February 6, 2025

Kevin Bryan
Ina Ganguli
Kyle Myers
NBER Innovation Research Boot Camp
Cambridge, MA 02139

Dear Professors Bryan, Ganguli, and Myers,

I am writing to apply for the 2025 NBER Innovation Research Boot Camp. I am a third-year PhD candidate in Technology & Operations Management at Harvard Business School, where my current research focuses on the geography of innovation and technology diffusion. Given my interest in how labor markets shape and respond to technological change, I would benefit greatly from the boot camp.

The opportunity to engage with leading scholars in the field, refine my methodological toolkit, and build connections with a research community dedicated to innovation would be invaluable for my work. I have attached my CV, including completed PhD coursework, and a research statement detailing my current and future projects. Professor Josh Lerner will be submitting a letter of recommendation on my behalf.

Thank you for your time and consideration. I look forward to the opportunity to participate.

Sincerely,

Paul Hamilton

2028 HBS Mail Center, 700 Soldiers Field Rd
Boston, MA 02163-1302
phamilton@hbs.edu | (810) 360-8684

I am applying to the bootcamp to help advance my research on regional innovation and technology diffusion. My current work focuses on the geography of innovation, examining knowledge spillovers, STEM worker mobility, and the evolution of technology clusters. The bootcamp's specialized training in innovation economics would provide me with the theoretical knowledge and methods I need to advance this research.

At the beginning of the doctoral program, I was primarily interested in IT productivity and the engineering labor force. Those interests have evolved somewhat to understanding broader patterns of technological innovation and human capital. My current project investigates the spatial dynamics of technology diffusion through both labor supply and demand. Using a novel dataset from a job matching platform, I analyze how new technologies spread from pioneering regions to other areas. I find that while job postings (labor demand) for new technologies readily diffuse geographically, worker interest (labor supply) remains more concentrated in pioneer regions. This spatial mismatch between labor supply and demand grows larger as technologies mature, particularly for high-skill technologies that require advanced degrees. The research reveals how early-adopting regions maintain their advantage in attracting talent even as job opportunities diffuse, creating mismatches in regional labor markets.

I want to attend the bootcamp to deepen my understanding of innovation economics and learn empirical techniques crucial for my research. I am particularly interested in methods for measuring innovation, including the use of patent data, firm-level R&D spending, and labor market outcomes to track technology's geographic spread. Given my current focus on spatial patterns of labor and innovation, I also want to learn methodologies for studying the geography of innovation.

My future research will continue exploring the geography of technical skills—examining how specialized knowledge develops and spreads across regions, how firms and workers adapt to shifting technological demands, and how regional labor markets evolve with new industries. I plan to identify factors that help regions maintain their technological advantages and examine how universities, firms, and local institutions contribute to building and spreading technical expertise. This research has important policy implications for regional development and innovation policy. Understanding the persistent advantages of pioneer regions and the growing spatial mismatch in technology labor markets can help policymakers design more effective strategies to support emerging tech hubs and ensure broader access to innovation opportunities. It can also inform decisions about regional R&D investment and research funding allocation, helping regions build their scientific capacity and maintain their technological competitiveness.

The NBER Innovation Research bootcamp would be invaluable for strengthening my research agenda on the geography of innovation. It would help me refine my empirical methods, connect with leading scholars, and gain deeper insight into measuring innovation effectively.

Paul Hamilton

Phone: (810) 360-8684
phamilton@hbs.edu

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Education

PhD Harvard Business School *2023 - 2028 (Expected)*
Technology & Operations Management
Advisors: Shane Greenstein, Prasanna Tambe (Wharton), Iavor Bojinov

BS University of Michigan *2013 - 2017*
Economics & Statistics
Phi Beta Kappa

Affiliations

Laboratory for Innovation Science at Harvard (LISH) *2021 - Present*
Faculty PIs: Karim Lakhani

Data Science Operations Lab *2022 - Present*
Faculty PIs: Iavor Bojinov, Edward McFowland III

Research

Yue, Daniel, **Paul Hamilton**, and Iavor I. Bojinov. "Nailing Prediction: Experimental Evidence on The Value of Tools in Predictive Model Development." Harvard Business School Working Paper, No. 23-029. *Major Revision, Management Science*.

Paul Hamilton, Daniel Yue, Jessie Li, Veeksha Madhu, and Iavor I. Bojinov, "The Impact of LLMs on Data Scientist Productivity: Evidence from a Field Experiment." Unpublished Working Paper.

Conference presentations

DRUID Conference *2023, 2024*

Conference on Artificial Intelligence, Machine Learning, and Business Analytics *2024*

Manufacturing & Service Operations Management (MSOM) *2023*

Completed coursework

Microeconomic Theory I & II (ECON 2020)

Causal Inference (STAT 286); Econometric Methods I & II (ECON 2110, 2115); Design & Analysis of Experiments (MIT 15.838); Unleashing Novel Data at Scale (ECON 2355); A Statistical Study of Privacy (STAT 188)

Empirical Studies of Innovation & Digitization (HBS 4561); Economics of Ideas, Innovation, & Entrepreneurship (MIT 15.357)

Foundations of Strategy (HBS 4110)

Algorithms and Behavioral Science (MIT 14.163)

Empirical TOM (HBS 4482)

Teaching Experience

Harvard Business School *Spring 2020 - Present*
Teaching Fellow

- Teaching Fellow for the Technology & Operations Management course in the required MBA curriculum.
- Teaching Fellow for *Data Science for Managers I & II*, two MBA courses averaging 90 students per semester. These courses provide students with an understanding of how to create, design, and manage data science projects from inception through data collections, analysis, and reporting.
    - Developed course materials, including new case studies, technical notes, and code notebooks students used to analyze case data; also developed interactive web applications to illustrate important concepts from statistics and machine learning.
    - Assisted MBA students with classroom coding exercises.

