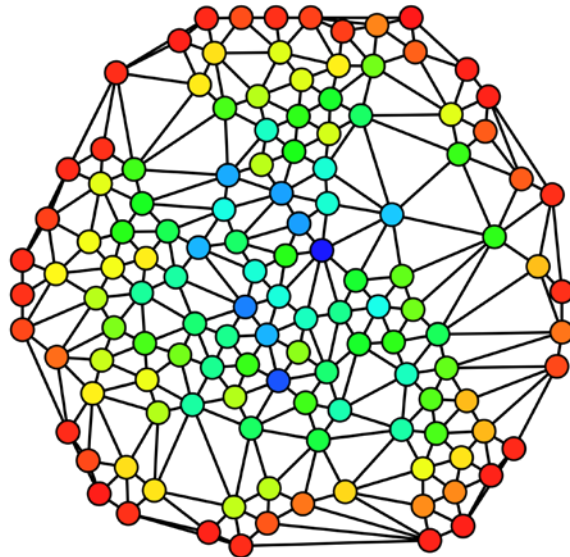


ANNENBERG SCHOOL OF COMMUNICATION



COMM 645: Seminar in Communication Networks

Fall 2015, Mondays, 2:00 to 4:50PM, ASC 328

Professor Peter Monge

Office Hours: Mondays, 1:00 – 2:00PM and by appointment

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Overview

Over the past few decades networks have come to play an increasingly important role in our understanding of a wide array of human phenomena. In communication and the organizational sciences, extraordinary developments in computing and telecommunications have engendered new organizational forms based on fluid, dynamic networks. These new network forms of self-organizing are constantly evolving in dynamic communities as new network links are created, and dysfunctional ones dissolved. While many writers assert that the capability to nurture networks will differentiate 21st century organizations from their predecessors, little is known about how this important new organizational form emerges and evolves.

This seminar is intended to review theoretical, conceptual, and analytic issues associated with network perspectives on communicating and organizing. The course will review scholarship on the science of networks in communication across a wide array of disciplines in order to take an in-depth look at theories, methods, and tools to examine the structure and dynamics of networks.

As with most graduate seminars, the majority of class time will be spent discussing the assigned readings. A series of laboratory exercises will provide experience with computer-based network analysis, modeling and visualization. Students will write a term paper advancing and empirically testing some theoretical, methodological, or substantive aspect of communication networks.

Assigned Texts for the Course:

Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside (published in digital form at <http://faculty.ucr.edu/~hanneman>)

Monge, P. R., & Contractor, N. S. (2003). *Theories of communication networks*. New York: Oxford University Press.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York: Cambridge University Press.

Additional assigned readings will be available on the course web site.

Software tools that will be introduced in the course

Gephi: Bastian, M. (2012) An open graph visualization platform. The Gephi Consortium. <http://gephi.org>, <http://consortium.gephi.org>

iGraph: Csardi, G. & Nepusz, T. (2006). The igraph software package for complex network research, InterJournal, Complex Systems 1695. <http://igraph.org>

NodeXL: Smith, M., Milic-Frayling, N., Shneiderman, B., Capone, T., Mendes Rodrigues, E., Leskovec, J., Dunne, C. (2012) Network Overview, Discovery and Exploration Add-In for Microsoft Excel. <http://nodexl.codeplex.com>

R and RStudio. R Core Team (2015). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <http://www.R-project.org/>.

Statnet: Handcock, M. S., Hunter, D. R., Butts, C. T., Goodreau, S. M., and Morris, M. (2012) Statnet: *An R package for the Statistical Modeling of Social Networks*. Funding support from NIH grants R01DA012831 and R01HD041877. <http://www.csde.washington.edu/statnet>.

