Chieh-Hsuan Hu
cfhh45@bu.edu

National Bureau of Economic Research Feb 2026
Innovation Research Boot Camp 2026

Dear NBER Innovation Research Boot Camp organizers,

I am a fifth-year PhD student in Economics at Boston University, and I am writing to express my enthusiastic interest in participating in the 2026 NBER Innovation Research Boot Camp. My research lies at the intersection of industrial organization and applied microeconomics, with a specific focus on how institutional frameworks and government procurement affect firm-level innovation and product portfolio. I expect to complete my PhD in May 2027.

My research examines product entry decisions within the defense industry. In my job market paper, "Product Networks and Innovation in the Defense Industry", I investigate how specific contract structures and the size of entry costs shape the evolution of firms' product portfolios. I have constructed a novel dataset to track contractors and their contracting activities between 1989 and 2019. I build a structural model that allows me to determine whether larger contractors create distinct innovations or instead introduce products that overlap with existing portfolios to build entry barriers against small competitors. By modeling the supply-side entry decisions, I can identify the entry costs associated with innovation and strategic repositioning that may lead to an anti-competitive environment.

The boot camp provides an opportunity for me to ground my research in the foundational theories of the economics of innovation. Both coursework and the Summer Institute meeting will allow me to delve more deeply into the evolution of technological frontiers and how to rigorously define innovation within R&D-intensive industries. My work demonstrates that without accounting for the structural role of entry costs, we cannot fully understand how barriers to entry distort innovation and product-network decisions. By providing an empirical framework to evaluate how procurement policy can be leveraged as a tool to steer innovation and maintain productivity, my research directly contributes to the NBER's mission of advancing our understanding of innovation policy and its broader economic impacts.

Below is the information of the faculty for the recommendation letter: Gaurab Aryal, Associate Professor, Department of Economics, Boston University. Email: aryalg@bu.edu

Thank you for providing this opportunity and considering my application to the boot camp. Please let me know if any additional materials are needed.

Chieh-Hsuan Hu

Chieh-Hsuan Hu

Curriculum Vitae
This version: Jan 2026

PERSONAL DETAILS

Email	cfhh45@bu.edu
Address	Department of Economics, Room B19 Boston University 270 Bay State Rd, Boston, MA 02215

EDUCATION

Ph.D. in Economics 2024-present
Boston University
Advisor: Gaurab Aryal

Ph.D. in Economics 2021-2024
Washington University in St. Louis
Transferred to Boston University with Advisor.
with M.A. in Economics in 2024 (Artium Magistri in Scientia Economica)

M.A. in Economics 2019-2021
Pennsylvania State University

B.A. in International Business 2013-2017
National Taiwan University

RESEARCH

Work in Progress

- Product Networks and Innovation in the Defense Industry
- Auctioning Exclusive Right to Sell Drugs (*with Gaurab Aryal and Jiafeng Wu*)
- Multi-Category Entry Games and Mergers

RESEARCH INTERESTS

Primary	Industrial Organization
Secondary	Health Economics, Applied Economics

WORK EXPERIENCE

Research Assistant 2025.09-present
Department of Economics, Boston University
Supervisor: Chiara Margaria
Research projects, titled **"Recommender Systems and Self-Preferencing"**

Research Assistant 2023.05-2023.10
Olin Business School, Washington University in St. Louis, Part-time
Supervisor: Cecilia Diaz-Campo
Research projects, titled **"Market Responses to Legal Opioid Shifts: An Analysis of Illicit Opioid Supply and Non-Opioid Alternatives"** and **"Demographic disparity on COVID-19 mortality"**

PHD COURSES COMPLETED

Boston University 2024-present
Market Organization and Public Policy (CASEC 731)

Washington University in St. Louis 2021-2024
Structural Microeconometrics (Econ 5175), Topics in Empirical Industrial Organization (Econ 5553), Industrial Organization IV (MEC 628), Topics in Labor Economics I (Econ 583), Economics of Industrial Organization I (Econ 555), Advanced Microeconometrics (Econ 5141), Microeconomics I & II (Econ 503 & 504), Macroeconomics I & II (Econ 501 & 502), Quantitative Methods in Economics I & II (Econ 511 & 512), Applied Econometrics (Econ 5161)

Research Assistant 2019.01-2019.07
Department of Economics, National Taiwan University, Full-time
Supervisor: Jin-Tan Liu
Research project, titled **"The Influence of Exchange Rate Movement to Taiwanese Exporting Firms"**

Research Assistant 2017.08-2018.12
Department of Economics, National Taiwan University, Full-time
Supervisor: Jin-Tan Liu
Corporate research project with Institute of Labor, Occupational Safety and Health, Ministry of Labor, titled **"Health and Labor Insurance Big Data Value Added Application: Health Welfare, Return to Work, and Employment Promotion of Specific Labor Groups"**.

TEACHING

Teaching Assistant, Boston University
Market Structure and Industrial Organization (EC 531), Fall 2024 and Spring 2025
Economics of Information (EC 515), Spring 2025
Firms, Markets, and Economic Development (EC 379), Spring 2025
Special Topics in Economics (EC 590), Fall 2024

Teaching Assistant, Washington University in St. Louis
Intermediate Microeconomic Theory (Econ 4011), Fall 2022 and Spring 2023

FELLOWSHIPS

Washington University in St Louis
McDonnell International Scholar Academy Fellowship 2021-2024

Taiwan Ministry of Education (MOE)
Taiwan Washington University in St. Louis Scholarship 2021-2024

PRESENTATIONS

Taiwan Economics Research workshop (2025), SEA Annual Meeting (2024), Olin Business School at Washington University in Saint Louis (2024)

SKILLS

Languages	Mandarin (native),English (fluent)
Software	Stata, Python, MATLAB, LaTeX, ArcGIS

Research Statement

Chieh-Hsuan Hu

Current Research: Product Networks and Innovation in the Defense Industry My current research sits at the intersection of Industrial Organization and the Economics of Innovation, specifically investigating how market power and government procurement influence the direction of product innovation in the US Defense Industry. The defense industry is R&D-intensive, where innovation is the primary driver of productivity. However, the buyer (the DoD) exercises monopsony power, which allows it to dictate procurement specifications and contract structures that can shape firms' innovation incentives. My research therefore asks: How does this market structure affect the technology frontier? What are the policy implications for DoD, and how can it better incentivize innovation?