Harvard University *Spring 2020*
Teaching Fellow

- Teaching Fellow for undergraduate course on statistical inference.
- Held office hours to review lecture material and assist students with problem sets; graded student problem sets.

Research Experience (Pre-doctoral)

Harvard Business School *2019 - 2022*
Research Associate

- Research project under Prof. Srikant Datar applying machine learning techniques to portfolio construction.

- Helped develop and teach the following courses in the MBA program, which teach data science and statistics to management students through the case method: *Applied Business Analytics*, *Introduction to Data Science*, and *Data Science for Managers I & II*.
- Wrote case studies with multiple faculty on organizational applications of data science and machine learning (see *Teaching Materials*).

Laboratory for Innovation Science at Harvard (LISH) *2021 - 2022*
Research Associate

- Research project studying social interaction data from a massively open online course; investigating how social interactions on online learning platforms contribute to student success.

University of Michigan, School of Information (UMSI) *2015 - 2016*
Research Assistant

- Conducted research under Kevyn Collins-Thompson, Associate Prof. of Information & Computer Science.
- Developed natural language processing algorithm to evaluate students' understanding of key vocabulary terms.
- Reviewed academic literature in computer science, psychology, and linguistics; synthesized wide array of academic research for relevance to DSCoVAR project.

PUBLICATIONS (PRE-DOCTORAL)

Bojinov, Iavor, Michael Parzen, and **Paul Hamilton**. "On Ramp to Crypto." Harvard Business School Case 623-040, October 2022.

Bojinov, Iavor I., Michael Parzen, and **Paul Hamilton**. "Prediction & Machine Learning." Harvard Business School Module Note 622-101, March 2022. (Revised July 2022.)

Bojinov, Iavor, Michael Parzen, and **Paul Hamilton**. "Causal Inference." Harvard Business School Module Note 622-111, June 2022. (Revised July 2022.)

Bojinov, Iavor I., Michael Parzen, and **Paul Hamilton**. "Linear Regression." Harvard Business School Module Note 622-100, March 2022. (Revised July 2022.)

Bojinov, Iavor I., Michael Parzen, and **Paul Hamilton**. "Statistical Inference." Harvard Business School Module Note 622-099, March 2022. (Revised July 2022.)

Bojinov, Iavor I., Michael Parzen, and **Paul Hamilton**. "Exploratory Data Analysis." Harvard Business School Module Note 622-098, March 2022. (Revised July 2022.)

Parzen, Michael, and **Paul Hamilton**. "Probability Distributions." Harvard Business School Technical Note 621-704, February 2021.

Bojinov, Iavor I., Chiara Farronato, Janice H. Hammond, Michael Parzen, and **Paul Hamilton**. "Precision Paint Co." Harvard Business School Case 622-055, August 2021.

Datar, Srikant M., Amram Migdal, and **Paul Hamilton**. "IBM: Design Thinking." Harvard Business School Case 121-007, April 2021. (Revised June 2021.)

Parzen, Michael, and **Paul Hamilton**. "The FIRE Savings Calculator." Harvard Business School Case 621-087, January 2021.

Datar, Srikant M., Sarah Mehta, and **Paul Hamilton**. "Applying Data Science and Analytics at P&G." Harvard Business School Case 121-006, July 2020.

Grushka-Cockayne, Yael, Michael Parzen, **Paul Hamilton**, and Steven Randazzo. "Kaggle 2019 Data Science Survey." Harvard Business School Case 620-091, January 2020.

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February 3, 2025

Ms. Brett Maranjian
Conference Department
National Bureau of Economic Research

Dear Brett:

I am delighted to write a letter of recommendation for Paul Hamilton for the NBER Innovation Research Bootcamp this summer. I have been very impressed with Paul in my interactions over the past half year as an advisor to him and would ***strongly encourage*** you to accept you to this program.

By way of preface, Paul is in somewhat of an unusual doctoral program, Harvard Business School's program in Technology and Operations Management. This program was historically part of the school's Doctor of Business Administration program. In my experience, while the students admitted to the program were traditionally very bright, they did not really get the disciplinary foundation to become effective researchers (at least in economics or economics-flavored strategy). Whether this reflects changes to the program or Paul's inherent abilities, he is very much the exception to the historical pattern.

I have been supervising him most closely on his project on technological diffusion. He has launched a project in the spirit of analysis in Kalyani et al. (2025) but making a signficant leap forward. Rather than looking at job announcements a la those authors, he uses a job matching board (originally founded by AngelList) to assess the differing patterns of supply and demand for new technologies: in other words, to what extent do companies want to diffuse new technologies but are limited by the supply of workers and the like. The finding to date are quite provocative, and his next steps—e.g., marrying in firm characteristics—will make the paper even more interesting.

In short, Paul is only in his second year and has already produced a paper that I sense will easily find a home in an outlet like the *Review of Economics and Statistics*. More generally, he is very personable and intellectually curious, and I am sure he will benefit tremendously from the Boot Camp.

I hope these comments are of use. Please do not hesitate to follow up with any additional questions.

Best wishes,



Josh Lerner

Aakash Kalyani, Nicholas Bloom, Marcela Carvalho, Tarek Hassan, Josh Lerner, Ahmed Tahoun, The Diffusion of New Technologies, *The Quarterly Journal of Economics*, 2025, qjaf002.