Application for the 2025 NBER Innovation Research Boot Camp

[Applicant Information]

Jin Ai, Ph.D.

Postdoctoral Fellow, University of Pennsylvania
Incoming Assistant Professor, Rutgers University-Newark (Starting September 2025)
School of Social Policy and Practice, University of Pennsylvania
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[Refenence Information]

Richard S. Steinberg, Ph.D.

Professor, Department of Economics, School of Liberal Arts
Lilly Family School of Philanthropy
Indiana University, Indianapolis
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JIN AI, PHD

Philadelphia, PA
ail@upenn.edu

ACADEMIC APPOINTMENTS

Rutgers University-Newark, School of Public Affairs and Administration
Assistant Professor in Emerging Technologies, September 2025

University of Pennsylvania, School of Social Policy and Practice
Postdoctoral Fellow in Data Science and Nonprofit Leadership, 2024-2025

EDUCATION

Indiana University, Lilly Family School of Philanthropy
Ph.D. in Philanthropic Studies, Minor in Economics, 2024

Renmin University of China, School of Public Administration and Policy
Master of Public Administration

China University of Political Science and Law, School of Political Science and Public Administration
Bachelor of Public Management, *Summa Cum Laude*

RESEARCH INTERESTS

Science, Technology, & Innovation Policy | Philanthropy & Nonprofit |
Artificial Intelligence & Algorithmic Governance | Computational Social Science

WORKING PAPERS

Science & Technology Innovation

Constructing the Field of Philanthropic and Nonprofit Studies Using Large Language Models with Richard Steinberg, Chao Guo, and Filipi Silva [Under Review]

Modeling Research Novelty Using Network Science: Typology and Metrics with Richard Steinberg, Chao Guo, and Filipi Silva [Final Draft]

Philanthropic Funding and Science Advances with Filipi Silva, Jacob Dalsgaard, and Charlott Ren [Data Analyzing]

Constructing A Comprehensive Database to Analyze the Global Science Funding Landscape using Natural Language Processing with Filipi Silva and Jacob Dalsgaard [First Draft]

Nonprofit Interventions on AI Policy: Participation, Focus, and Effectiveness with Sara Abdulla [Data Analyzing]

Social Innovation

Evaluating Selection Criteria in Social Impact Accelerators: Evidence from the Global Accelerators Learning Initiative with Jacob Dalsgaard and Valentina Assenova [Final Draft]

Tech-Driven Philanthropy: How Alibaba's Charitable Goods Program Encourages Individual Giving with Aihua Wang [Rej. & Revision]

Volunteering Contagion between Adult Siblings: Insights from Machine Learning with Sara Konrath and Femida Handy [Rej. & Revision]

Humanitarian Crisis Volunteering: A Framework from the Afghan Evacuee Response with Jamie Goodwin, Kent Annan, and Jon Bergdoll [Final Draft]

PUBLICATIONS

Peer-Reviewed

[5] Herzog, P.S., **Ai, J.**, Osili, U., Clark, C., & Kou, X. (2023). Bibliometric Applications in Social Science Research: The Social Network Context of Generosity. *IntechOpen*. http://doi.org/10.5772/intechopen.112953

[4] Paarlberg, L.E., **Ai, J.**, LePere-Schloop, M., & Walk, M. (2023). The Political Embeddedness of Voluntary Action: The Case of Local Philanthropic COVID-19 Relief Funds. *Administration & Society.* 55(7), 1402-1431. https://doi.org/10.1177/00953997231177217

[3] Herzog, P.S., **Ai, J.**, & Ashton, J. (2022). Applying Bibliometric Techniques: Studying Interdisciplinarity in Higher Education Curriculum. *Computation*,10(2):26. https://doi.org/10.3390/computation10020026

[2] Paarlberg, L.E., LePere-Schloop, M., Walk, M., **Ai, J.**, & Ming, Y. (2020). Activating Community Resilience: The Emergence of COVID-19 Funds Across the United States. *Nonprofit and Voluntary Sector Quarterly*, 49(6), 1119-1128. https://doi.org/10.1177/0899764020968155

[1] Zhang, T., **Ai, J.**, & Han, P. (2017). The Development of Rational Online Participation Mechanisms from The Perspective of Risk Society Governance. *Modern Management Science* (Chinese Language), 2, 64-66. doi: 10.3969/j.issn.1007-368X.2017.02.021

Non-Peer-Reviewed

[5] **Ai, J.** (2023). How to Measure Novelty of Interdisciplinary Research? A Network Structural Approach. *International Society for Scientometrics and Informetrics. 19th International Conference on Scientometrics & Informetrics Proceedings: Volume 3*. https://doi.org/10.5281/zenodo.11163417

