Applicant Summary for Entrepreneurship Research Boot Camp

Applicant Name: Xizhao Wang

Contact Information:

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Mailing Address: 1516 Hinman Ave, Apt 510, Evanston, IL, 60201

School: Kellogg School of Management, Northwestern University

Area of Interest: Economics of Innovation and Entrepreneurship

Year of Entry into Ph.D. Program: 2020

Expected Year of Completion: 2026

Reference

Professor Benjamin F. Jones
Gordon and Llura Gund Family Professor of Entrepreneurship
Professor of Strategy
Co-Director, Ryan Institute on Complexity
Professor of Economics (Courtesy)
Kellogg School of Management
bjones@kellogg.northwestern.edu
847-491-3177

Thank you for considering my application. I look forward to the opportunity to participate in the Entrepreneurship Research Boot Camp 2025. Please feel free to contact me if you require any additional information.

Xizhao Wang

(773)595-8453 xizhao.wang@kellogg.northwestern.edu

Education

Northwestern University - Kellogg School of Management **2020-present**
Ph.D., Managerial Economics and Strategy

The University of Chicago - Harris School of Public Policy **2018-2020**
M.A., Public Policy (Honors), GPA Rank: 1/25

Southwestern University of Finance and Economics **2014-2018**
BEcon., Economics, GPA Rank: 1/122

ISCTE - Instituto Universitário de Lisboa **2016**
Exchange Student

Research Interests

Innovation and entrepreneurship, Technology, Labor and organizational economics, Applied microeconomics

Working Papers

[1] Patenting and Information Disclosure

- Winner, Best PhD Student Paper (Vithala Rao Award), 2024 AIM Conference (USC Marshall)
- Selected for Best Paper Proceedings, 2024 Academy of Management Conference
- Nomination, Best Conference Paper, 2024 Academy of Management Conference TIM Division
- Nomination, Best PhD Paper, 2024 Academy of Management Conference TIM Division
- Winner, Best Poster Award, 2023 International Conference on Science of Science and Innovation

[2] Human Capital and Firm's Innovation Direction

- Winner, Best PhD Student Paper, 2024 SMS Conference

[3] Adaptability and the Pivot Penalty in Science and Technology
with Ryan Hill, Yian Yin, Carolyn Stein, Dashun Wang, and Benjamin Jones
Revise and Resubmit at Nature

[4] Knowledge as Output and as Input: Artificial Intelligence and Quantum Computing
with Daniel Spulber

Presentations

2025 Wharton Innovation Doctoral Symposium (Scheduled)

2024 AOM, SMS, Northwestern (Econ), Northwestern (Kellogg), Eastern Economic Association Annual Meeting (Boston), AI in Management Conference (USC Marshall), International Conference Science of Science and Innovation (Washington DC)

2023: Northwestern (Econ), International Industrial Organization Conference (Washington DC), Economics of QIT Conference (USC Marshall), Northwestern (Kellogg), International Conference Science of Science and Innovation (Kellogg), Northwestern (AI@NU)

Workshops & Conference Participation

2024: NBER Innovation Bootcamp, NBER Innovation Summer Institute, TIM Doctoral Consortium & Research Development Workshop (AOM)

2023: NBER Economics of Artificial Intelligence Conference (Toronto), NBER Digital Economics and AI Tutorial (Toronto)

Research Experience

Research Assistant to Prof. Benjamin Jones, Northwestern University **2024**
Research Assistant to Prof. Daniel Spulber, Northwestern University **2022-2023**
Research Assistant to Prof. Richard Hornbeck, The University of Chicago **2019-2020**
Research Assistant to Prof. Steven Durlauf, The University of Chicago **2019-2020**

Teaching Experience

Teaching Assistant, Northwestern University
Analytical Approach to Uncertainty (Executive MBA), Prof. Alireza Tahbaz-Salehi **2023-2025**
International Business Strategy (MBA), Prof. Daniel Spulber **2023**
Business Analytics (MBA), Prof. Alireza Tahbaz-Salehi **2021-2023**
Teaching Assistant, The University of Chicago
Microeconomics (MBA), Prof. Richard Hornbeck **2019-2020**
Business in Historical Perspective (MBA), Prof. Richard Hornbeck **2019-2020**
Principles of Microeconomics and Public Policy II (MPP), Prof. Konstantin Sonin **2020**

Awards and Honors

Winner, Best PhD Student Paper (AIM Conference, USC Marshall) **2024**
Winner, Best PhD Student Paper (Strategic Management Society Conference) **2024**
2024 DIG Scholarship (Academy of Management Conference) **2024**
Selected for Best Paper Proceedings (Academy of Management Conference) **2024**
Nomination, Best Conference Paper (TIM, Academy of Management Conference) **2024**
Nomination, Best PhD Student Paper (TIM, Academy of Management Conference) **2024**
ICSSI Travel Funds (ICSSI Conference) **2024**
Winner, Best Poster Prize (ICSSI Conference) **2023**
Kellogg Graduate Fellowship (Kellogg, Northwestern) **2020-present**
Merit Scholarship (University of Chicago) **2018-2020**
Outstanding Graduate (Sichuan Province, China, Top 1%) **2018**
National Scholarship (China, Top 1%) **2015-2016, 2017-2018**
Top 10 Students in the Class of 2018 (Undergraduate, 10 out of 3751 students) **2015**

Skills

Softwares: Stata, Python, R, LaTeX

Languages: Chinese (native), English (fluent)

Application Essay

As a fifth-year Ph.D. student in the Managerial Economics and Strategy program at the Kellogg School of Management, Northwestern University, I am deeply fascinated by research on the economics of innovation and entrepreneurship. Last year, I participated in the NBER Innovation Boot Camp, where I gained valuable insights into the latest research methods, empirical strategies, and emerging questions in innovation. Building on this experience, I am applying to the Entrepreneurship Research Boot Camp 2025, which I believe will further enhance my academic training and provide new perspectives on entrepreneurship research. I am confident that this boot camp will be an invaluable opportunity for me to deepen my understanding of key concepts and collaborate with leading scholars in the field.

