Cover Letter

Masoom Suchdeo
6530 El Colegio Road
Santa Barbara, California, 93106
masoom@ucsb.edu

February 12, 2026
The National Bureau of Economic Research

Dear NBER Innovation Research Boot Camp Selection Committee,

I am writing this letter to submit my application for the NBER Innovation Research Boot Camp 2026. I am excited about the prospect of learning from the esteemed and expert faculty, as well as engaging with the participants of the vibrant innovation economics community. My research examines the role of technology in the economics of science, and the bootcamp will greatly benefit me towards furthering my work. I am advised by Paul Leonardi, with support from Sukhun Kang and Matt Beane; all of whom have strongly recommend that I attend the bootcamp. Paul is writing the recommendation for this application.

I am a PhD student in Technology Management at the University of California, Santa Barbara, with parallel training in economics and statistics. By the time the Boot Camp convenes in July 2026, I will have completed two years of PhD coursework, including first-year econometrics, Personnel Economics, Panel Data and Causal Machine Learning in the Economics department alongside training in Technology Strategy, Networks and Innovation, and Team Processes in my home department. Other relevant training includes methods bootcamp run by Evan Starr and Brent Goldfarb from the University of Maryland.

My research focuses on how instrument development by scientists drives science by directing the expertise of scientific teams, and the structure of specialized collaboration around tools, ultimately driving knowledge production in science. I have been doing extensive fieldwork since the past one year at UCSB's Quantum Foundry to build institutional knowledge around instrument development in Physics. I am currently working on an author-year panel of instrument developers, derived from OpenAlex. I aim to produce work that helps us understand the role of technology in the knowledge production function for science, as well as be useful for policy decisions towards instrumentation and grant-making.

The Innovation Research Bootcamp will greatly benefit me in terms of interaction with knowledgeable faculty, developing a deeper theoretical understanding of innovation economics, and being on the cutting edge of research in this area. I have the requisite coursework, an empirical setting that I am invested in and the support from my mentors to prepare myself adequately for the bootcamp, should I be selected for this opportunity.

Thank you for your consideration.

Sincerely,
Masoom Suchdeo

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masoom@ucsb.edu
Department of Technology Management
Robert Mehrabian College of Engineering
University of California Santa Barbara
Goleta, CA, 93106

EDUCATION

Ph.D. in Technology Management, University of California Santa Barbara
Expected Completion: June 2029
Proposed Dissertation: *Instrumentation and the organization of Science*
Committee: Paul Leonardi, Sukhun Kang, Matt Beane

M.B.A. Indian Institute of Management Indore (India), 2017-2019
B.A. Indian Institute of Management Indore (India), 2014-2019

RESEARCH INTERESTS

Economics of Science, Sociology of Science, Innovation Policy

ONGOING RESEARCH

Instrumental Variation: The relationship between instrument development and collaboration among university physicists (**Qualifying Paper, under preparation**)

Description: This paper studies instrument building as a key form of scientific output and examines how collaborations generate instrument-based complementarities that induce new instrument development among university scientists in Physics. It then tests how newly developed instruments reshape collaboration patterns by broadening ties to new partners and deepening existing ties, thereby driving knowledge production.

GRADUATE COURSEWORK

Technology Management: Technology and Organizational Change, Team Processes, Technology Strategy, Organizational Theory, Qualitative Methods, Discourse and Institutions, Networks and Innovation (in progress)

Economics: First Year Econometrics (I, II, III), Causal Machine Learning, Panel Data and Differences-in-differences (scheduled for spring), Personnel Economics (scheduled for spring)

Statistics: Statistical Machine Learning
Media, Arts and Technology: Critical Theory and Artificial Intelligence

CONFERENCES ATTENDED

West Coast Research Symposium, *Foster School of Business, University of Washington*, September 2025

Economics of Quantum Information Technologies, *University of Southern California*, November 2024

BOOK CHAPTERS

1. (With Paul Leonardi) **Cognition in Synthesis: Rethinking Expertise in the Age of AI**
   In Research Handbook on Artificial Intelligence and Organizational Transformation
   (Status: Under revision)

2. (With Nelson Phillips) **Discourse and Innovation**
   In Discursive Foundations of Responsibility, Sustainability and Innovation (Status: Under revision)

TEACHING EXPERIENCE

2025-26	Teaching Assistant for Technology Strategy (Master's), UCSB
2024-25	Teaching Assistant for Technology Strategy (Master's), UCSB

PRIOR EXPERIENCE

2023-24	Predoctoral Researcher, PI: Aruna Ranganathan, Haas School of Business University of California, Berkeley
2021-23	Product Manager, Rebel Foods (India)
2021	Founder, Scool.in
2019-21	Brand Operations Manager, Rebel Foods (India)

Research Essay

My research studies instrument development by university scientists as an under-recognized form of innovation and asks how it shapes the organization and direction of scientific knowledge production. In many frontier scientific domains, progress depends not only on new ideas, but on the creation of new tools and capabilities. For example, in the early 1930s, Ernest Lawrence and his students built the first cyclotrons inside a university lab, because existing approaches and commercial supply could not deliver the specialized capability frontier they needed for nuclear research. The cyclotron then enabled breakthrough research in nuclear physics, bringing Lawrence the Physics Nobel in 1939. Scientists often cannot rely on external toolmakers to produce highly specialized instruments with uncertain demand, and existing tools only take science so far. Therefore, scientists themselves engage in the process of instrument building to further their research. Yet instrument building is often backgrounded as infrastructure rather than as a core scientific activity. In my dissertation, I treat it as the center stage in shaping collaboration, expertise, and the direction of knowledge production.

