FALL 2020 - SCHEDULE - Seminar in Economics of Science & Engineering		
DATE	**SPEAKER**	**TITLE**
9/11 @ 10:30am	Janet Freilich (Fordham Univ, School of Law) and Soomi Kim (MIT Sloan School of Management)	TITLE: Is the Patent System Sensitive to Information Quality? **SEMINAR ZOOM RECORDING - 2020.09.11 (mp4)** and CHAT questions ABSTRACT: We investigate whether the patent system is sensitive to information quality by observing how players in the patent system (applicants, examiners, and downstream readers) treat inaccurate information. We propose a novel approach to identify poor quality patents: patent-paper pairs where the paper has been retracted and the corresponding patent contains retracted information. We find that these patents are prosecuted, maintained, and cited at rates similar to control patents, despite containing inaccurate information. Insensitivity to information quality may lead to erroneous decisions during patent examination and has implications for patent quality, patent disclosure, and how patents facilitate knowledge flows. RELATED RESEARCH: Freilich, Janet and Lisa Larrimore Ouellette. (2019) "Science Fiction: Fictitious Experiments in Patents" *Science*: Policy Forum (Intellectual Property),*Science* Vol. 364, Issue 6445 (14 Jun): 1036-1037. BIO & HOME PAGE: Fordham University HOME PAGE: MIT Sloan School
9/18 @ 10:30am	Megan E. Frederickson (University of Toronto, Ecology & Evolutionary Biology	TITLE: "The Pandemic Penalty: The Gendered Effects of the COVID-19 Pandemic on Scientific Productivity" (paper joint with Molly M. King, Santa Clara University) **SEMINAR ZOOM RECORDING - 2020.9.18:** Includes Audio transcript & chat (toggle tab to see chat) ABSTRACT: The COVID-19 pandemic has touched everyone's lives, but it has not affected everyone equally. The risk and severity of the disease itself, and the pandemic's economic and social impacts, vary by age, income, race, and gender. The pandemic has laid bare and often worsened many pre-existing inequalities in our world. One issue of longstanding concern is gender equality, especially in science, and I will discuss why the pandemic has the potential to worsen gender gaps in STEM fields. Data from several sources, including my own analysis of preprint submissions to arXiv and bioRxiv broken down by gender, suggest that women are getting less research done than men during the pandemic. I will explore several possible explanations for this trend, including an increased child care burden, and discuss possible solutions. BIO & WEB-PAGE: Frederickson Lab, Mutualism Ecology & Evolution WEB-PAGE: Frederickson Lab, Mutualism Ecology & Evolution

| 9/25/20 | Josh Nicholson (cofounder and CEO, scite.ai) | TITLE: "scite.ai: a deep learning platform that evaluates the reliability of scientific claims by citation analysis".
 SEMINAR ZOOM RECORDING - 2020.9.25

 ABSTRACT:
 Scite is an award-winning platform for discovering and evaluating scientific articles via Smart Citations. Smart Citations allows users to see how a scientific paper has been cited by providing the context of the citation and a classification describing whether it provides supporting or disputing evidence for the cited claim. To date, scite has classified over 675 million citation statements from 18 million scientific articles and has partnered with leading publishers including Wiley, Rockefeller University Press, Cambridge University Press, and the BMJ amongst others. In this talk, I will highlight scite as a tool and how it is being used by researchers, academic publishers, and others. I will also tell the founding story of scite, challenges faced, and future planned developments.
 BIO and Josh Nicholson at Medium.com |
| 10/2/20 | Caroline Wagner (Ohio State Univ) | TITLE: "Consolidation in a Crisis: Patterns of International Collaboration in COVID-19 Research" (paper joint with Caroline V. Fry, Xiajing Cai, and Yi Zhang)
 SEMINAR ZOOM RECORDING - 2020.10.2

