SOC 312
Sociology of Science

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Class Meetings: Tuesdays & Thursdays from 11:30 am - 12:50 pm in EV2-2069 (KI Studio)
Office Hours: Thursday from 1-3 pm or by appointmentin EV1-215
Communication: Please contact me on the class #slack: `[private group]`

1 Course Description

This course is about (i.) the production of science and technology, and (ii.) struggles over scientific expertise and technology in the public sphere. Topics we will examine include the role of culture and networks in knowledge creation, gender inequalities, open science and technology, expert advising and governance, knowledge diffusion, and large-scale collaborations / team science.

Please note that this course emphasizes collaborative learning. There will be a lot of group discussion, and most of the course deliverables are collaborative. Finally, all of the writing you do will be shared with the class using the team collaboration tool #slack.

2 Learning Objectives

By the end of this course, you should be able to:

1. Understand and Apply Course Material
    - 1.1. Explain how networks, institutions, public policy, and social movements shape the creation of science and technology
    - 1.2 Compare the regulation of secrecy, sharing, and collaboration in science and technology
    - 1.3 Explain how network analysis has been used in research on science and technology
    - 1.4 Describe gender inequalities in STEM fields, and historical changes in gender and computing
2. Develop Research and Writing Skills

2.1 Collect and clean publication data from the Web of Science

2.2 Use Web of Science data to create scholarly networks using Sci2 and Visone1

2.3 Interpret network visualizations and statistics to describe scientific communities

2.4 Develop skills for collaborating on empirical research, and co-authoring research papers

3 Deliverables & Evaluation

Given the learning objectives outlined above, your grade in this course will be based on the tasks described below.

To do well in this course, you have to take the material seriously, consider it, and discuss it. If you have strongly held opinions, you should be willing to change your mind on the basis of empirical evidence, or rational and respectful argument. That said, you do not have to agree with the readings, with what I say about them, or what others say about them. When you disagree, **be respectful**.

	Value	Due
Memo / Discussion Questions		
300 word memo posted to #slack before class	5%	Sign Up
Collaborative Project		
Proposal (500 words)	5%	February 12
Detailed Outline & Project Plan	15%	March 12
Data Collection & Preliminary Analysis	10%	March 19
Poster and Presentation	15%	March 31
Final Co-Authored Paper (6,000 words)	35%	April 2
Participation / Engagement		In class & on #slack
Involvement in class and #slack conversations	12%	Ongoing
Attendance	3%	ongoing

Reading Memos / Discussion Questions

Each person will write one reading memo on a reading of their choice, and post it as a text file, a PDF, or a link to a Google Doc on #slack. Each memo should be roughly 300 words, and should not exceed 330 words. I expect them to be thoughtful, clear, and carefully edited. Your reading memos should identify core points from the readings, offer any thoughts or reactions, and raise discussion questions for class. You are encouraged but not required to relate them to any personal experiences. In order to make sure that there are reading memos and student-submitted discussion questions for each class, students will sign up for specific readings at the start of the term.

Each memo is due the night before the class where will will discuss the readings you wrote about. These memos will be shared with the class on #slack, where others can read and leave constructive and thoughtful comments. You are not required to comment on the memos, but doing so is a good way to contribute to class discussions. Disrespectful comments will not be tolerated. They will be as damaging to your participation grade as hostile behaviour in the classroom.

Collaborative Projects

The main deliverable for this course is a collaborative project with multiple parts. It includes: (1) a short proposal, (2) a detailed outline and project plan, (3) an informal discussion of data and preliminary analysis, (4) a final co-authored article on scholarly networks written in the style of an empirical journal article, and (5) a poster communicating the core details of your collaborative project.

Much of the research on science and technology requires understanding – and being able to think in terms of – networks. Requiring you to do your own empirical research on scholarly networks is one way of helping you do this. You do not need to have a background in network analysis, quantitative sociology, statistics, mathematics, or programming in order to do the research for this class. If you tend to think in more qualitative or historical-comparative ways, you should know that there is a long and important tradition of qualitative social network analysis.

This collaborative project will also help you learn important research and project management skills, and it will give you a chance to try your hand at research before you have to tackle a larger project, such as a senior honors thesis in Knowledge Integration, Sociology, or Legal Studies.

When you have formed your co-author teams, you will begin to pick research questions to answer, or specific disciplines or interdisciplinary fields to systematically explore. In Winter 2014, class projects included analyses of (1) changes in the specialty structure of physics 5 years before, during, and after the second world war, (2) the overlap between famous and academically elite astrophysicists, (3) linguistic and disciplinary divisions in digital humanities scholarship, (4) the impact of the social sciences in human computer interaction research, and (5) differences in American and Canadian scholarship on patent law.

