Shangze (Rudy) Dai
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February 11, 2026

NBER Innovation Research Boot Camp Selection Committee

Dear Selection Committee,

I am writing to apply for the 2026 NBER Innovation Research Boot Camp. I am currently a PhD student in Applied Economics at the University of Florida, and I would be very grateful for the opportunity to participate in this program. Enclosed please find my curriculum vitae, coursework list, and one-page research statement.

My recommendation letter writer is my committee chair **Prof. Zhengfei Guan**.

Thank you very much for your time and consideration.

Sincerely,

Shangze (Rudy) Dai

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Research Interests

Innovation and Technological Change; Economics of AI and Automation; Environmental and Resource Economics; Development and Structural Transformation.

Education

University of Florida 2023–2027 (expected)
Ph.D. in Applied Economics GPA: 3.94/4.00

Johns Hopkins University 2023–2026 (expected)
M.S. in Applied & Computational Mathematics GPA: 3.84/4.00

Wuhan University 2020–2023
M.Phil. in Economics GPA: 3.82/4.00

Tongji University 2016–2020
B.S. in Economics (Mathematical Finance) GPA: 4.65/5.00

Selected Publications

- **Dai, S.***, & Ji, J. (2026). Unintended carbon cost of automation technology in transforming economies: The role of capital dependence and structural change. *Ecological Economics*
- **Dai, S.*** (2025). Understanding automation's impact on ecological footprint. *Environmental and Resource Economics*.
- **Dai, S.***, Ji, J., & Yu, H. (2025). Technology import and biased technological progress in transforming economies: Evidence from China. *Review of Development Economics*.
- Yang, B., Fan, F.*, **Dai, S.*** et al. (2025). Industrial robots, resource misallocation, and firm innovation performance. *Journal of Regional Science*.
- **Dai, S.**, Fan, F.*, & Zhang, K. (2025). How enterprise innovation shapes stock price informativeness in emerging economies: Evidence from China. *Applied Economics*,

Selected Working Papers

- **Dai, S.,** & Ji, J., & Huang, K.,* Mitigating the Heat: The role of AI technology in shielding corporate environmental performance from extreme temperatures. *Revise & Resubmit, Business Strategy and the Environment*.
- Yu, H., & **Dai, S.*** Rural e-commerce and land-augmenting technological progress. *Revise & Resubmit, Land Use Policy*.
- **Dai, S.,** & Huang, K.,* AI-cing on the Top of ESG, *Working paper*.

Skills

- Methods: causal inference, applied econometrics, mathematical and structural modeling, optimization and dynamic programming, machine learning, spatial econometrics and spatial data analysis.
- Programming: R, Python, Stata, Matlab, SQL, LaTeX.
- Languages: Chinese (native), English (fluent), French (Basic).

Teaching

Instructor, PhD Math Camp, University of Florida (2025)

PhD Coursework – University of Florida

- Microeconomic Theory I
- Microeconomic Theory II
- Macroeconomic Theory
- Mathematical Statistics for Applied Economics
- Mathematical Methods for Economists
- Game Theory for Economists
- Natural Resource Economics
- Development Economics and Agriculture
- Econometric Methods I
- Computational and Empirical Methods in Economics II
- Applied Microeconometrics
- Machine Learning
- Geographic AI
- Geocomputation Using R Programming
- Applied Valuation Methods
- Empirical Industrial Organization I
- Empirical Industrial Organization II (in progress)

Graduate Coursework – Johns Hopkins University

- Multivariable Calculus and Complex Analysis
- Introduction to Optimization
- Statistical Methods and Data Analysis
- Real Analysis
- Ordinary Differential Equations
- Partial Differential Equations
- Nonlinear Differential Equations and Dynamical Systems
- Probability and Stochastic Processes I
- Probability and Stochastic Processes II (in progress)
- Theory of Machine Learning (in progress)

Research Statement

I am currently a PhD student in Applied Economics at the University of Florida, and I am at a pivotal stage of finalizing my dissertation agenda. My broader research examines the economics of innovation and new technology, particularly AI and automation, and how technological change shapes distributional and environmental outcomes.