Other software available:

Netlogo: Wilensky, U. (2012). NetLogo 5. Center for Connected Learning and Computer-Based Modeling. Northwestern University, Evanston, IL. <http://ccl.northwestern.edu/netlogo>

Pajek: Vladimir Batagelj & Andrej Mrvar (2012): Pajek – Analysis and Visualization of Large Networks. <http://pajek.imfm.si/doku.php>

SIENA: Snijders, T.A.B., Steglich, C. E. G., Schweinberger, M. & Huisman, M. (2012). SIENA: *Simulation Investigation for Empirical Network Analysis*. University of Groningen: ICS / Department of Sociology; University of Oxford: Department of Statistics, <http://www.stats.ox.ac.uk/~snijders/siena>

UCINET: Borgatti, S., Everett, M., & Freeman, L. (2012) UCINET 6.415 for Windows software for social network analysis. Harvard, MA: Analytic Technologies. <http://www.analytictech.com>, <http://sites.google.com/site/ucinetsoftware>

Expectations & Evaluation

There are two requirements for the course: ten network labs and one term paper. The network labs will require you to conduct computational analyses on network data. Equal emphasis will be given to conducting the analysis and interpreting and reporting the results. The lab assignments are due by class time of the week after they are assigned. Labs submitted after that date will receive a maximum of half credit. All labs must be completed correctly in order to receive a grade for the class. You are free to revise these reports as often as you wish before November 30.

The term paper should develop or elaborate a theory, method or application of your choice, explicitly incorporating a network perspective. It should review the relevant theory, research literature and include a research design that tests network hypotheses or makes novel methodological or computational contributions. Original data are preferred, but secondary data are acceptable. Papers need to be prepared according to the guidelines specified in the *Publication Manual of the American Psychological Association* (6th ed.). You can also prepare your work according to the guidelines for a specific journal of your choosing, though you should work out of the APA guidelines first, and then adapt your paper after you have met all APA Guidelines. You are free to use this assignment as an opportunity to develop a working paper, dissertation proposal, or conference paper or to develop ideas you have worked on in other courses. If the latter, be sure to discuss with us the overlap with previous work and the anticipated extension. The term paper is due on Monday, December 7th. Your final grade will be calculated as follows:

Network Labs (10):	40% (4% each)
Term Paper:	60%
Total	100%

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards*<https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Course Outline

Date Activity

Aug. 24 **Introduction to the Communication Networks Class**

Review of syllabus
Network analysis demo

Aug. 31 **Network Theory, Concepts & Measures I (Nodes, Relations, Network Articulation & Roles, One & Two Mode Networks, Density, Centrality, Issues in network measurement)**

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks* (TCN). New York: Oxford University Press. Chapter 1

Monge, P.R., & Contractor, N. (1988). Communication networks: Measurement techniques. In C.H. Tardy (Ed.), *A handbook for the study of human communication* (pp. 107-138). Norwood, NJ: Ablex.

Krebs, V. E. (2002). Mapping networks of terrorists cells. *Connections*, 24(3), 43-52.

Optional reading:

Campbell, K. E. & Lee, B. A. (1991). "Name generators in surveys of personal networks." *Social Networks*, 13: 203-221.

Valente, T. W. (2010). *Social Networks and Health: Models, Methods, and Applications*. New York, NY: Oxford University Press. Ch. 3: Methods (Data Collection Techniques, Data Management, Data Characteristics, Network Variables)

Lab 1: Introduction to Network Data and Demo Replication (Due Sept. 14)

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York: Cambridge University Press. Cps. 1 & 2.

Hanneman, R A. & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside. Chapters 1-6. Available online at:
<http://faculty.ucr.edu/~hanneman/nettext/index.html>

Optional reading:

Easley, D., & Kleinberg, J. (2010). Graphs. In D. Easley & J. Kleinberg, *Networks, Crowds, and Markets*. Cp. 2.

Sept. 7 Labor Day Holiday, no class

Sept. 14 Network Concepts & Measures II (Density, connectivity, distance, reciprocity, transitivity, clustering, centralization)

Hanneman, R. A. & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside. Chapters 7-10. Available online at:
<http://faculty.ucr.edu/~hanneman/nettext/index.html>

Wasserman, S., & Faust, K. (1994) *Social network analysis: Methods and applications*. New York: Cambridge University Press. Cp. 3, Notation for Social Network Data and Cp. 4: Graphs and Matrices

Lee, S., Monge, P. R., Bar, F., Matei, S. (2007). The emergence of clusters in global telecommunications networks. *Journal of Communication*. 57, 415-434.