I have constructed a novel and rich dataset spanning three decades (1989-2019) from the Defense Contract Action Data System and the Federal Procurement Data System. This data tracks over $400 billion in annual Department of Defense (DoD) expenditures and enables an analysis of how firms make "product network" decisions in a market dominated by a single buyer, i.e., the DoD. For example, the data reveal how legacy contractors such as Lockheed Martin Corporation have reoriented their product supply focus over time, shifting from a traditional concentration in guided missiles and aircraft toward diversification into other products, including naval vessels and ground-effect vehicles, beginning in the early 2000s. Ultimately, my research investigates whether high entry barriers impede innovation and competition by capable potential entrants, leading the DoD to overpay for essential defense products relative to what a more competitive market could deliver.

I begin by treating product offerings and repositioning as observable outcomes of innovation activity. For example, expansion from aircraft-focused systems into naval or ground-based platforms, or shifts in emphasis across defense product lines over time, serve as measures of innovation outcomes. Applying text analysis with cosine similarity of product descriptions, I can measure the "distance" between different products and track how the network of products evolve over time. With this framework, I evaluate whether firms diversify into new, innovative peripheral markets, strategically reinforce existing market shares to create entry barriers, or expand into new areas due to underlying cost or knowledge advantages.

Currently, I am developing a model of strategic innovation that captures the salient features of the market and the interactions between firms and the DoD. Once estimated, I can simulate counterfactual product networks under different entry costs and procurement incentives, quantify the extent of these entry barriers, and explore the optimal incentive structures required to drive frontier innovation in the defense industry.

Motivation for Attending the NBER Innovation Research Boot Camp While my background in Industrial Organization provides foundation for modeling firm strategy and bargaining with the government, the defense industry's heavy reliance on R&D requires a deeper understanding in the theoretical and empirical frontiers of innovation economics. As the bootcamp description notes, innovation is rarely taught as a standalone field course. I have reached a stage where I must move beyond treating product universe as fixed and studying the evolution and innovation of products. To accurately reflect the industry's dynamics, I need to explicitly model the uncertainty and cumulative nature of R&D investments.

I am particularly interested in the sessions on innovation policy and public finance, as understanding how government spending shapes technological innovation is central to my work. Furthermore, the NBER Summer Institute Innovation Policy meeting offers an opportunity to engage with frontier questions regarding how policy can steer innovation in markets like defense industry. This bootcamp is essential for me to transition from a purely firm decision on entry to one that fully accounts for the life cycle of innovation.

Future Research Directions My future research aims to bridge the gap between contract theory and innovation policy. I plan to extend my current framework to study how specific contract types (e.g., cost-plus vs. fixed-price) influence not just the cost of procurement, but the type of innovation produced. I intend to explore how firm risk-aversion influence its participation, innovation and contract outcomes, and whether alternative contract designs can incentivize participation from smaller contractors. Ultimately, I aim to provide an empirical framework that helps policymakers use procurement as a strategic tool to drive innovation and competition. This model is intended to be applicable not only to defense but to other high-risk, R&D-intensive public sectors, such as green energy and pharmaceuticals.

Gaurab Aryal
Department of Economics
Boston University
e-mail: aryalg@bu.edu

February 9, 2026

Innovation Research Boot Camp Selection Committee
National Bureau of Economic Research
Cambridge, MA

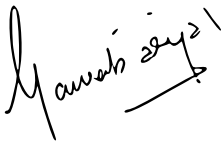
Dear Selection Committee,

I am writing to enthusiastically recommend my PhD advisee, Ms Chieh-Hsuan Hu, for the NBER Innovation Research Boot Camp. Chieh-Hsuan is a rising fifth-year student, and over the past two years, I have watched her develop what I think is a really exciting dissertation project on innovation and competition in defense contracting—one of the most R&D-intensive yet least-studied sectors of the U.S. economy.

Her project centers on a question that gets at the heart of innovation policy: Do entry barriers in the defense industry (and the lack of competition) distort innovation and slow growth? She has built an impressive dataset from scratch, combining contract-level procurement data, which was not easy to do. More importantly, she has developed a structural bargaining model between defense firms and the Department of Defense that could make a real contribution. The model is solid, but what she needs now, and why this boot camp would be so valuable, is to see where her work fits in the broader innovation literature and what policy levers actually matter for promoting innovation in settings like this.

Chieh-Hsuan would benefit enormously from the boot camp's focus on innovation policy and from engaging with experts. The lectures on growth, firm dynamics, and innovation policy would help her connect her micro-level findings to bigger questions about technological progress and industrial policy. Just as importantly, her research on the defense sector offers the boot camp participants a relatively unexplored empirical setting for thinking about innovation under monopsony, cost-plus vs. fixed-fee contracting, and heavy regulation. So she would contribute interesting perspectives to the discussions as well. She is exceptionally hardworking, intellectually curious, and ready to engage seriously in the camp. I give her my strongest recommendation.

Sincerely,



Gaurab Aryal
Associate Professor
Department of Economics
Boston University