My current research interest is to provide empirical evidence for questions that broadly fall into two sub-categories: human capital and innovation, and innovation commercialization and knowledge disclosure. I am also open to exploring various research topics, and I firmly believe that my horizons will expand significantly through the boot camp training.

One of my current research projects are on human capital and firm's innovation direction. This project examines how the loss of personnel impacts the direction of innovation within firms. I introduce three distinct measures to quantify shifts in firms' innovation trajectories. Using a difference-in-differences approach, I then analyze changes in the innovation direction of U.S. public firms following personnel deaths. The results reveal that the death of upper-tail inventors significantly alters a firm's innovation trajectory, while deaths among lower-tail inventors and management personnel do not. Further analysis suggests that a firm's innovation direction is shaped by the aggregation of individual inventors' expertise and the collaborative dynamics within teams. The findings—characterized by reduced invention in the technology fields of upper-tail inventors, a lack of new inventors in affected firms, and declines in firm performance—highlight the hard-to-replace nature of inventive human capital and underscore its role in firms' dynamic capabilities.

Another research project I am working on is how the commercialization of innovation affects patent disclosure. Invention disclosure facilitates knowledge spillovers, supporting future progress but potentially limiting appropriability for the inventor. This project examines invention disclosure behavior by analyzing the readability of patent texts, using both traditional and novel AI-based readability scores. Using two difference-in-difference analyses, the study finds that following the 1980 Bayh-Dole Act and the establishment of Technology Transfer Offices, university-affiliated inventors reduced the readability of patent detailed descriptions. This decrease in readability does not extend to patent summary texts, suggesting that university inventors strategically limit information on how to make and use the invention. The findings reveal strategic disclosure behavior not just in the decision of whether to patent or keep inventions as trade secrets, but also in the degree of patent language clarity. Institutional changes lead inventors to selectively adjust the information disclosed in their patents. The mechanisms behind this influence and its impact on follow-on innovation are further explored.

I also coauthored a project on adaptability and the pivot penalty in science and technology. This project introduces a measurement framework to quantify how far researchers move from their existing research when producing new works. We uncover a pervasive "pivot penalty", where the impact of new research steeply declines the further a researcher moves from their prior work. The pivot penalty applies nearly universally across scientific publishing and patenting and has been growing in magnitude over the past five decades. While creativity frameworks suggest a benefit to exploratory search by researchers and often emphasize outsider advantages in driving breakthroughs, we find little evidence for such an advantage. The pivot penalty is consistent with increasingly narrow specializations of researchers, and when researchers undertake large pivots, a signature of their work is weak engagement with established mixtures of prior knowledge.

I believe this competitive research boot camp taught by outstanding researchers will greatly help me in furthering research in the economics of innovation and entrepreneurship. I will have the opportunity to learn cutting-edge entrepreneurship and innovation research, improve my ability to formulate research questions, develop innovative research ideas, and make significant contributions to the field in the future. I believe that the research skills that I have acquired in my research projects can be used to address questions in innovation and entrepreneurship study.

I am very eager and enthusiastic to join the NBER Entrepreneurship Research Boot Camp. I strongly believe this is an essential opportunity for a young scholar like me to get intensive academic training, build an academic connection with fascinating scholars, and advance my research in the economics of innovation and entrepreneurship. I sincerely hope to be considered for admission to this competitive boot camp.

NORTHWESTERN UNIVERSITY
Kellogg
School of Management

Strategy Department

7 February 2025

Recommendation Letter for Xizhao Wang

Dear ERBC Committee:

Xizhao Wang has emerged as one of the very best Ph.D. students I have had the chance to advise over the last two decades. She has a number of super interesting projects in the innovation space, all creative ideas – both conceptually and empirically – that are all her own. She is technically adept, hard-working, and always interesting to talk to. I think she has an extremely bright future and will likely place in a top department.

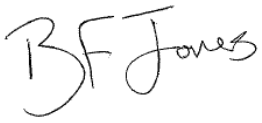
One of her projects examines how replaceable inventive human capital is within firms. Using inventor deaths, and some novel measurement approaches, she shows that the inventive direction of firms changes when they lose top inventors. Interestingly, the deaths of top inventors affect the technological trajectory of the firm, while the deaths of top managers do not, suggesting that the specialized nature of inventive human capital is hard to replace (and influential). Another of her projects examines how patents are written, and whether assignees can have a strategic incentive to obfuscate the invention in the disclosure process. She uses comparisons between university patenting and corporate patenting, with Bayh-Dole as a quasi-experiment, to show that the language in university patents (even from the same inventor) becomes more obfuscated after TTOs are established, and converges to corporate behavior.

Xizhao is currently in her fifth year in the Ph.D. program at Kellogg, and I expect that she will go on the market this coming fall. The boot camp will be a great opportunity for her to learn and to meet people. She would benefit substantially from learning the extant entrepreneurship literature with a depth and range of perspectives. She will also be a strong contributor to the group – in addition to her research strengths, she is extremely pleasant,

curious, and engaging, and she may well develop new potential collaborators through the boot camp opportunity. Please note that she participated in the Innovation Research Boot Camp in July 2024.

She has my highest recommendation.

Sincerely,



Benjamin F. Jones
Gund Family Professor of Entrepreneurship
Kellogg School of Management
bjones@kellogg.northwestern.edu