[4] Paarlberg, L.E. & **Ai, J.** (2023). The United Way, in K.P. Kearns & W.J.Wang (Eds), Elgar Encyclopedia of Nonprofit Management, Leadership and Governance, Edward Elgar Publishing Ltd. (Book Chapter)

[3] **Ai, J.,** Cart-Turner, L. Horning, C., & Paarlberg, L.E. (2021). Understanding Cooperation in the Face of Competition: Coopetitive Dynamics between Community Foundations and Local United Ways. https://hdl.handle.net/1805/26481. (Preprint)

[2] Paarlberg, L.E., LePere-Schloop, M., Horning, C., & **Ai, J.** (2020). The Landscape of Community Philanthropy: Navigating Relationships between Local United Ways and Community Foundations. http://hdl.handle.net/1805/25309. (Technical Report)

[1] Zhang, Y. & **Ai, J.** (2016). 2016 Observation Report on China's Third Sector: Resource-Reputation Exchange Theory and Its Application in Nonprofit-Corporate Collaboration. New Jersey, US: Huamin Research Center, Rutgers University. (Technical Report)

FUNDED GRANTS

Co-investigator with P.I. Jamie Goodwin combined a **$7,878** grant for Humanitarian Crisis Volunteering. Issued by *Kindness.org* (KindFund, $4,800) and *Midwest Sociological Society (MSS) Grant for Research* ($3,078), 2022-24.

Student P.I., combined **$4,950** grant for dissertation research - Finding Novel Ideas in Philanthropic Studies. Issued by *Ph.D. Block Research Grant* ($2,250), *Emily Book Fund* ($1,200), and *Student Travel Grant* ($1,500) at Indiana University, Lilly Family School of Philanthropy, 2021-24.

FELLOWSHIPS AND AWARD

CSS Fellow, The Summer Institutes of Computational Social Science (at PENN), 2024
Dickenson-Stone-Ilchman Fellow ($3,000 awards), Indiana University, 2021-23
Doctoral Dissertation Fellowship, ARNOVA, 2020
Graduate Diversity Scholars & Leaders Program, ARNOVA, 2018-20
University Travel Fellowship Award ($2,350), Indiana University, 2021-23
Graduate & Professional Educational Grant ($2,500), Indiana University, 2019-23
Honored Graduate Students (Top 3%), Beijing Municipal Education Commission, 2014
Outstanding Student Leader (Top 1%), Beijing Municipal Education Commission, 2014
Innovative Research Scholarship (Top 5%), China Univ. of Poli.Sci. and Law, 2013

CONFERENCE PRESENTATIONS (SELECTED)

2025 Nonprofit Interventions on AI Policy: Participation, Focus, and Effectiveness. American Society for Public Administration (**ASPA**), Mar 2025. Washington, D.C. (with Abdulla, S. and Guo, C.)

2024 What Does AI Tell Us about Philanthropic and Nonprofit Studies? Association for Research on Nonprofit Organizations and Voluntary Actions (**ARNOVA**), Nov 2024. Washington, D.C. (with Steinberg, R., Guo, C., and Silva, F.N.)

Network Approach to Research Novelty: Typology and Metrics. International Society for Computational Social Science (**IC²S²**), Jul 2024. Philadelphia, PA. (with Silva, F.N., Guo, C., and Steinberg, R)

Mapping Philanthropic Studies Using Natural Language Processing. **IC²S²**, Jul 2024. Philadelphia, PA. (with Silva, F.N., Steinberg, R., and Guo, C.)

Network Approach to Research Novelty: Typology and Metrics. International Conference for Science of Science and Innovation (**ICSSI**), Jul 2024. Washington, D.C. (with Silva, F.N., Guo, C., and Steinberg, R)

2023 Knowledge Evolution in Philanthropic and Nonprofit Studies: A Novelty Perspective. **ARNOVA**, Nov 2023. Orlando, FL.

The State of Nonprofit Research in East Asia: A Bibliometric Analysis. **ARNOVA-Asia** (Virtual), Jul 2023. Tokyo, Japan. (with Guo, C. and Zhang, Z.)

How to Measure Novelty of Interdisciplinary Research? A Network Structural Approach. International Society for Scientometrics and Informetrics (**ISSI)**, Jul 2023. Bloomington, IN.

2022 The Multidimensional Contagion of Volunteering Between Adult Siblings. **ARNOVA**, Nov 2022. Raleigh, NC. (with Konrath, S., and Handy, F.)
*__Nominated for the ARNOVA Best Conference Paper Award__

The Multidimensional Contagion of Volunteering: The Spread of Volunteering Behaviors and Psychological Factors. Science of Philanthropy Initiative (**SPI)**, Sep 2022.Indianapolis, IN. (with Konrath, S. and Handy, F.)

The Development of Network Theorizing. Network Science Society (**NetSci**) (Virtual), Jul 2022. Shanghai, China.