In my completed work, I study the environmental consequences of automation and highlight two countervailing forces: a consumption/leisure channel that can increase ecological pressure and a conservation channel that can improve environmental quality. Importantly, I show that environmental awareness and technological advancement shape the relative strength of these channels and determine which force dominates in practice. Building on this perspective, I also find that automation may raise carbon intensity in transforming economies by increasing capital dependence and accelerating structural change. I have also pursued related work on technological change beyond environmental outcomes, including how it interacts with resource misallocation and influences the direction of technological progress.

My primary dissertation project investigates how AI adoption redirects the direction of technological progress within U.S. manufacturing and other industrial firms and what this implies for labor income and inequality. I identify firm-level AI adoption through textual analysis of publicly listed firms' annual reports and estimate dynamic effects using staggered adoption event-study designs following the Sun and Abraham framework. The central outcome is biased technological progress, measured by whether AI systematically tilts technical change toward labor-saving innovation. I then examine how this bias translates into distributional consequences using structural model. The key policy implication is that manufacturing revitalization in the AI era may not automatically raise labor incomes: even if AI expands output and demand, it can increase the relative return to capital and amplify inequality under existing institutions, offering a new perspective on current U.S. policy expectations and the need for complementary policies to achieve inclusive growth.

My second dissertation line studies innovation in agriculture and its positive externalities for resilience and food security. The 2022 U.S. Census of Agriculture newly reports adoption of precision agriculture technologies such as drones and sensor-based tools. I plan to combine county-level adoption measures with geospatial data on extreme heat and drought to test whether precision technology adoption reduces yield losses during adverse weather and lowers yield sensitivity to climate shocks. Beyond private productivity gains, the broader motivation is societal: improving yield stability during extreme events can generate positive externalities through more reliable food supply, reduced volatility, and greater food security. A central policy implication is the importance of complementary infrastructure that enables diffusion and effective use of these technologies, especially rural connectivity and information infrastructure.

I am eager to attend the NBER Innovation Research Boot Camp because it offers a high-level, in-person setting to understand the field's frontier and to build relationships that support long-run research development. Looking beyond the dissertation, and with the goal of building a long-run research career, I aim to develop a clearer sense of which questions are well understood, which remain open, and which issues are most urgent from both scientific and policy perspectives. This Boot Camp would provide a direct window into current frontier debates and the standards by which leading scholars evaluate contributions. Further, interacting in person with faculty and peers would help me internalize how top researchers identify important questions, connect micro evidence to broader economic mechanisms, and translate research into policy-relevant insights. This exposure will help me lay a foundation for a coherent, long-term research agenda.

UF UNIVERSITY of FLORIDA

Institute of Food and Agricultural Sciences
Food and Resource Economics Department

Citrus Research and Education Center
700 Experiment Station Rd
Lake Alfred, FL 33850
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February 10, 2026

Selection Committee
NBER Innovation Research Boot Camp 2026

Dear Committee Members,

I write to provide my highest recommendation in support of Mr. Shangze Dai's application for the 2026 NBER Innovation Research Boot Camp. As his PhD advisor, I can attest to his remarkable research potential.

Shangze is exceptionally talented. He published eight papers in 2025 alone and is well beyond the level expected of a PhD student. Focusing on the economics of innovation, he has completed several solid projects on technological change, including work on automation and environmental outcomes, demonstrating a strong ability to integrate theory, data, and policy-relevant questions.

Shangze has a firm grounding in economic theory and strong technical skills. He has developed theoretical models with highly relevant applications. In one line of work, his model shows how foreign export controls, when combined with a large domestic market, can drive firms toward indigenous innovation and move up the technology frontier. This framework explains the patterns of technological advancement observed in China, illustrating his sharp instinct and ability to address important and timely questions.

With his intellectual curiosity and deep engagement with the innovation literature, he would both benefit from and contribute in distinctive ways to the NBER Innovation Research Boot Camp. I recommend him without reservation and believe he is a candidate worthy of special attention.

Thank you.

Sincerely,

Zhengfei Guan
Associate Professor, Food and Resource Economics
guanz@ufl.edu

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