When you have started to settle on your project ideas, we will collect data from the Web of Science database, clean and prepare it for analysis using Sci2, and then (3) analyze and visualize scholarly networks using Visone.3 I will teach you how to do all of this in class.

We will set aside class time throughout the semester to work on your projects, discuss methodology, and address practical matters. In addition to the details below, we will be talking about all of this in great detail over the course of the semester. I will provide examples and templates where appropriate.

Undergraduate students rarely co-author papers in university, but co-authoring is very common in most academic disciplines and in the public, private, and non-profit sectors. We will discuss co-authoring in detail throughout the semester, including how to avoid violating academic integrity policies. Together, we will develop group contracts and expectations documents that will set the context for your collaborations.

Your paper should be roughly 6,000 words before references, have standard margins, and use a 12 pt font.5 Roughly 2/3 of the paper should be set aside for a formal presentation of the results (including a visualization of the network), and a bigger picture discussion. Do not use a cover page. Put the title and your names in alphabetical order at the top of the first page. You are free to use any citation style you like, but you must use it consistently.

You will submit your research papers for everyone to read and comment on on #slack, but you will also submit your paper on Learn, which will be set up with the plagiarism detector Turn It In. If you do not want to submit your research paper to Turn It In, your team can schedule a 45 minute meeting with me to discuss your paper in detail.

I will discuss my grading criteria in more detail in our class meetings, and I am happy to discuss

your work in progress or when it is finished. If you feel you have been given a grade you do not deserve, please wait 24 hours and then write a 500-600 word memo to me outlining the perceived error.

Although I will be giving you feedback on your work throughout the term, I encourage you to make appointments with people at the writing centre. Their services are available to all UW students.

At the end of the semester, there is time set aside for you to present posters communicating the details of your research to your classmates and other interested people.

Participation / Engagement and Attendance

The quality of this course – like any other – depends on you being engaged. Your participation grade will be based on (a) contributions to class discussion, (b) small group discussion, (c) your involvement on #slack, and (d) attendance. If you really don't like speaking up in class, you can participate more on #slack. Although I will not be assigning a participation grade until the end of the semester, I am happy to provide qualitative feedback on your participation throughout the semester.

Submitting Work Late Policy

You will submit all work electronically on #slack. Please do not give me hard copies of anything, under any circumstances. I will deduct 5 points a day for every day, or part of a day, that your work is late, including weekends. I will not make exceptions without a medical note.

Required Book

The only required book for this course is Harry Collins. 2013. *Are We All Scientific Experts Now?* Polity Press. You can get it on Amazon really cheap. All journal articles and chapters from books will be made available on the course syllabus (as a link), or on #slack as a download. Please note that Lessig's book has a creative commons license. You can legally download the entire book for free from his website.

Recommended Books

Although not required, I highly recommend getting copies of Janet Abbate's *Inventing the Internet* and Heather Douglas' *Science, Policy, and the Value Free Ideal*.

Reference Books

I am hoping that this course sparks your interest in social network analysis more broadly. If you want to pick up a book on the field, I have plenty of suggestions. Christina Prell's *Social Network Analysis: History, Theory, and Methodology* and John Scott's *Social Network Analysis* provide excellent overviews of the field and have an applied focus. Silvia Domínguez and Betina Hollstein's 2014 *Mixed Methods Social Networks Research: Design and Applications* is an outstanding resource for mixed methods studies. Wasserman and Faust *Social Network Analysis: Methods and Applications* is a classic, but may be a little too technical if you are new to the field. John Scott and Peter Carrington (a University

of Waterloo Professor in Sociology and Legal Studies) edited *The SAGE Handbook of Social Network Analysis*, which is a wonderful reference book.

4 Course Schedule

Please note that we may adjust the reading schedule throughout the semester. Changes will be announced in class and via the course website.

January 6 and 8: Introduction, Patents

Tuesday: Introduction

Thursday: Listen to "When Patents Attack... Part 2," by the folks at This American Life.

January 13 and 15: Code and Regulation

Tuesday: Lawrence Lessig. 2000. "Code is Law" (pages 1-8) and "Four Puzzles from Cyberspace" (pages 9-29) from Code V 2.0 Download the book for free

Thursday: Lawrence Lessig. 2000. Part 1: 'Regulability' (pages 31-60) from Code V 2.0 Download the book for free

January 20 and 22: Free / Open Source

Tuesday: Siobhán O'Mahony. 2003. 'Guarding the Commons: How Community Managed Software Projects Protect Their Work.' Research Policy. 32:1179-1198. Link to the article.

