Course overview

Science and innovation are central to economic growth and firms’ ability to create and capture value. As such, economists and management scholars are interested in studying the processes of science and innovation and their relation to social welfare and firm performance. This course has two related parts.

The first part of the course focuses on “The organization of science” and tackles questions related the production of scientific knowledge. This part has multiple objectives:

- Give students a “feeling” for what science looks like and how science works. Towards this end, we will discuss a range of descriptive studies and will discuss data sources that map the scientific landscape. As a result, students should be able to identify interesting research questions and to find data to address them.

- Provide students with an overview of the literature on the economics and sociology of science and point out pieces from other literatures that may provide complementary perspectives. By discussing “classics” as well as cutting-edge research, we will examine how various theoretical lenses and methodological tools can be used to advance knowledge of the scientific system. As a result, students should be able to critically evaluate prior work, see connections between different streams of literature, identify gaps in the literature, and design their own research projects in this area.

- Encourage students to make connections between science as an object of study and as an institution in which we, as research scholars, operate. While much of the prior literature
focuses on the natural (“hard”) sciences, many of the general issues apply to the social sciences as well. As a result, students should be able to gain a deeper understanding of their own institutional environment, allowing them to become more effective research scholars.

The second part of the course links “creativity and innovation” activities of individuals, teams and networks of actors.

Course format

We will meet once a week for three hours. In each meeting, you are expected to have prepared the assigned readings for each session. While reading the papers it may be useful to first identify the research question, major concepts used to formulate the research problem, the methodology used, key findings and its major shortcomings or weaknesses. You should then be able to suggest research ideas on how to address the weak or problematic aspects of the article.

Each participant will be assigned to present some papers in class during the course depending on the number of participants. The student assigned the paper being discussed is not only expected to introduce the paper but also to lead the class discussion. The presentation assignments will be communicated after the first session.

Readings

Required books for part 1:

• Thomas S. Kuhn: The Structure of Scientific Revolutions, ISBN 978-0226458083
• Donald E. Stokes: Pasteur’s Quadrant, ISBN 978-0815781776

Most other readings for part 1 are available as pdfs at https://cloud.esmt.org/s/dDbAFxY8qA55y7k.

Course evaluation

Performance evaluation will be based on three building blocks:

Class participation (20%) The course will be highly interactive and you are expected to advance discussions in the class-room by your participation. Note that the evaluation of your class participation will be based on quality not quantity.

Paper presentations (30%) You are expected to present papers during the course (see above).

Term paper (50%) Each student is expected to write and present a term paper/research proposal on one of the topics covered in the course. Although the focus should be on literature review and theory development, you should also think about an appropriate empirical strategy. Approximate length is 4000 words. Due date: February 20, 2020
Part 1: The economics and sociology of science

Henry Sauermann

Course Sessions

Session 1
Thursday, October 17, 2019
9:00–12:00

Introduction and overview

Required readings

- WSJ: “Climate emails stoke debate”
  http://online.wsj.com/article/SB125883405294859215.html#printMode
  and “Rigging a climate ‘consensus’”
  http://online.wsj.com/article/SB10001424052748703499404574559630382048494.html#printMode
- Samir Okasha (2002): Philosophy of science, pp. 1-33
- Dean Keith Simonton (2003): Scientific creativity as constrained stochastic behavior: The integration of product, person, and process perspectives
- Paula Stephan (2012): Chapter 1 “What does economics have to do with science?”

Discussion questions:

- What is science?
- Why does society care about science, what is “good” science, what are the institutions and organizations involved in science?
- How is the “Economics” of science different from the “Sociology” of science?

Session 2
Thursday, October 24, 2019
9:00–12:00

Knowledge and the cumulative nature of science

Required readings

Further reading

- Thomas Kuhn (1996): The structure of scientific revolutions. Chapters 1-4, 6, 8-12

Further reading

- Sara Delamont and Paul Atkinson (2001): Doctoring uncertainty: Mastering craft knowledge
- Harriet Zuckerman (1988), The Sociology of Science, pp. 542-545 (multiples)
- Robert Merton and Elinor Barber (2004): The diverse significance of serendipity in science
- Kenneth Arrow (1962): Economic welfare and the allocation of resources for invention

Session 3
Thursday, October 31, 2019
9:00-12:00

History of scientific research and the co-evolution of “basic” and “applied”

Required readings

- Steven Shapin (1996): The scientific life, chapter 2

Further reading

- Jeffrey Furman and Megan McGarvie (2007): Academic science and the birth of industrial research
- Nathan Rosenberg (1994): Exploring the black box: Technology, Economics, and History

Session 4
Thursday, November 7, 2019
9:00–12:00

Institution of science/rewards and incentives I: The Mertonian view

Required readings

• Robert Merton (1973): The sociology of science, ch. 13: “The normative structure of science”
• Robert Merton (1973): The sociology of science, chapter 14: “Priorities in scientific discovery”
• Robert Merton (1973): The sociology of science, Part 5 prefatory note pp. 415-418
• Robert Merton (1973): The sociology of science, chapter 20: “The Matthew effect in science”
• Robert Merton (1973): The sociology of science, chapter 21: “Institutionalized patterns of evaluation in science”

