Contact Information
Connie Xu (conniexu@g.harvard.edu)
Reference
Amitabh Chandra (Amitabh_Chandra@harvard.edu)

Dear NBER Innovation Research Boot Camp Review Committee,

I am writing to express my interest in participating in the 2026 Innovation Research Boot Camp. As a fifth-year PhD student in the health policy and economics program at Harvard University, my research studies how market structures and institutional environments shape scientific productivity and innovation in the life sciences.

My dissertation examines how input cost shocks in the scientific equipment market affect research output. My other projects study institutional drivers of scientist productivity and the effects of regulatory reform on medical device innovation. The bootcamp's emphasis on cross-disciplinary concepts in innovation economics and exposure to cutting-edge data and methods would help me refine my research projects and connect with peers working in this field.

My CV, list of courses taken, and research statement are attached. Thank you for considering my application.

Sincerely,
Connie Xu

Connie Xu

Contact Information

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Cambridge, MA 02139

conniexu@g.harvard.edu
Mobile: (240) 429-2307
Citizenship: USA

Education

Harvard University 2021–2027 (expected)
Ph.D. in Health Policy and Economics
Dissertation: Essays on the Economics of Life Sciences Innovation

University of Chicago 2015–2019
B.A. in Economics (with Honors); B.A. in Statistics

Teaching Experience

Harvard Medical School 2025
Small Group Leader for Essentials of the Profession Course – Nursing Home Module

Harvard Kennedy School 2024
Teaching Fellow for Professor Timothy Layton, Empirical Methods II (Econometrics)

Relevant Positions

Harvard Business School 2022–2024
Graduate Research Assistant to Professor Amitabh Chandra

Harvard Medical School 2022–2024
Graduate Research Assistant to Professor Timothy Layton

Massachusetts Institute of Technology 2019–2021
Pre-doctoral Research Fellow to Professor Amy Finkelstein

University of Chicago Law School 2018–2019
Research Assistant to Professor Anup Malani

Federal Reserve Bank of Chicago
Economic Research Intern – Microeconomics Team 2018
Statistics Intern – Supervision & Regulation 2017

Research Papers

Scientific Input Costs in University Life Sciences Research, *with Ruby Zhang*
[Job Market Paper]

Despite over $30 billion in annual federal funding from NIH and NSF, researchers face intensifying grant competition and stagnant award amounts while confronting rising costs for essential laboratory supplies. The scientific equipment industry is highly concentrated, dominated by firms like Thermo Fisher Scientific, with opaque pricing and high switching costs that enable supplier pricing power. Using transaction-level procurement data covering 4.8 million purchases across 165 universities from 2010-2019, we analyze the impact of the 2014 Thermo Fisher-Life Technologies merger as an exogenous price shock. Our difference-in-differences design reveals approximately 20% price increases for affected products post-merger. Linking these price shocks to researcher publication records, we find that this price increase translates to a 10-20% decline in research output. We then explore heterogeneous impacts across university types, research areas, and scientist characteristics. Since research budgets are grant-driven and largely fixed—with most funds committed to personnel salaries—consumable price increases force difficult tradeoffs. Our findings illuminate procurement inefficiencies and identify researchers most vulnerable to budget constraints, offering insights into how funding pressures affect scientific innovation.

Impacts of Centrally Provisioned GPU Clusters on Science, *with Ruby Zhang*

The rapid growth of AI research and the high cost of GPU infrastructure raise important questions about how federal funding for computing should be allocated. This project examines the scientific productivity impacts of centrally provisioned GPU clusters at universities. We structurally estimate a dynamic production function to causally determine the elasticity of AI research output with respect to central GPU cluster capacity, using the proxy variable approach of Ackerberg et al. (2015) with cloud computing expenditure as our proxy. We leverage novel data sources, including manually collected panel data on cluster hardware for the top 100 universities and purchase order data from GovSpend. With production function estimates in hand, we model optimal NSF funding allocation as a tradeoff between efficiency and equity, allowing us to identify where marginal returns to infrastructure investment would be greatest.

Scientists and Institutions in Life-Science Discovery, *with Amitabh Chandra*

Fundamental knowledge in the life sciences drives medical innovation; yet, the relative contributions of institutions versus individual scientists in scientific discovery remain poorly understood. Using pub-

lications in leading life-science journals to measure fundamental discoveries, we document substantial geographic concentration and a strong correlation between discoveries and subsequent patent citations. To identify institutional effects, we exploit a mover design and find that 50–60 percent of a scientist's output is attributable to their institution, and that there is positive assortative matching between high-output scientists and institutions, which is a necessary condition for maximizing discovery. Two-thirds of this institutional effect reflects the presence of highly productive scientists. The magnitude of institutional effects has not diminished despite technologies facilitating remote collaboration, does not increase with agglomeration size, and is not concentrated in particular fields.

Research in Progress

The Ripple Effects of Health Care Entry Regulation, *with Yunan Ji and Parker Rogers*

We examine how regulatory entry costs for healthcare inputs shape market structure, pricing, and bargaining dynamics throughout the healthcare supply chain. Using a difference-in-differences approach exploiting the FDA's 2016 removal of pre-market clearance requirements for certain medical devices, we find increased manufacturer entry and lower negotiated device prices between manufacturers and hospitals. These reduced input prices propagate downstream, modestly decreasing procedure prices negotiated with insurers and ultimately lowering patient out-of-pocket costs. We then develop and will estimate a structural model that jointly captures manufacturer entry decisions and simultaneous bargaining between hospitals, manufacturers, and insurers. Our proposed counterfactual simulations will quantify how tightening entry regulations or increasing horizontal consolidation would ripple through the supply chain.