2021 Understanding Multifaceted Inter-Organizational Roles of Community Philanthropic Organizations during the COVID-19 Pandemic through the Lens of Semantic Relationships. Networks 2021: A Joint **Sunbelt** (International Network for Social Network Analysis) and **NetSci** (Virtual), Jul 2021. Bloomington, IN.

2019 The Effect of Proximity on Mission Convergence: The Case of the Local United Ways and Community Foundations. **ARNOVA,** Nov 2019. San Diego, CA. (with Paarlberg L.E. and LePere-Schloop, M.)

Adaptation in Community Philanthropy: Mission Orientation of Local United Ways and Community Foundations. West Coast Nonprofit Data Conference **(WCND)**, Apr 2019. Phoenix, AZ. (with Paarlberg, L.E. and LePere-Schloop, M.)

TEACHING EXPERIENCE

Instructor, School of Social Policy & Practice, University of Pennsylvania. Spring 2025.
NPLD 7890: AI & Emerging Technologies for Nonprofits. Online.
NPLD 7860 (**Co-Instructor**): Strategic Management and Leadership of NPO. In-person.

Co-Designer, School of Philanthropy, Indiana University.
PHST 555: Do No Harm: Grantmaking for Good. 2024.
PHST 530: Economics & Philanthropy. 2023.
PHST 555: Building Board Culture. 2023.
Certificate Program at The Fund Raising School. *"Using Data for Good"* Executive Education Workshop. 2023.

Teaching Assistant (Lecturer Experience), School of Philanthropy, Indiana University.
PHST 210: Philanthropy and the Social Sciences. In-person. 2023 & 2021.
PHST 201: Introduction to Philanthropic Studies. In-person. 2022.
PHST 524: Civil Society in Comparative Perspective. In-person. 2022.
PHST 530: Data for Good. Online. 2022.
PHST 370: Learning by Giving. In-person. 2022.

Teaching Assistant, School of Philanthropy, Indiana University.
PHST 532: Applying Ethics in Philanthropy. Online. 2018.
PHST 401: Ethics & Values of Philanthropy. In-person. 2018.
PHST 530: Philanthropy Ethics East & West. Hybrid. 2017.

INVITED TALKS

Workshop Speaker, University of Pennsylvania, School of Social Policy & Practice, *Lunch & Learn Workshop, AI & Technology for Nonprofits.* 2024.

Guest Lecturer, Wheaton College, HDI 554: Monitoring, Evaluation, and Learning for NGOs. Lecture on *Interpreting Statistics In Quantitative Nonprofit Research*. 2020.

SKILLS

Language: Mandarin Chinese, English.
Programming Language: Python, RStudio, SQL.
Others: Adobe Illustrator, High-performance Computing (HPC), LaTeX.

ACADEMIC AND VOLUNTEER SERVICE

Reviewer, *Nonprofit and Voluntary Sector Quarterly*, *Nonprofit Management & Leadership, Academy of Management Conference Proceedings*, *Emotions.*

Committee Service, Student representative at the Academic Programs Assessment Committee, IU Lilly Family School of Philanthropy. 2020-22.

Conference Panel Chair, ARNOVA. 2018, 2021-23.

Workshop Organizer, Philanthropy Research Workshop, IU Lilly Family School of Philanthropy. 2019.

Symposium Coordinator, The International Symposium on Philanthropy and Commerce, China Institute for Philanthropy and Social Innovation, Renmin University of China, Beijing, China, 2018.

PROFESSIONAL MEMBERSHIPS

Association for Research on Nonprofit Organizations and Voluntary Actions (ARNOVA)
International Society for Computational Social Science (IC^2S^2)
International Society for Scientometrics and Informetrics (ISSI)
American Society for Public Administration (ASPA)

COMPLETED PHD COURSES (SELECTED)

Economics
Computer Methods & Data Analysis (STATA and Casual Inference)
Econometrics I - Statistical Foundations
Economics of Charitable Giving (Game Theory)
Introduction to Experiment Design

Statistics
Introduction to Quantitative Analysis
Applied Regression Analysis (R)
Categorical Data Analysis

Informatics
Introduction to Network Science
Social Networks with Machine Learning (Python)

Statement of Research and Interest in NBER Innovation Boot Camp

Scientific and technological advancement is increasingly shaped by complex interactions among public, private, and nonprofit sectors. My research in science, technology, and innovation (STI) policy examines how funding mechanisms, regulatory frameworks, and emerging technologies drive knowledge production and economic growth. By using large-scale datasets, natural language processing (NLP), network analysis, simulation, and econometric techniques, I analyze the dynamics of science funding, innovation ecosystems, and the role of tech-driven philanthropy in fostering both technological and social innovation. My work contributes to innovation economics by offering empirical insights into R&D spillovers, market failures in innovation, and the institutional drivers of technological progress.