My current work for my qualifying paper focuses on instrument-based complementarities in collaboration. The central question is: how do collaborations produce instrument-based complementarities that induce new instrument development; and how does that instrument development, in turn, reshape collaboration networks? Existing instrumentation and partner capabilities create specialization: scientists become highly skilled at particular tool-task bundles. When facing constraints or opportunities at the boundary of those bundles, scientists may choose to develop a new instrument as a complementary asset, expanding what type of science they can produce along with their collaborators. That new capability then changes collaboration patterns by (i) broadening ties to new partners who can use or build upon the instrument, and/or (ii) deepening ties with existing partners through intensified joint production. My hypothesized mechanism is based on year-long field work done at the Quantum Foundry in UCSB among condensed matter and cold-atom physicists.

Empirically, I will combine two sources of leverage. First, I have built a large OpenAlex-based panel centered on publications in *Review of Scientific Instruments* to identify scientists engaged in instrument development. I match these "developers" to comparable "users" with similar profiles (field, publication history, institutions, tenure, and collaboration). This allows me to track how collaborations evolve around instrument-development events. Second, I will use policy and infrastructure shocks that plausibly shift the incentives or opportunities to build instruments, such as changes in NSF/DoD instrumentation funding or major upgrades in national laboratory / beamline infrastructure, to strengthen causal interpretation.

This qualifying paper anchors a dissertation with two additional papers. One examines how instrument development shapes expertise formation and careers inside labs as repeated engagement with tool-task bundles builds specialized human capital for graduate students and postdocs. Another examines search: how technology search (over components and instrument architectures) and scientific search (over topics, phenomena and materials) interact, and when instrument search redirects scientific attention toward new questions.

The Boot Camp is a natural fit for what I need next: targeted feedback on identification, sharper theoretical grounding, and socialization into the larger Economics of Innovation community. The faculty lineup maps

directly onto the questions I am trying to answer. Particularly the panel's work on the direction and elasticity of science (Kyle Myers) and the collaboration structure of knowledge production (Ben Jones, Pierre Azoulay) is the most salient to me. My near-term goal after the Boot Camp is to translate this agenda into concrete outputs in my qualifying paper and a clear dissertation kickoff plan. Longer term, I want to position instrument building as a core scientific activity in the Economics of science as well as policy design. Overall, I hope to add academic value to the bootcamp and leverage the opportunities it affords towards meaningful research.

UC SANTA BARBARA

Department of Technology Management

Paul Leonardi, Ph.D.
Duca Family Professor of Technology Management
Chair, Department of Technology Management
p: +1.805.893.5414
e: leonardi@ucsb.edu

February 12, 2026

To the Selection Committee, NBER Innovation Research Boot Camp 2026:

I am pleased to recommend Masoom Suchdeo for the NBER Innovation Research Boot Camp. I have advised Masoom since the summer of his first year in the PhD program in technology Management at the Robert Mehrabian College of Engineering, UCSB; and I have had sustained opportunities to observe his research independence and rigor.

Masoom is building a distinctive research program on instrument building as an under-measured form of innovation and on how it reorganizes the production of scientific knowledge. He is currently investigating instrument development by university scientists in condensed matter physics and cold atom physics. A central project for his qualifying paper examines how new instrument building reshapes collaboration patterns, including cases where one PI's instrument-building becomes a complementary asset to collaborators' existing capabilities. Other key directions of his work include how instrument developers conduct search and knowledge recombination along both scientific knowledge domains as well as instrument component domains, and how instrument search shapes scientific search. Another important dimension of his research is an analysis of how instrument development shapes the expertise and careers of the scientists involved, including PhD students and postdocs. To build an understanding of the fields, Masoom has independently secured deep field access to the Quantum Foundry at UCSB (including grant archives, lab records, and tacit-knowledge conversations with PIs) and he is using institutional knowledge to assemble large scale data for casual analysis. Currently, Masoom has constructed a large OpenAlex-based dataset on careers of scientists who have published in the Review of Scientific Instruments, and is pairing it with relevant 'shock' variation from NSF/DoD instrumentation grants, and upgrades to National laboratories and synchrotron facilities, to study instrument development decisions among scientists.

Masoom will benefit enormously from the Boot Camp's training and network, especially faculty whose work speaks broadly to productivity, direction and the organization of science (e.g., Azoulay, Myers, and Ben Jones). Given the understudied nature of his topic, and his steadfast academic commitment, I expect Masoom to add value to the cohort and I recommend him without reservation.

Sincerely,



Paul Leonardi