Further reading
• Bruce Macfarlane and Ming Cheng (2008): Communism, universalism, and disinterestedness: Re-examining contemporary support among academics for Merton’s scientific norms
• Jack Gibbs (1965): Norms: The problem of definition and classification
• Stephen Cole and Jonathan Cole (1967): Scientific output and recognition: A study in the operation of the reward system in science

Session 5
Thursday, November 21, 2019
9:00–12:00

Institution of science/rewards and incentives II

Required readings
• Partha Dasgupta and Paul David (1994): Toward a new economics of science
• Paula Stephan (2012): Chapter 6 “Funding for research”, pp. 129-150
• Aloysius Siow (1998) : Tenure and other unusual personnel practices in academia
• Nico Lacetera and Lorenzo Zirulia (2011): The economics of scientific misconduct

Further reading
• Henry Sauermann and Wesley Cohen (2010): What makes them tick? Employee motives and firm innovation
• Edward Lazear and Sherwin Rosen (1981): Rank-order tournaments as optimum labor contracts
• Brian Wright (1983): The economics of invention incentives
• Edward Lazear (1992): Incentives in basic research
• Lorne Carmichael (1988): Incentives in academics: Why is there tenure?
• Warren Hagstrom (1974): Competition in science

Session 6
Thursday, November 28, 2019
9:00–12:00
### Freedom and the direction of research

**Required readings**
- Philippe Aghion, Mathias Dewatripont and Jeremy Stein (2008): Academic freedom, private-sector focus, and the process of innovation
- Jason Owen-Smith (2001): Managing laboratory work through skepticism: Process of evaluation and control
- Michael Polanyi (1962): The republic of science: Its political and economic theory
- Robert Merton (1973): The sociology of science, chapter 12: “Science and the social order”

**Further reading**
- Nicola Lacetera (2009): Different missions and commitment power in R&D organizations: Theory and evidence on industry-university alliances
- Vannevar Bush (1945): Science - The Endless Frontier

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### The scientific labor market

**Required readings**
- Paula Stephan (2012): Chapter 7 “The market for scientists and engineers”
- Margaret Blume-Kohout and John Clack (2013): Are graduate students rational? Evidence from the market for biomedical scientists
- Scott Stern (2004): Do scientists pay to be scientists?
- Michael Roach and Henry Sauermann (2010): A taste for science? PhD scientists’ academic orientation and self-selection into research careers in industry

**Further reading**
- Richard Freeman (1975): Supply and salary adjustments to the changing science manpower market
- Richard Freeman et al. (2001): Competition and careers in biosciences
- Rajeshree Agarwal and Atsushi Ohyama (2013): Industry or academia, basic or applied? Career choices and trajectories of scientists
- Sherwin Rosen (1986): The theory of equalizing differences
Session 8  
Thursday, December 12, 2019  
9:00–12:00

“New” developments in science

Required readings
- Patrick Gaule and Nicolas Maystre (2011): Getting cited: Does open access help?  
- Henry Sauermann and Carolin Haeussler (2017): Authorship and contribution disclosures  
- Katrin Vohland et al. (2018): Citizen Science and Sustainability Transitions  
- Andrew Sparkes et al. (2010): Towards robot scientists for autonomous scientific discovery
Part 2: Creativity and Innovation

Linus Dahlander

Course Sessions

You will work deeper on at least one paper during our sessions, but I expect you to have read all readings that are required. For your own presentation of a paper, the purpose is to grapple with the readings and respond with questions, criticisms, and new ideas. You can do one part where you summarize the papers and what can be learned from them. More importantly, devote more attention to developing promising research ideas suggested by the paper.

We only have some sessions together and I won’t cover many of the classics. Some useful classical readings on innovation include these:


Session 9
Thursday, January 9, 2020
9:00–12:00

Session topic

| Individuals and innovation |

Required Papers:


Optional papers:

Amabile, T. 1985. The Social Psychology of Creativity, Chapter 4, Springer-Verlag, 65-96


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Session 10
Thursday, January 16, 2020
9:00–12:00

Session topic Teams and innovation

Papers:


Optional readings:

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Session 11
Thursday, January 23, 2020
9:00–12:00

Session topic Networks and innovation
Papers:


Optional readings:


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**Session 12&13**
**TBC Thursday, February 6, 2020**
**9:00–14:00 (including joint lunch)**

**Session topic**
Distributed innovation and new forms of organizing

**Papers:**


**Henry Sauermann & Linus Dahlander**

**Session 14**  
**TBC Thursday, February 13, 2020**  
**9:00–12:00**

| Session topic | Final presentations – Wrap up |