 ABSTRACT:
 The COVID-19 global pandemic led scientists to turn their research agendas towards coronavirus related research. This paper seeks to understand whether a catastrophic and urgent event, such as the COVID-19 pandemic, accelerates or reverses trends in international collaboration, especially in and between China and the United States. This early review shows that COVID-19 teams are smaller than those on coronavirus related research in the preceding period, and include fewer nations. The results reveal that the United States and China were, and continue to be, at the center of the global network in coronavirus related research, and continue their roles as the largest contributors to, and home to the main funders of, coronavirus related research during the global pandemic. An examination of the international collaborative activities of scientists based in these two countries documents that both nations increased their absolute levels of international collaboration following the outbreak and increased their collaboration with each other, but that they are partnering with fewer nations than in the preceding period. These findings suggest that the global COVID-19 pandemic shifted the structure of scientific teams, narrowing team membership and favoring elite structures. These findings raise further questions over the decisions that scientists face in the formation of teams to maximize a speed, skill trade-off. Policy implications are discussed.
 BIO: OSU Glenn Close College of Public Affairs |

| 10/9/20 | Jeffrey L. Furman (BU, Questrom Sch of Business) and Florenta Teodoridis (USC, Marshall Sch of Business) | TITLE: Measuring the Direction of Innovation: Frontier Tools in Unassisted Machine Learning" (paper joint with Jino Lu, USC)
 SEMINAR ZOOM RECORDING - 2020.10.9

 ABSTRACT:
 Understanding the factors affecting the *direction of innovation* is a central aim of research in the economics and strategic management of innovation. Progress on this topic has been inhibited by difficulties in measuring the location and movement of innovation in ideas space. We introduce and explore an approach based on an unassisted machine learning technique, Hierarchical Dirichlet Process (HDP), that flexibly generates categories from a corpus of text and enables calculations of the distance and movement in ideas space. We apply our algorithm to patent abstracts from the period 2000-2018 and demonstrate that, relative to the USPTO taxonomy of patent classes, our algorithm provides a leading indicator of shift in innovation topics and enables a more precise analysis of movement in ideas space.
 RELATED RESEARCH:
 1. Furman, J. and F. Teodoridis. 2020. "Machine Learning Could Improve Innovation Policy" (*Nature*, *Nature Machine Intelligence*, 2(84): 245-534, C2.
 2. Furman, J. and F. Teodoridis. 2020. "Automation, Research Technology, and Researcher's Trajectories: Evidence from Computer Science and Electrical Engineering" (*Organization Science*, 31(2).
 BIO: Jeff Furman
 BIO: Florenta Teodoridis |
| 10/23 @ 10:30am | Adam Jaffe (Brandeis University) | TITLE: "Tracing the Linkages Between Scientific Research and Energy innovations: A Comparison of Clean and Dirty Technologies" (paper joint w/ Robert K. Perrons &Trinh Le)
 SEMINAR ZOOM RECORDING: 2020.10.23

 ABSTRACT:
 The challenge of mitigating climate change has focused recent attention on basic scientific research feeding into the development of new energy technologies (Popp, 2017). Energy innovation tends to consist of a series of partially overlapping processes involving: (1) the production of scientific and technological knowledge, (2) the translation of that knowledge into working technologies or artifacts, and (3) the introduction of the artifacts into the marketplace, where they are matched with users' requirements. However, relatively little data are available showing how long each of these processes takes for energy technologies. Here we combine information from patent applications with bibliographic data to shine light on the second process—that is, the translation of scientific knowledge into working prototypes. Our results show that "clean" energy technologies are more dependent on underlying science than "dirty" technologies, and that the average lag between publication of scientific findings and the incorporation of those findings in clean energy patents has risen from about five to about eight years since the 1980s. These findings will help policymakers to devise more effective mechanisms and strategies for accelerating the overall rate of technological |

