

WORKSHOP SYLLABUS
POLI 279: Special Topics in Methodology: Social Networks
Spring 2014
Tuesday 9:00am – 11:50am, Social Sciences Building 104
Prof: James Fowler, SSB 392
fowler@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.

From another Physicist's point of view:

- Barabasi, Laszlo. *Network Science*. <http://barabasilab.neu.edu/networksciencebook>

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://fowler.ucsd.edu/judicial.htm>

Cosponsorships – <http://fowler.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 (but old) tutorial on the igraph package in R:

<http://cneurocv.s.rmk.kfki.hu/igraph/NIPS08.html>

For more recent implementations look here: <http://www.r-bloggers.com/?s=igraph>

For network movies I use SoNIA: <http://www.stanford.edu/group/sonia/> which has recently been implemented in R.

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
<https://web.duke.edu/pn/index.html>
<http://sitemaker.umich.edu/fordschool-pnc/home>
<http://socsci.colorado.edu/~stwo0664/workshops.html>
<https://polnet2013.indiana.edu/>

Listservs

SOCNET - <http://www.insna.org/pubs/socnet.html>
PN-L - PN-L@listserv.siu.edu

Requirements

- 1. First Group Presentation.** Your research group will be required to present your topic to the class. You should assign 2 readings for your topic (distribute to class listserv), including a “classic” paper (preferably 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 two class days, each group will 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.

Tentative Schedule

- Apr 8 Introduction: Meet, greet, and brainstorm.
- Data introduction
- Tools introduction
- Citation Networks
http://fowler.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 15 Cosponsorship Networks
http://fowler.ucsd.edu/best_connected_congressperson.pdf
- Newman Text:
 3.5 Affiliation networks
- Network Communities
http://fowler.ucsd.edu/community_structure.pdf
- Newman Text:
 11.2, 11.6, 11.7 Community detection
- Apr 22 Social Contagion Theory
http://fowler.ucsd.edu/spread_of_obesity.pdf
http://fowler.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

Apr 29

Small Experiments

http://fowler.ucsd.edu/cooperative_behavior_cascades.pdf

Big Experiments

http://fowler.ucsd.edu/massive_turnout.pdf

Big Natural Experiments

http://detecting_emotional_contagion_in_massive_social_networks.pdf

May 6

Network Models

http://fowler.ucsd.edu/turnout_in_a_small_world.pdf

http://fowler.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://fowler.ucsd.edu/hunter_gatherer_social_networks.pdf

Newman Text:

15.2 Exponential random graphs

7.9, 8.6 Transitivity / Clustering Coefficient

7.10 Reciprocity

No class May 13 – Use class time to meet with your project groups

May 20

Networks as Sensors

http://fowler.ucsd.edu/social_network_sensors.pdf

<http://arxiv.org/abs/1211.6512>

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

7.8 k -Core centrality

May 27

Group presentations

June 3

Group presentations

June 10

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

June 13

(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!