Thursday: Fabrizio Ferraro and Siobhán O'Mahony. 2012. 'Managing the Boundaries of an 'Open' Project.' In John Padgett and Walter Powell (eds). The Emergence of Organizations and Markets. Princeton: Princeton University Press.

January 27 and 29: Free / Open Source

Tuesday: Steven Weber. 2006. 'Patterns of Governance in Open Source.' In Chris DiBona, Danese Cooper, and Mike Stone (eds.) Open Sources 2.0: The Continuing Evolution. O'Reilly.

Thursday: EITHER Andrew Hessel. 2006. 'Open Source Biology.' In Chris DiBona, Danese Cooper, and Mike Stone (eds.) Open Sources 2.0: The Continuing Evolution. O'Reilly. OR Alessandro Delfanti. 2013. 'We are the Biohackers' from Biohackers: The Politics of Open Science. London: Pluto Press.

February 3 and 5: Inventing the Internet

Tuesday: Janet Abbate. 2000. "White Heat and Cold War: The Origins and Meaning of Packet Switching" from Inventing the Internet (pages 7-42)

Thursday: Janet Abbate. 2000. "Building the ARPANET: Challenges and Strategies" from Inventing the Internet (pages 43-82)

February 10 and 12: Collaboration Networks

Tuesday: Christina Prell. 2012. 'Becoming Familiar with Social Networks' (pages 7-18) from Social Network Analysis and Evans and Foster 'Metaknowledge' in Science. Link to the article. Although not required, I recommend looking at other work that James Evans has been doing at Knowledge Lab.

Thursday Lab: Borgatti, Stephen, Ajay Mehra, Daniel Brass, and Giuseppe Labianca. 2009. "Network analysis in the social sciences." Science (volume 323, pages 892-895). Link to the article. Also read: Larivire, Vincent, Yves Gingras, and Éric Archambault. 2006. 'Canadian Collaboration Networks: A Comparative Analysis of the Natural Sciences, Social Sciences and the Humanities.' Scientometrics. 68(3):519-533. Link to the article.

Initial Proposal Deadline

February 17 and 19: READING WEEK

February 24 and 26: Collaboration Networks

Tuesday: James Moody. 2004. 'The Structure of a Social Science Collaboration Network: Disciplinary Cohesion from 1963 to 1999.' American Sociological Review. 69:213-238. Link to the article

Thursday Lab: Peter Carrington. 2014. 'Social Network Research' (pages 35-64) in Silvia Domínguez and Betina Hollsein (eds) Mixed Methods Social Networks Research: Design and Application.

March 3 and 5: Collaboration Networks

Tuesday: Elisa Bellotti. 2012. 'Getting Funded: Multi-Level Network of Physicists in Italy.' Social Networks. 34(2):215–229. Link to the article

Thursday: Networks Lab

March 10 and 12: Gender in Science and Technology

Tuesday: Networks Lab

Thursday Lab: Christina Prell. 2012. 'How to Study Social Networks, From Theory to Design' (pages 59-92) from Social Network Analysis. We will have a lab on collecting web of science data, and the basics of Sci2. Read Scott Weingart's blog posts "Networks Demystified 4: Co-Citation Analysis" and "Networks Demystified 7: Doing Co-Citation Analyses".

Detailed Outline Project Plan Deadline

March 17 and 19: Gender in Science and Technology

Tuesday: Janet Abbate. 2012. 'Introduction: Rediscovering Women's History in Computing' (pages 1-10) and "Breaking Codes and Finding Trajectories: Women at the Dawn of the Digital Age" from Recoding Gender: Women's Changing Participation in Computing (pages 11-39).

Thursday: Read any 1 of the 53 the life history interviews that Janet Abbate conducted for Recoding Gender, which are made available here by the IEEE Global History Network. Also watch Carla Fehr. 2013. "Creating great scientific workplaces: From theory to practice and back again" Science and Technology in Society Day, Perimeter Institute of Theoretical Physics.

Data Collection and Preliminary Analysis Deadline

March 24 and 26: Expertise and Open Science

Tuesday: Harry Collins. 2014. 'Introduction: The Growing Crisis of Expertise' (pages 1-16) in Are We All Experts Now? and 'Academics and How the World Feels' (pages 17-48) in Are We All Experts Now?

Thursday: Harry Collins. 2014. 'Experts' (pages 49-79) in Are We All Experts Now? and EITHER 'Citizen Sceptics' OR 'Citizen Whistle-Blowers' (pages 103-114) (pages 80-102) in Are We All Experts Now?

March 31 and April 2: Poster Session and Debriefing **Tuesday:** Poster session for collaborative projects

Poster and Presentation Deadline

Thursday: Debriefing

Reminder: Final Co-Authored Paper is due on April 5