Adamic, L. A. & Glance, N. (2005). The Political Blogosphere and the 2004 U.S. Election: Divided They Blog, LinkKDD-2005, Chicago, IL, Aug 21, 2005.

Optional reading:

Borgatti, S.P. & Foster, P. (2003). "The network paradigm in organizational research: A review and typology." *Journal of Management*. 29(6), 991-1013.

Faust, K. (1997). "Centrality in Affiliation Networks." *Social Networks*, 19: 157-191.

Powell, W. (1990). "Neither Market Nor Hierarchy: Network Forms of Organization." *Research in Organizational Behavior*, 12: 295-336.

Lab 2: Introduction to R including input, processing, simple operations and matrix manipulations (Due Sept. 21)

Vance, A (2009) Data Analysts Captivated By R's Power, The New York Times, <http://www.nytimes.com/2009/01/07/technology/business-computing/07program.html>

Sept. 21 Multitheoretical MultiLevel (MTML)

Monge & Contractor (2003), Cp. 2.

Contractor, N., Wasserman, S., & Faust, K. (2006). Testing multi-theoretical multilevel hypotheses about organizational networks: An analytic framework and empirical example. *Academy of Management Review*, 31, 681-703.

Lee, S. & Monge, P. (2011). The coevolution of multiplex networks in organizational communities. *Journal of Communication*, 61, 758-779.

Ognyanova, K. & Monge, P. (2013) A multitheoretical, multilevel, multidimensional network model of the media system: Production, content, and audiences. In E.L. Cohen (Ed.), *Communication Yearbook 37* (pp 67-93). New York, NY: Routledge.

Keegan, B., Gergle, D., & Contractor, N. (2012, February). Do editors or articles drive collaboration?: multilevel statistical network analysis of wikipedia coauthorship. In *Proceedings of the ACM 2012 conference on computer supported cooperative work* (pp. 427-436). ACM.
<http://129.105.146.12/pubs/CSCW2012-KeeganEtal-EditorsOrArticles.pdf>

Lab 3: Computing Subgroups and Structural Equivalence (Due Sept. 28).

Hanneman, R. A. & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside. Chapters 11-16. Available online at:
<http://faculty.ucr.edu/~hanneman/nettext/index.html>

Wasserman S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York: Cambridge University Press. Cps. 7-9

Sept. 28 Theories of Self-Interest and Collective Action (Social Capital, Transaction Cost Economics, and Public Goods)

Monge and Contractor (2003), Cp. 5.

Burt, R. S. (2005) The Social Capital of Structural Holes. Cp. 1 in *Brokerage and Closure: An Introduction to Social Capital*, pp. 10-57.

Marwell, G., P. E. Oliver, et al. (1988). Social Networks and Collective Action: A Theory of the Critical Mass. III. *The American Journal of Sociology* 94(3), 502-534.

Shen, C., Monge, P., & Williams, D. (2012). Virtual brokerage and closure: Network structure and social capital in a massively multiplayer online game. *Communication Research*, 39(4), 1-21.

Lab 4: Computing Centrality Measures (Due Oct. 5)

Freeman, L. C. (1979). Centrality in social networks conceptual clarification. *Social Networks*, 1(3), 215-239.

Optional reading:

Paradis, E. (2005). *R for Beginners*.

Oct. 5 Evolutionary and Ecological Theories

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks*. New York: Oxford University Press. Chapter 9.

Powell, W. W., D. R. White, et al. (2005). "Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences." *American Journal of Sociology* 110(4): 1132-1206.

Palazzolo, E. T., Serb, D., She, Y., Su, C., & Contractor, N. S. (2006). Co-evolution of communication and knowledge networks as Transactive Memory systems: Using computational models for theoretical integration and extensions. *Communication Theory*, 16, 223-250.

Monge, P.R., Heise, B.R., & Margolin, D. (2008). Communication network evolution in organizational communities. *Communication Theory*, 18, 449-477.

[Bryant, J. A., & Monge, P. R. \(2008\). The evolution of the children's television community, 1953-2003. *International Journal of Communication*, 2, 33.](#)

Research Paper topic proposal due.

Lab 5: Manipulating and Extracting Networks in R (Due Oct. 12).