A primary strand of my research focuses on science funding as a catalyst for innovation. Despite substantial investments by government, philanthropic, and business entities, the economic and scientific impacts—and the interactions—among these funding sources remain understudied. My coauthors and I have disambiguated funding information for over 80 percent of articles in the Web of Science, identifying more than one million distinct funding agencies. We are now analyzing funding flows to map the global innovation landscape, with a particular focus on quantifying knowledge spillovers and assessing the additionality of governmental and philanthropic R&D investments. This comprehensive mapping not only provides a detailed picture of the funding ecosystem but also enables testing of economic models of optimal R&D allocation and evaluation of policy instruments designed to stimulate innovation.

I also expect to advance metrics of research novelty by integrating economic perspectives into approaches traditionally based on network science. My previous work has constructed a typology categorizing three types of research novelty. As a next step, I plan to develop economic models to quantify the trade-offs between different forms of novel endeavors. This approach will improve our understanding of how innovation policy instruments and funding mechanisms can be tailored to encourage breakthrough discoveries and maximize the economic returns from R&D investments while preserving the scientific utility of novel ideas.

In another project, I examine how public participation shapes the rulemaking of artificial intelligence (AI) and emerging technologies. My current work applies NLP and econometric methods to analyze the profile of commenters, the content of their submissions, and the impact of these comments posted on regulation.gov on U.S. policy regarding AI and other emerging technologies. I plan to expand this analysis by incorporating game-theoretic models to evaluate how regulatory agencies can structure participation to achieve socially optimal outcomes. This research aims to inform the design of innovation-friendly regulatory environments that balance technological progress with societal concerns.

My research on social innovation extends economic inquiry into entrepreneurship and platform economics. Using double machine learning, my coauthors and I estimated the causal effects of social accelerator programs on entrepreneurial success. We plan to incorporate structural economic models to understand further how these programs drive economic growth and social impact. Additionally, I investigate tech-driven philanthropy, exploring how digital platforms influence charitable giving and social innovation. By analyzing platform incentives and transaction costs, I aim to clarify the role of technology-enabled philanthropy in modern innovation ecosystems and assess its potential to complement traditional innovation policy instruments.

Attending the NBER Innovation Research Boot Camp is an opportunity I eagerly anticipate, as it offers systematic, cutting-edge training in innovation economics alongside a community of scholars at the forefront of innovation policy research. I am excited to join this community, where I can refine my analytical and econometric skills and help bridge the gap between the economics of innovation and the empirical approaches used in the science of science and social innovation studies. By integrating rigorous economic frameworks with my computational methods, I aim to develop more robust models for evaluating the impact of innovation policies and understanding the economic mechanisms driving technological progress. Topics covered by the Boot Camp, such as the economics of intellectual property, R&D tax incentives, and innovation-driven growth, will be essential in enhancing the policy relevance of my research. Moreover, I look forward to engaging in discussions on emerging areas like the economics of AI, which is critical for designing forward-looking innovation policies. By synthesizing these economic insights with my data-driven approach, I aim to develop evidence-based policies that stimulate innovation and maximize its economic and social returns. Ultimately, my goal is to leverage this experience to foster interdisciplinary collaborations that can address complex challenges in innovation policy and drive sustainable technological, social, and economic progress.

To: Selection Committee, NBER Innovation Research Boot Camp 2025

From: Richard Steinberg, Professor of Economics and Philanthropic Studies, Indiana University Indianapolis

Re: Application of Jin Ai

Date: 2/4/2025

It is my pleasure to recommend Jin Ai for the Innovation Research Boot Camp. I sat on her dissertation committee in Philanthropic Studies, a multidisciplinary PhD offered by our Lilly Family School of Philanthropy. In one essay of her dissertation, she distinguished four kinds of research network "novelty," developing measures of each type and measures of the impact of each type of novelty which were then applied to a bibliometric database. I imagine that innovation measures based on a single construct confound distinct processes with distinct impacts, in which case her approach is quite relevant to your Boot Camp. Following her defense in mid-2024, she began a Post-Doc at the University of Pennsylvania, and recently accepted a tenure track Assistant Professor position at Rutgers University Newark.

Jin learned some economics in her PhD (she took my doctoral course Nonprofits in Society, which included material on the economics of giving and volunteering and models of nonprofit behavior), but obviously less than she would have learned in an Economics PhD. However, she also brings a variety of skills that are not part of most Economics PhDs, including the use of large language models, network analysis, and other tools of informatics. She is smart and hardworking, and I believe she can overcome gaps in her knowledge of economic methods. Her career research interests focus on the impact of new technology on society, so she would clearly benefit, and I hope you can accept her for this program. I am happy to answer any questions you might have and am best reached as rsteinbe@iu.edu.