Nursing Home Value-Added: Evidence from Nursing Home Closure, *with Amitabh Chandra and Timothy Layton*

Poor quality of care in nursing homes has been a longstanding public policy concern, yet the reliability of reported quality measures remains contested. A central question is whether these observational estimates provide an unbiased measure of nursing homes' causal impacts on patient health. In this project, we test for bias using a quasi-experimental design based on the reallocation of patients following nursing home closures. The exogenous variation in market share allows us to validate quality measures by comparing how health outcomes change differentially in markets where high- versus low-quality facilities close. Rich, longitudinal patient data allows us to examine multiple dimensions of health, including physical health, mental health, cognitive capacity, and activities of daily living. Beyond validating quality measures, we use this variation to estimate causal nursing home effects on quality and investigate the extent to which racial health disparities among nursing home residents are driven by patients from different racial and ethnic groups utilizing nursing homes with differing causal effects on health.

Invited Presentations

Wharton Innovation Doctoral Symposium	March 2026
NBER Assessing the U.S. Medical Innovation System (co-author)	March 2026
American Society of Health Economists Conference (co-author)	June 2025
NBER Place-Based Policies and Entrepreneurship	December 2024

Professional Activities

Organizer: Harvard Health Care Policy Health Economics Seminar	2023–2025
Peer Mentor: Harvard Health Policy PhD Program	2022–2025
Affiliations: Institute for Quantitative Social Sciences	2024–present

Fellowships, Honors, and Awards

NSF Graduate Research Fellowship Program	2024–2027
Harvard Kennedy School Distinction in Student Teaching Award	2024
NBER Pre-Doctoral Fellowship in Aging & Health	2023–2024
Agency for Healthcare Research and Quality T32 Training Grant	2021–2023
Phi Beta Kappa	2019
UChicago Careers in Health Professions Health Policy Scholar	2016–2019

Research Grants

The Lab for Economic Applications and Policy Award, *with Ruby Zhang*	2024–2025
NBER Center for Aging and Health Research Pilot Grant, *with Amitabh Chandra and Timothy Layton*	2023–2024

PhD Courses Taken

HLTHPOL2000A/B: Core Course in Health Policy
ECON2020A/B: Microeconomic Theory
ECON2110/2115: Econometrics
ECON2245: Empirical Research in Labor and Public Economics
14.472: Public Economics II
ECON2810A: Labor Market Analysis
14.662: Labor Economics II
ECON2880: Economics of Science
ECON2465: Health Economics
HLTPOL3070: Health Economics Reading Course
ECON3017: Research in Health Economics

Research Statement

Innovation in the life sciences depends not only on the talent of individual scientists but also on the markets and institutions that surround them. My research combines topics from labor and health economics to study this relationship, examining how institutional environments and market structures shape scientific productivity and the diffusion of discoveries.

My job market paper, with Ruby Zhang, examines how input costs shape scientific production by leveraging an exogenous price shock in the scientific equipment market. Despite over $30 billion in annual federal funding from NIH and NSF, university-based life sciences researchers face intensifying grant competition and stagnant award amounts while confronting rising costs for essential laboratory supplies. Since research budgets are grant-driven and largely fixed, rising consumable prices force difficult tradeoffs between purchasing necessary inputs and maintaining research activity. These pressures are compounded by the structure of the scientific equipment industry, which is highly concentrated and characterized by opaque pricing and high switching costs that grant suppliers considerable pricing power. Yet little empirical evidence exists on how these market frictions propagate through to scientific output. We address this gap using transaction-level procurement data covering 4.8 million purchases across 165 universities from 2010–2019, leveraging Thermo Fisher's $13.6 billion acquisition of Life Technologies in 2014 as a natural experiment. Our difference-in-differences design reveals approximately 20% price increases for affected products post-merger. Linking these price shocks to researcher publication records, we find that this price increase translates to a 10–20% decline in research output. We are currently extending the analysis by exploring heterogeneous impacts across university types and PI characteristics, as well as examining mechanisms including grant-writing responses and labor-capital substitution. This research provides insights essential for science funding policy and antitrust enforcement in concentrated scientific supply markets.

My other work complements these themes. With Ruby Zhang, I am studying how central provision of high-performance computing infrastructure shapes research production. In a project with Amitabh Chandra, we examine how institutions shape scientific productivity through a mover's research design, finding that place-based factors explain 50–60% of observed output differences across institutions. Finally, with Yunan Ji and Parker Rogers, we are analyzing how FDA deregulation of certain medical device categories affects market entry, pricing, and healthcare costs across the full value chain from manufacturers to patients.

Attending the NBER Innovation Research Boot Camp would be a valuable opportunity to learn how to apply frontier methods to my own research. I would especially benefit from engaging with scholars working in similar areas and from the chance to workshop ideas and build connections.

February 12, 2026

Dear Brett,

I am sending you a short letter of recommendation for **Connie Xu**, who is a PhD student at Harvard. Connie wishes to attend the NBER innovation bootcamp and would be an excellent choice for three reasons. First, her PhD dissertation explicitly focuses on innovation and the role of institutions (like universities and hospitals in shaping innovation). Second, she has already presented our joint work on the causal effect of institutions on the discovery of fundamental knowledge to at a recent NBER innovation group conference that Josh Lerner organized where it was very well received— it would benefit her enormously to know the community of scholars who work in this space. Finally, Connie is a terrific citizen— she gives more than she receives and always offers terrific suggestions and feedback to others. She's a lot like Heidi Williams, which is the highest form of praise!

Thank you for considering her application.

Best wishes
Amitabh

Amitabh Chandra

Ethel Zimmerman Wiener Professor
Harvard Kennedy School of Government
Henry and Allison McCance Family Professor of Business Administration
Harvard Business School
Website and Scheduling: https://www.hks.harvard.edu/faculty/amitabh-chandra