Social Networks In R. <http://www.shizukalab.com/toolkits/sna>

An Introduction to Social Network Analysis with Statnet
<https://statnet.org/trac/wiki/Sunbelt2014>

Skim through the package manuals for SNA and iGraph:

Butts, C. T. (2012) *'SNA' Manual*

Csardi, G. (2012) *Package 'igraph'*

Oct. 12 Contagion, Semantic and Cognitive Theories (Including Transactive Memory)

Adamic, L. (2015, February). The Diffusion of Support in an Online Social Movement: Evidence from the Adoption of Equal-Sign Profile Pictures. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (pp. 1741-1750). ACM.

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks*. New York: Oxford University Press. Chapters 3 & 6.

Bearman, P., Moody, J., & Stovel, K. (2004). "Chains of affection: The structure of adolescent romantic and sexual networks." *American Journal of Sociology*, 110(1): 44-91.

Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine*, 357(4), 370-379. (or smoking, or happiness)

Lab 6: Social Structures and Quadratic Assignment Procedures (QAP & MRQAP) (Due Oct. 19)

Hanneman, R. A. & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside. Chapter 18. Available online at:
<http://faculty.ucr.edu/~hanneman/nettext/index.html>

Krackhardt, D. (1987). Cognitive social structures. *Social Networks*, 9, 109-134.

Krackhardt, D. (1988). Predicting with networks: Nonparametric multiple regression analysis of dyadic data. *Social Networks*, 10, 359-381

Mann, J., Stanton, M.A., Petterson, E.M., Bienenstock, E.J., & Singh, L.O. Social networks reveal cultural behavior in tool-using dolphins. *Nature Communications*, 3, doi:10.1038/ncomms1983

<http://www.nature.com/ncomms/journal/v3/n7/abs/ncomms1983.html>

Oct. 19 Exchange and Dependency Theories and MultiDimensional Models

Contractor, N., Monge, P., & Leonardi, P. (2011, Apr 8). Network theory | Multidimensional networks and the dynamics of sociomateriality: Bringing technology inside the network. *International Journal of Communication* [Online] 5:0. Available: <http://ijoc.org/ojs/index.php/ijoc/article/view/1131>

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks*. New York: Oxford University Press. Chapter 7.

Shumate, M., & Palazzolo, E. T. (2010). Exponential Random Graph (p*) Models as a Method for Social Network Analysis in Communication Research. *Communication Methods and Measures*, 4(4), 341-371.

Harrigan, N. (2009). Exponential Random Graph (ERG) models and their application to the study of corporate elites. Center for research methods in the social sciences.

Potter, G. E., & Handcock, M. S. (2010). A description of within-family resource exchange networks in a Malawian village. *Demographic research*, 23(6), 117. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2990531/>

Lab 7: Exponential Random Graph Models (ERGMs) in R (Due Oct 26)

Robins, G., Snijders, T., Wang, P., Handcock, M., & Pattison, P. (2007). Recent developments in exponential random graph (p*) models for social networks. *Social Networks*, 29, 192-215.

Hunter, D. R., Handcock, M. S., Butts, C. T., Goodreau, S. M., & Morris, M. (2008). ergm: A package to fit, simulate and diagnose exponential-family models for networks. *Journal of Statistical Software*, 24(3).

Optional reading:

Goodreau, S. M. (2007). Advances in exponential random graph (p*) models applied to a large social network. *Social Networks*, 28, 231-248.

Introduction to Exponential-family Random Graph (ERG or p*) modeling with Statnet – Butts et al Sunbelt Handout available at: <http://csde.washington.edu/statnet/Resources/Sunbelt2012/ERGM/ERGMtutorial.pdf>

Robins, G., Pattison, P., Kalish, Y., & Lusher, D. (2007). "An introduction to exponential random graph (p^*) models for social networks." *Social Networks*, 29(2): 173-191.

Oct. 26 Network Formulations of Homophily, Proximity, & Social Support

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks*. New York: Oxford University Press. Chapter 8.

McPherson, M., Smith-Lovin, L., Cook, J.M. (2001) "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology*, 27: 415-444.

Hampton, K.N., Livio, O., & Sessions, L. (2010). "The Social Life of Wireless Urban Spaces: Internet Use, Social Networks, and the Public Realm." *Journal of Communication*, 60(4): 701-722.

