WORKSHOP SYLLABUS

POLI 279: Special Topics in Methodology: Social Networks

Spring 2013

Wednesday 12:00pm – 2:50pm, Social Sciences Building 104

Prof: James Fowler, SSB 392

jhfowler@ucsd.edu

Office Hours: by appointment

Workshop Description

This workshop is designed to give students an opportunity to publish a paper using network methodology. The course provides a brief introduction to social networks concepts and then focuses on the projects students are working on. By the end of the course, each student team will have produced a core set of results that will form the basis of an article to be submitted for publication.

The format of this workshop is social. Science is a *social* activity, so there will be a very large emphasis on working with, soliciting feedback from, and providing feedback to your peers. *All papers must be coauthored.*

Main Text

From a Physicist's point of view:

- Newman, Mark. *Networks: an introduction*. Oxford University Press, Inc., 2010.

Please try to at least skim the sections assigned before doing the readings for each week.

Other Texts (All Optional, but Very Helpful)

From a Sociologist's point of view:

- Wasserman, Stanley, and Katherine Faust. *Social network analysis: Methods and applications*. Cambridge university press, 1994.

From a Computer Scientist's point of view:

- Easley, David, and Jon Kleinberg. *Networks, crowds, and markets*. Cambridge University Press, 2010.

From an Economist's point of view:

- Jackson, Matthew O. *Social and economic networks*. Princeton University Press, 2010.

Format of the Workshop

Each week we will read one or two studies that illustrate network concepts. I plan to walk through the methods I used in these studies and in some cases I will provide R code and data so you can see exactly how things were implemented. I have provided links to each paper – please also read the supplementary material for each paper carefully since that is where description of methods takes place.

Starting in Week 2, groups will be assigned to present papers related to their topics and lead a discussion (see requirements).

If there is time left over at the end of class, we'll do a lab session where I will circulate and help you with analysis of your data (please also come see me in office hours!).

In the last two weeks, groups will present the first drafts of the methods and results sections of the papers you are writing.

Data

The most important thing you must do, and quickly, is to decide on a data source for your project. This will help you figure out who to work with. You are more than welcome to use your own data, but here are some existing sources you may also decide to use:

Judicial Citations – http://jhfowler.ucsd.edu/judicial.htm

Cosponsorships– http://jhfowler.ucsd.edu/cosponsorship.htm

Roll Call Affiliations - http://www.voteview.com/

Legislative Committee Assignments - http://web.mit.edu/17.251/www/data_page.html

Campaign Contributions - http://www.fec.gov/finance/disclosure/ftp_download.shtml

IR Data / Correlates of War - http://www.correlatesofwar.org/

Add Health - http://www.cpc.unc.edu/addhealth (You must get permission from Add Health before you use this data – tell me ASAP if you intend to use it)

Other possibilities include Twitter data, academic citations, placements in political science, and students on Facebook (ask me if you are interested in these)

Tools
The next important thing is to get your data into a package for analysis and visualization.

For analysis I use R: http://cran.r-project.org/
Here's a nice tutorial on the igraph package in R: http://cneurocvs.rmki.kfki.hu/igraph/NIPS08.html

For visualization I use Pajek: http://pajek.imfm.si/doku.php which exports to beautiful 3-D .svg images that can be manipulated in Inkscape: http://www.inkscape.org/
For network movies I use SoNIA: http://www.stanford.edu/group/sonia/
I am also starting to use Cytoscape: http://www.cytoscape.org/
And Gephi is also nice: http://gephi.org/

A nice R package that implements exponential random graph models (ERGM) is http://statnet.org with a tutorial here: http://www.nips2008.statnet.org/

If you have dynamic observational data on a small network (~100 nodes) then SIENA is the state-of-the-art for distinguishing selection effects from influence effects: http://stat.gamma.rug.nl/siena.html and a nice tutorial is here: http://www.gmw.rug.nl/~steglich/workshops/NIPS2008.html

For smaller networks you might also try UCINET http://www.analytictech.com/ucinet/ucinet.htm or VISONE: http://visone.info/

Websites with Good Sources of References
>   Lada Adamic - http://www.ladamic.com/
>
>   Albert-László Barabási - http://www.barabasilab.com/
>
>   Mark Handcock - http://www.stat.washington.edu/handcock/
>
>   Matthew Jackson - http://www.stanford.edu/~jacksonm/
>
>   Jon Kleinberg - http://www.cs.cornell.edu/home/kleinber/
>
>   David Lazer - http://www.davidlazer.com/
>
>   Jure Leskovec - http://snap.stanford.edu/
>
>   Mark Newman - http://www-personal.umich.edu/~mejn/

Networks in Political Science Conferences
>   http://www.hks.harvard.edu/netgov/html/colloquia_NIPS.htm
>
>   http://www.hks.harvard.edu/netgov/html/colloquia_HPNC2009.htm

http://sitemaker.umich.edu/fordschool-pnc/home

http://socsci.colorado.edu/~stwo0664/workshops.html

Listservs

SOCNET - http://www.insna.org/pubs/socnet.html

PN-L - PN-L@listserv.siu.edu

Requirements

Your grade for this course will depend on class participation and your final paper.

1. **First Group Presentation**.   Your research group will be required to present your topic to the class. You should assign 3 readings for your topic (distribute to class listserv), including at least one "classic" paper that has not yet been covered in the class, one related article from *Nature*/*Science* /*PNAS*, and the published paper that comes closest to the one you intend to write. You will also be required to demonstrate the use of a tool for network analysis and/or visualization (the demonstration must not significantly overlap with prior presentations).