		change in this domain. BIO: Brandeis and BIO: MOTU, NA
10/30 @ 10:30am	Vincent Larivière (University of Montréal)	TITLE: "Dissemination of Knowledge in the Context of a Pandemic" **SEMINAR ZOOM RECORDING: 2020.10.30** ABSTRACT: Created in the second half of the 17th Century, journals became the fastest and most convenient way of disseminating new research results, outranking correspondence and monographs. They consolidated this position throughout the 20th Century, especially in the sciences. The advent of the digital era then challenged their traditional role and form. Indeed, digital technologies, which are easy to update, reuse, access, and transmit, have changed how researchers produce and disseminate knowledge, as well as how this knowledge is accessed, used, and cited. It also led to major changes in ownership of journals, as well as to how libraries subscribe to scholarly content. Drawing on historical and contemporary data, this talk will address the past and current transformations of scholarly communication, with an emphasis on the effects of the current pandemic. Related research: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0127502 https://www.nature.com/articles/d41586-018-07101-w https://crl.acrl.org/index.php/crl/article/view/16829 https://blogs.lse.ac.uk/impactofsocialsciences/2020/03/05/the-coronavirus-covid-19-outbreak-highlights-serious-deficiencies-in-scholarly-communication/ https://www.natureindex.com/news-blog/decline-women-scientist-research-publishing-production-coronavirus-pandemic BIO: l'Université de Montréal
11/6 @ 10:30am	Benjamin Jones (NW Kellogg School of Mgmt) and Daniel J. Kim (UPenn Wharton School)	TITLE: "Immigration and Entrepreneurship in the United States" (paper joint with Pierre Azoulay and Javier Miranda) **SEMINAR ZOOM RECORDING: 2020.11.06** ABSTRACT: Immigration can expand labor supply and create greater competition for native-born workers. But immigrants may also start new firms, expanding labor demand. This paper uses U.S. administrative data and other data resources to study the role of immigrants in entrepreneurship. We ask how often immigrants start companies, how many jobs these firms create, and how these firms compare with those founded by U.S.-born individuals. A simple model provides a measurement framework for addressing the dual roles of immigrants as founders and workers. The findings suggest that immigrants act more as "job creators" than "job takers" and that non-U.S. born founders play outsized roles in U.S. high-growth entrepreneurship. BIO - Benjamin F. Jones BIO - Professor Danny Kim

11/13 @ 10:30am	Ashley Nunes (Harvard Law School)	TITLE: Forecasting the energy implications of electric, autonomous fleets (paper joint with Laurena Huh and Richard Freeman) **SEMINAR ZOOM RECORDING: 2020.11.13** ABSTRACT: - Energy demand in land transportation is significant. In the United States alone, gasoline consumption averages nearly 400 million gallons daily, most of which is used by light-duty vehicles. Though exercise of these vehicles facilitates economic mobility, negative externalities persist. Internal combustion engines (ICE) - used to propel most light duty vehicles – convert a fraction of stored energy into propulsion, thereby producing consumption inefficiencies. ICE powered vehicles are also - owing to their reliance on fossil-fuels - a dominant source of air pollutants, exposure to which increases societal morbidity and mortality risk. Can electric, autonomous vehicles help? - In this talk, we explore the energy impact of deploying electric, autonomous taxis. We leverage publicly available data to develop an energy forecasting model. Our results show that the adoption of electric powertrains coupled with higher levels of automation represent a viable pathway towards reducing energy consumption though not necessarily CO_2 emissions. Our results further identify the factors that affect the ability of electric, autonomous taxis to compete with the status quo. We explore the implications of our findings for public policy. BIO: Ashley Nunes is a Research Fellow in the Labor and Worklife Program at Harvard Law School. He is also a lecturer in the Department of Economics at Harvard College and previously held research appointments at the Massachusetts Institute of Technology and the U.S. Department of Transportation. Dr. Nunes earned his Ph.D from the University of Illinois at Urbana Champaign.
11/20 @ 10:30am	Qingnan Xie (Nanjing University of Science and Technology)	TITLE: Chinese Diaspora Researchers in the US: Contributing to US science discoveries and connecting US and China science (paper joint with Richard B. Freeman) **SEMINAR ZOOM RECORDING: 2020.11.20** ABSTRACT: As the 2 biggest powerhouse of scientific papers, the interactions of US and China in science have long been discussed. The conventional measurement of international collaborations in scientific publications is based on the addresses of papers, which would overlook works done by the diaspora researchers outside of their birth countries. This study provides a name-based analysis to distinguish US addressed papers associated with Chinese diaspora researchers working at US. Our evidence shows that diaspora researchers produce a large proportion of US scientific papers, with high scientific impact. Besides contributing to paper itself, Chinese diaspora authors in US also play a critical role in connecting the science of US and China through the co-authorship and citation networks. By analyzing the publication history of the Chinese addressed authors in 2018, we also found the Chinese addressed authors who used to have the diaspora experience in US contributed a significant proportion of Chinese addressed papers with high scientific impact. By mutually benefiting scientific researchers in China and US and

		by connecting US-based research with China-based research, Chinese diaspora authors advance global scientific knowledge.
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