Takhteyev, Y., Gruzd, A., & Wellman, B. (2011). Geography of Twitter networks. *Social Networks*.

Macy, M. W. & Willer, R. (2002). From factors to actors: Computational sociology and agent-based modeling. *Annual Review of Sociology* 28(1), 143-166.

Lab 8: Network dynamics and actor based modeling with TERGM (Due Nov. 2).

Temporal Exponential Random Graph Models (TERGMs) for dynamic network modeling in statnet-
http://statnet.csde.washington.edu/workshops/SUNBELT/current/tergm/tergm_tutorial.html

Desmarais, B. A., & Cranmer, S. J. (2013). Forecasting the locational dynamics of transnational terrorism: A network analytic approach. *Security Informatics*, 2(1), 1-12.
<http://link.springer.com/article/10.1186/2190-8532-2-8/fulltext.html>

Optional reading:

Snijders, T. A. B., Van de Bunt, G. G., & Steglich, C. E. G. (2010). Introduction to stochastic actor-based models for network dynamics. *Social Networks*, 32(1), 44-60.

Ripley, R. M., Snijders, T. A. B., Preciado, P. (2012) *Manual for RSiena*.

Nov. 2 The New Science of Networks.

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks*. New York: Oxford University Press. Chapter 10.

Watts, D. J. (2004). The "new" science of networks. *Annual Review of Sociology* 30(1), 243-270.

Easley, D., & Kleinberg, J. (2010). Power laws and rich-get-richer phenomena. In D. Easley & J. Kleinberg, *Networks, Crowds, and Markets*. Cp. 18

Barabasi, A. & Albert, R. (1999). "Emergence of Scaling in Random Networks." *Science*, 286: 509-512.

Lazer, D., Pentland, A. S., Adamic, L., Aral, S., Barabasi, A. L., Brewer, D., ... & Van Alstyne, M. (2009). Life in the network: the coming age of computational social science. *Science (New York, NY)*, 323(5915), 721.

Lab 9: Network Visualization with R and Gephi (Due Nov 9)

Moody, J., McFarland, D., Bender-deMoll, S. (2005). Dynamic Network Visualization. *The American Journal of Sociology*, 110(4), 1206-43.

Scott, J., & Carrington, P. (Eds.). (2011). *The Sage Handbook of Social Network Analysis*. Thousand Oaks, CA: Sage Publications.
Ch. 37 Network Visualization

Optional reading:

Freeman, L. C. (2000). Visualizing social networks. *Journal of Social Structure*, 1(1), 4.

Hansen, D., Shneiderman, B., & Smith, M. A. (2010). *Analyzing social media networks with NodeXL*. Burlington, MA: Morgan Kaufmann
Ch. 5 Calculating and Visualizing Network Metrics

Pfeffer, J, Freeman, L. The Historic Development of Network Visualization. Sunbelt 2015. <http://www.pfeffer.at/data/visposter/>

Nov. 9 Analyzing the Web

Ackland, R. (2012) *Concepts, Data and Tools for Social Scientists in the Digital Age*. Ch.4 Hyperlink Networks

Easley, D., & Kleinberg, J. (2010). Link analysis and web search. In D. Easley & J. Kleinberg, *Networks, Crowds, and Markets*, Cp. 14.

Weber, M. & Monge, P. R. (2011). The flow of digital news in a network of sources, authorities, and hubs. *Journal of Communication*, 61, 1062-1081.

Catanese, S. A., De Meo, P., Ferrara, E., Fiumara, G., & Proveti, A. (2011, May). Crawling facebook for social network analysis purposes. In *Proceedings of the international conference on web intelligence, mining and semantics* (p. 52). ACM.

Kramer, A. D., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences*, 111(24), 8788-8790.

