Social Networks PhD Area Examination

DRAFT (August 20, 2009 by David Hachen)

Social Network Analysis is both a substantive area with theories, concepts and research studies and a methodology with a set of evolving tools and measures for analyzing social networks. As such students intending to take this exam will need to master both the tools used to conduct social network analysis and the theories and concepts that inform research on social networks.

Examination Objectives

The objective of the social network area exam is to assess a graduate student's ability to conduct first-rate research and teach both undergraduate and graduate level courses in the area of social networks. Because the ability to conduct first-rate research on social networks requires both substantive knowledge about social networks and mastery of the research tools and methods used in social network analysis, students are expected to have a thorough knowledge of (1) social network concepts, theories and prior research and (2) the various methods, measures, and statistical procedures that currently exist for analyzing network data. We also expect that students will be able to use their knowledge about social network methods, theories and past research to articulate their own informed views, assessments, critiques and insights about social networks.

The methodological tools informing social network analysis involve a good deal of mathematics, and new developments are occurring all the time. We do not expect that students will be able to develop new methods. What we do expect is that students have sufficient understanding of the full range of currently used methods for analyzing social networks so that they know when to use specific tools, the underlying theory behind a method or measure, how to use the method and interpret results, and how to explain the method to others.

Among the topics, sub-areas and methods that we expect students to know about are:

- Network Analysis vs. other sociological methods
- The basics of graph theory
- Measurement and data issues
- Ego Networks
- Measures of Centrality
- Cliques, Clustering and Cohesion
- Affiliation (bi-partite) Networks
- Structural Equivalence measures
- Dyadic Configurations, Processes, Persistence and Decay
- Triadic Configurations and Processes
- Statistical Models (P*, ERGM)
- Small World Networks and Models

- Diffusion
- Scale-Free Networks
- Network Effects

In addition, students are expected to have an area of expertise in which they have in-depth knowledge of the research tools, theories and prior work in that area. Examples of such foci are communication networks, friendship networks, exchange networks, and inter-organizational networks.

Examination Preparation

Because the area of social networks is relatively new in our department there are not very many courses. Students who expect to take the social network exam should take the Social Network Seminar (SOC 63901). We recommend that students also take at least one directed reading on social network analysis in which they focus on network research in a specific substantive area and the specific network tools and methods that have been developed to conduct network research in this area. Students are also encouraged to take other network related courses in computer science, physics and mathematics.

Taking courses is only the first step in preparing for the exam. Here are the additional things that students should do to prepare for the exam:

- Meet with the chairperson of the Social Network Exam Committee
- Determine what your focus area for network research will be and convey this to the chairperson.
- Put together a reading list and share it with the examination committee for feedback on omissions. You can and should adapt the reading list fro the Social Network Seminar.
- Read and study the material on the reading list.
- Because there are currently no past exams, we suggest that students preparing for the exam come up with questions that could be asked on an exam in consultation with members of the committee. They should then write answers to some of the questions. If desired, one or more committee members can review the practice answers.

Examination Format & Procedures

The exam takes place over 2 days, with 4 hours scheduled for the exam on each day. Each day there will be three parts to the exam, for a total of 8 parts. Most of the parts will involve essay questions, though some parts may consist of terms and/or short answer questions. At least two of the eight parts will deal with issues pertaining to your chosen focus area. Throughout all the various parts of the exam, students will be given a choice of essay questions or term to answer, giving students some flexibility in what specific questions that want to answer.

The exam is closed book and no notes or other materials can be used during the exam. Although it will not always be necessary, students should bring a scientific calculator to the statistics portion of the exam. We do not expect students to memorize complicated formulas, so if such formulas are deemed necessary they will be listed in the exam. However, students will be expected to recognize what those formulas are for and which ones are appropriate for the problem at hand. In most cases, any required calculations will be simple and straightforward; the challenge will be recognizing how to do the calculations in the first place.

We expect that answers will include references to the literature. We do not expect full citations. Author's last names and when necessary to distinguish multiple works by the same author, relevant years of publication are sufficient. You can include titles of articles or books if you want, but this is not necessary.

Examination Results

The faculty committee consisting of three people will read and evaluate your examination. They will then discuss their individual assessments and assign one of three grades for the exam: pass with distinction, pass, or fail. In rare cases the committee may decide to require a partial retake, usually requiring that a student retake one of the day's examinations. In such situations the chairperson of the committee will negotiate with the student the time of the retake, taking into account that we expect students retaking part of the exam to spend adequate time studying to overcome the weaknesses identified by the committee. The retake is likely to have totally different questions than the original exam did.

The committee will try to provide results within two to three weeks but faculty conflicts or exam scheduling (e.g. right before Christmas or during the summer) may result in longer turnaround times. After the committee renders its decision, the student will be notified of the results by e-mail. The student will then be asked to schedule a meeting with the committee chair to discuss both strengths and weaknesses of the students' performance. This meeting will be scheduled for all students, regardless of whether they pass or fail the exam. Other committee members may provide written feedback to each student, or they may set up a separate meeting to discuss the students' exam performance. This decision will be left at the discretion of faculty on the committee.