2. **Class Participation**. Ask questions! Ask questions of me and ask questions of your fellow classmates. Did I mention you should ask questions?

3. **Final Group Presentation.** On the last day, each group will get about 10-15 minutes to present their results and answer questions.

4. **Final Group Paper.** This paper should describe the data, methods, and results of your network analysis. It will help if you also provide at least 1-2 pages of context (briefly sketch the topic, main literature, importance of your question) but my main interest is in your analysis and results.

5. **Peer evaluation**. At the end of the workshop you will be asked to evaluate the contributions of fellow group members and the feedback you received from other classmates, and you will be graded based on their evaluation of your feedback. These evaluations are private and will only be seen by me.

Policies

I will not grant permission to add requests (PTAs).

I will only give incompletes for compelling, unanticipated, and nonacademic reasons. Late assignments will be marked down the equivalent of a full letter grade for each 24 hour period *in which* they are late (one hour late = -1 letter, 25 hours late = -2 letters, and so on). I will only make an exception to this policy if 1) you contact me in writing a week in advance to discuss a conflict, or 2) you provide documentation of a severe illness or family emergency that prevented you from completing the assignment on time.

I reserve the right to check a digital form of any of your written work with software designed to check for plagiarism. I will prosecute all cases of detected plagiarism to the fullest extent of University policy (see UCSD's Academic Integrity policy: http://www-senate.ucsd.edu/manual/appendices/app2.htm).

Tentative Schedule

Apr 3　　　　Introduction: Meet, greet, and brainstorm.

　　　　　　Data introduction

　　　　　　Tools introduction

　　　　　　Citation Networks
　　　　　　　　　http://jhfowler.ucsd.edu/network_analysis_and_the_law.pdf

　　　　　　　　　Newman Text:
　　　　　　　　　4.2 Citation networks
　　　　　　　　　6.1 Networks and their representation
　　　　　　　　　6.2 The adjacency matrix
　　　　　　　　　6.3 Weighted networks
　　　　　　　　　6.4 Directed networks
　　　　　　　　　6.6 Bipartite networks
　　　　　　　　　6.9 Degree
　　　　　　　　　6.10 Paths
　　　　　　　　　7.1 Degree centrality
　　　　　　　　　7.2 Eigenvector centrality
　　　　　　　　　7.4 PageRank
　　　　　　　　　7.5 Hubs and authorities
　　　　　　　　　7.6 Closeness centrality
　　　　　　　　　7.7 Betweenness centrality
　　　　　　　　　6.11, 8.1 Components
　　　　　　　　　8.3 Degree distributions
　　　　　　　　　8.4 Power laws and scale-free networks
　　　　　　　　　8.5 Distributions of other centrality measures

Apr 10　　　　Cosponsorship Networks
　　　　　　　　　http://jhfowler.ucsd.edu/best_connected_congressperson.pdf

　　　　　　　　　Newman Text:
　　　　　　　　　3.5 Affiliation networks

　　　　　　Network Communities
　　　　　　　　　http://jhfowler.ucsd.edu/community_structure.pdf

　　　　　　　　　Newman Text:
　　　　　　　　　11.2, 11.6, 11.7 Community detection

Apr 17　　　　Social Contagion Theory
　　　　　　　　　http://jhfowler.ucsd.edu/spread_of_obesity.pdf
　　　　　　　　　http://jhfowler.ucsd.edu/social_contagion_theory.pdf

　　　　　　　　　Newman Text:
　　　　　　　　　3.1 The empirical study of social networks
　　　　　　　　　3.2 Interviews and questionnaires
　　　　　　　　　3.3 Direct observation
　　　　　　　　　3.4 Data from archival or third-party records
　　　　　　　　　7.13, 8.7 Homophily and assortative mixing

No class Apr 24 – Use class time to meet with your project groups

May 1   Small Experiments
         http://jhfowler.ucsd.edu/cooperative_behavior_cascades.pdf

     Big Experiments
         http://jhfowler.ucsd.edu/massive_turnout.pdf

May 8   Network Models
         http://jhfowler.ucsd.edu/turnout_in_a_small_world.pdf
         http://jhfowler.ucsd.edu/genes_and_social_networks.pdf

     Newman Text:

     12.1, 12.8 Random graphs

     15.1 The small-world model

     14.1, 14.2 Preferential attachment

     3.6 The small-world experiment

     3.7 Snowball sampling, contact tracing, and random walks

     8.2, 10.4 Shortest paths and the small-world effect

     ERGMs/Dyadic Independence Models
         http://jhfowler.ucsd.edu/hunter_gatherer_social_networks.pdf

     Newman Text:

     15.2 Exponential random graphs

     7.9, 8.6 Transitivity / Clustering Coefficient

     7.10 Reciprocity

May 15   Networks as Sensors
         http://jhfowler.ucsd.edu/social_network_sensors.pdf

     17.1, 17.2, 17.3, 17.4 Models of the spread of disease

     7.8 k-Core centrality

     Network Visualization

No class May 22

May 29   Group presentations

June 5   Group presentations

June 12   (No class) *email me a copy of your final results by Noon.*

June 17   (No class) *Deadline by which I will email you my thoughts.*

July-Sep   Finish up full draft of paper and solicit feedback

Oct-Dec   Submit!