Optional reading:

Turow, J., & Tsui, L. (Eds.). (2008). *The Hyperlinked Society: Questioning Connections in the Digital Age*. Ann Arbor, MI: University of Michigan Press. Available at <http://www.digitalculture.org/books/hyperlinked-society>

**Lab 10: Collecting and Analyzing Twitter data with NodeXL
(Due Nov. 16)**

Fielding, N. (Ed.). (2008). *The Sage Handbook of Online Research Methods*. Thousand Oaks, CA: Sage Publications. Ch.8 Analyzing Social Networks Via the Internet – Bernie Hogan

Nov. 16 Paper Consultation Day

Nov. 23 NCA Conference & Thanksgiving break

No Class

Nov. 30 Research Paper presentations

Fifteen minute presentations for each project

Dec. 7 Research Paper presentations

Fifteen minute presentations for each project

Final Research Paper due at noon, December 8

Happy Holidays!!

Other Network Resources

Academic Organizations and Conferences

- Sunbelt Conference, International Network for Social Network Analysis (INSNA). <http://www.insna.org/index.html>
- INSNA SOcNET listserv. <http://www.insna.org/pubs/socnet.html>
- Web Science Trust. <http://webscience.org/home.html>
- Communication and Technology Division, Organizational Communication Division. International Communication Association (ICA). <http://www.icahdq.org>
- Organizational Behavior Division, Organizational Communication and Information Systems Division, Academy of Management (AoM). <http://www.aom.pace.edu>
- Conference on Human-Computer Interaction (CHI), Conference on Computer-Supported Cooperative Work (CSCW), Conference on Supporting Group Work (GROUP), Association for Computing Machinery (ACM). <http://www.acm.org>
- Conference on Social Computing (SocialComp), World Wide Web Conference (WWW), Hawaii Conference on System Sciences (HICSS), Conference on Advances in Social Networking and Mining (ASONAM), IEEE Computer Society. <http://www.computer.org>
- Conference on Network Science (NetSci). <http://netsci2011.net/>
- Conference on Weblogs and Social Media (ICWSM), Conference on Artificial Intelligence (AAAI), Knowledge Discovery and Data Mining (KDD), Association for Advancement of Artificial Intelligence (AAAI). <http://www.aaai.org/>

Data Sets

- McFarland, D. "Social Network Analysis Labs in R and SoNIA." Stanford University. <http://sna.stanford.edu/flabs.php>
- Newman, M. "Network data." University of Michigan. <http://www-personal.umich.edu/~mejn/netdata/>

- Leskovec, J. “Large Network Dataset Collection.” Stanford University.
<http://snap.stanford.edu/data/>
- Batagelj, V. & Mrvar, A. “Pajek datasets.” University of Ljubljana.
<http://vlado.fmf.uni-lj.si/pub/networks/data/>
- Börner, K., *et al.* “InfoVis Cyberinfrastructure Databases.” Indiana University.
<http://iv.slis.indiana.edu/db/index.html>
- Barabasi, A.-L. & Toroczkai, Z. CCNR Lab at the University of Notre Dame
<http://www.nd.edu/~networks/resources.htm>

People and Research Groups

- Science of Networks in Communities (SONIC). Noshir Contractor.
<http://sonic.northwestern.edu>
- Northwestern Institute on Complex Systems. Daniel Diermeier, Brian Uzzi, Kevin Lynch, William Kath, *et al.* <http://www.northwestern.edu/nico/>
- Amaral Lab. Luis Amaral. <http://amaral.northwestern.edu>
- Center for Connected Learning. Uri Wilensky.
<http://www.ccl.sesp.northwestern.edu>
- Research on Complex Systems. Dirk Brockmann. <http://rocs.northwestern.edu>
- Annenberg Networks Network. Peter Monge, University of Southern California.
<http://ann.uscannenberg.org/>
- Program for Network Governance. David Lazer, Harvard University.
<http://www.hks.harvard.edu/netgov/html/index.htm>
- NETLAB. Barry Wellman, University of Toronto.
<http://www.chass.utoronto.ca/~wellman/>
- CASOS. Kathleen Carley, Carnegie Mellon University.
<http://www.casos.cs.cmu.edu/>
- MELNET. Gary Robbins, University of Melbourne.
<http://www.sna.unimelb.edu.au/>
- LINKS Center. Steve Borgatti, University of Kentucky. <http://linkscenter.org/>
- Santa Fe Institute. <http://www.santafe.edu/>

- Center for the Study of Complex Systems, University of Michigan.
<http://www.cscs.umich.edu/>