimation Among Sport-Active Adolescent Substance Users." *Connections* 27(1):51-68.
- Schaefer, David R., Steven A. Haas, and Nicholas J. Bishop. 2012. "A Dynamic Model of US Adolescents' Smoking and Friendship Networks." *American Journal of Public Health* 102(6):e12-e18.
- Schaefer, David R., John M. Light, Richard A. Fabes, Laura D. Hanish, and Carol L. Martin. 2010. "Fundamental Principles of Network Formation Among Preschool Children." *Social Networks* 32:61-71.
- Snijders, Tom A. B. 1996. "Stochastic Actor-Oriented Models for Network Change." *Journal of Mathematical Sociology* 21(1-2):149-72.
- Snijders, Tom A. B. 2001. "The Statistical Evaluation of Social Network Dynamics." *Sociological Methodology* 31:361-95.

10 May Final Paper Due by 7pm

Spring 2016 CLAS Academic Policies

The following policies, procedures, and deadlines pertain to all students taking classes in the College of Liberal Arts and Sciences (CLAS). They are aligned with the Official University Academic Calendar:

http://www.ucdenver.edu/student-services/resources/Registrar-dev/CourseListings/Pages/AcademicCalendar.aspx

- **Schedule verification**: It is each student's responsibility to verify that their official registration and schedule of classes is correct in their Passport ID portal before classes begin and by the university census date. Failure to verify schedule accuracy is not sufficient reason to justify late adds or drops.   Access to a course through Canvas is not evidence of official enrollment.
- **E-mail**: Students must activate and regularly check their official CU Denver e-mail account for university related messages.
- **Administrative Drops:** Students may be administratively dropped from a class if they never attended or stopped attending, if the course syllabus indicates that the instructor will do this. Students may be administratively dropped if they do not meet the requisites for the course as detailed in course descriptions.
- **Late adds and late withdrawals** require a written petition, verifiable documentation, and dean's approval. CLAS undergraduate students should visit the CLAS Advising Office (NC1030) and graduate students should visit the Graduate School (12th floor LSC) to learn more about the petition process and what they need to do to qualify for dean's approval.
- **Waitlists:** The Office of the Registrar notifies students at their CU Denver e-mail account if they are added to a class from a waitlist. Students are <u>not</u> automatically dropped from a class if they never attended, stopped attending, or do not make tuition payments.   After waitlists are purged, students must follow late add procedures to be enrolled in a course. Students will have access to Canvas when they are on a waitlist, but this does not mean that a student is enrolled or guaranteed a seat in the course.   Students must obtain instructor permission to override a waitlist and this is only possible when there is physical space available in a classroom, according to fire code.

Important Dates and Deadlines

All dates and deadlines are in Mountain Time (MT).

- **January 19, 2016:** First day of classes.
- **January 24, 2016:** Last day to add or waitlist a class using the Passport ID portal.
- **January 24, 2016**: Last day to drop a class without a $100 drop charge--this includes section changes.
- **January 25, 2016:** All waitlists are purged. Students should check their schedules in their Passport ID portal to confirm in which classes you are officially enrolled.
- **January 26-Feburary 3, 2016, 5 PM:** To add a course students must obtain instructor permission using the *Instructor Permission to Enroll Form* and bring it to the CLAS Advising Office (NC 1030) or have their instructor e-mail it to CLAS_Advising@ucdenver.edu .
- **February 3, 2016: Census date.**
  - o **2/3/16, 5 PM:** Last day to add full term classes with instructor approval. Adding a class after this date (late add) requires a written petition, verifiable documentation, and dean's approval. After this date, students will be charged the full tuition amount for additional classes added – College Opportunity Fund hours will not be deducted from eligible student's lifetime hours.
  - o **2/3/16, 5 PM:** Last day to drop full term classes with a financial adjustment on the Passport ID portal. After this date, withdrawing from classes requires instructor signature approval and will appear on student's transcript with a grade of 'W'. After this date, a complete withdrawal (dropping all classes) from the term will require the signature of the dean and no tuition adjustment will be made. Students should consult appropriate service offices (e.g. international status, Financial Aid (loans, grants, and/or scholarships) or Veteran's Student Services) before withdrawing from course(s) to determine any impact for continued enrollment and funding.
  - o **2/3/16, 5 PM:** Last day to apply for Spring 2016 graduation. Undergraduates must make an appointment and see their academic advisor before this date to apply. Graduate students must complete the Intent to Graduate and Candidate for Degree forms.
  - o **2/3/16, 5 PM:** Last day to request No Credit or Pass/Fail grade for a class using a schedule adjustment form.
  - o **2/3/16, 5 PM:** Last day to petition for a reduction in Ph.D. dissertation hours.
- **February 4-April 4, 2016, 5 PM:** To withdraw from a course**,** students must obtain instructor permission using the *Schedule Adjustment Form* and must bring the signed form to the Office of the Registrar. To add a course, students must petition through College/School undergraduate advising offices or the Graduate School, as appropriate.
- **March 21-27, 2016**: Spring break- no classes, campus open.
- **April 5, 2016:** The Office of the Registrar now requires both the instructor's signature and a CLAS advisor's/dean's signature on a Schedule Adjustment Form to withdraw from a class. Students should consult their home college advising office for details.
- **April 18, 5 PM:** Deadline for undergraduate CLAS students to withdraw from a course without filing a late withdrawal petition. Contact CLAS Advising (NC 1030 – 303-556-2555).
- **May 14, 2016:** End of semester.
- **June 24, 2016:** Final grades available on the Passport ID portal and on transcripts (tentative).

Please contact an academic advisor if you have questions or concerns.