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Recommendation letter writer:
Jennifer La'O
Columbia University, Economics
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February 10, 2026

Re: Application to the NBER Innovation Research Boot Camp 2026

Dear Selection Committee,

I am writing to apply to the NBER Innovation Research Boot Camp 2026. I am a third-year PhD student in Economics at Columbia University (Business Economics track), and my research interests center on innovation and growth, with an emphasis on modeling research as an inherently uncertain, learning-driven activity. I am developing a dissertation agenda that bridges micro-theoretic tools for experimentation into macroeconomics, with the goal of producing theory that is both disciplined and useful for policy.

My background combines formal training in macroeconomics with experience working on applied questions as a research assistant. I have also spent time in policy institutions (including the European Commission and the Italian Council of State). My CV provides full details on my training and experience.

I am particularly drawn to the Boot Camp because it offers structured exposure to the innovation literature and, just as importantly, sustained interaction with researchers who approach innovation from different angles. That multidisciplinary setting is a strong match for my current stage: it would help me sharpen how to bridge the macroeconomic literature on growth and innovation with microeconomic insights, learn what empirical patterns are most informative to target in theory, and build connections with scholars working across different fields. I would be grateful for the opportunity to participate and to engage actively with the cohort and faculty.

Thank you for your consideration.

Sincerely,
Guglielmo Imperiali

The following is a list of the coursework I completed in the first two years of my PhD.

Coursework

- **First year:**
  - First-year sequences in *Microeconomics*, *Macroeconomics*, and *Econometrics*
  - *Mathematical Methods for Economics* (J. La'O)
  - *Perspectives on Economic Research* (S. Naidu, J. Stiglitz)
  - *Financial Economics of Climate Change* (online inter-doctoral course)
- **Second year:**
  - *International Macro-Finance* (J. Schreger)
  - *Topics in Macro-Development, Growth, and Firm Dynamics* (T. Porzio, C. Walsh)
  - *Macroeconometrics* (J. Bai)
  - *Climate Economics and Finance* (H. Hong, J. Scheinkman)
  - *Trade and Spatial Economics* (J. Dingel)
  - *Computational Macroeconomics* (V. Midrigan)

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EDUCATION

Columbia University, New York, USA — *Aug 2023 - present*
PhD in Economics, Business Economics Track

Bocconi University, Milan, Italy — *Sep 2020 - Mar 2023*
MSc Economic and Social Sciences (ESS-DES) **Summa cum Laude**

Bocconi University, Milan, Italy — *Sep 2017 - Oct 2020*
BSc International Economics and Finance (BIEF) **Summa cum Laude**
Exchange semester at Columbia University, Spring 2020

RESEARCH EXPERIENCE

Research Assistant for Prof. Decarolis (Bocconi, IGIER), Milan, Italy — *Nov 2022 - Jun 2023*
Topics: competition in digital markets

Research Assistant for Prof. Giustinelli (Bocconi, IGIER), Milan, Italy — *Oct 2021 - Jun 2022*
Topics: education policy and climate change

OTHER EDUCATION

Alliance Graduate Summer School, Paris, France — *Jun 2024*

Exchange student, **Columbia College**, New York, USA — *Spring 2020*

PROFESSIONAL EXPERIENCE

Teaching Assistant for undergrad International Trade, Columbia University — *Fall 2025 - Spring 2026*
Undergraduate course, Profs. Noor and Dingel

Committee for the Reform of Public Procurement Law, Rome, Italy — *Jul 2022 - Oct 2022*
Italian Council of State, *Assistant to Prof. Francesco Decarolis*

EU Commission, DG Economic and Financial Affairs, Bruxelles, Belgium — *Jun 2021 - Sep 2021*
Unit L.4 "Investment Programmes Management", *Trainee*

Private tutor for Macroeconomics, undergraduate level, Milan, Italy — *Oct 2022 - Dec 2022*

LANGUAGE AND IT SKILLS

Languages: Italian (native), English (proficient), German (intermediate)
Programming skills: Stata, Python, Matlab

Essay on research interests

My research agenda sits at the intersection of macroeconomics and innovation, with a focus on how the economy generates new ideas when research is inherently uncertain and learning is gradual. A motivating gap is that workhorse growth models treat innovation as a smooth function of R&D inputs (Romer, 1990; Aghion and Howitt, 1992; Jones, 1995), while the underlying process is closer to sequential experimentation: researchers choose among approaches with uncertain payoffs, update beliefs as evidence arrives, and reallocate effort in response to new information and competitive pressure. I am interested in bringing that micro-theoretic structure into macroeconomics in a way that preserves tractability, delivers clear welfare implications, and generates testable predictions about how market structure and policy affect the nature of innovation—not only its level.

A core pillar of my current project is to use a bandit-style framework (e.g., Bergemann and Välimäki, 2018) to model research choice under uncertainty within an endogenous growth environment. The main idea is to capture the value of learning as the "option value" of research: pursuing uncertain projects is valuable not only because it may succeed, but because it generates information that changes future decisions. Embedding this logic into a macro setting provides a disciplined way to study how incentives and competition shape experimentation intensity (Bolton and Harris, 1999; Keller et al., 2005; Keller and Rady, 2010), risk-taking in research, and the pace at which new technologies arrive. More broadly, this approach helps connect micro-level decision problems on optimal experimentation to aggregate outcomes such as productivity growth and welfare.

Looking forward, I plan to expand this research program along two complementary dimensions. First, I want to explore how different policies affect experimentation incentives in general equilibrium. Standard tools such as patent design, R&D subsidies, and competition policy plausibly shift the allocation between safer incremental work and riskier exploration. A bandit-based macro framework can help clarify when greater competition encourages exploration versus when it leads to duplication and short-termism and contribute with a new perspective to the long literature on the topic (e.g., Jovanovic and Rob, 1989; Aghion et al., 2005).

Second, I aim to discipline the model with empirical findings from the empirical innovation literature (e.g., Bloom et al., 2020). I am applying to the NBER Innovation Research Boot Camp because its multidisciplinary environment would directly support this second goal. Exposure to researchers who measure and study innovation from different angles would help me identify which empirical patterns are most robust and informative for theory, and translate those insights into a macro framework.

References

Aghion, P., Bloom, N., Blundell, R., Griffith, R., and Howitt, P. (2005). Competition and innovation: An inverted-u relationship. *The quarterly journal of economics*, 120(2):701–728.

Aghion, P. and Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, 60(2):323–351.

Bergemann, D. and Välimäki, J. (2018). Bandit problems. In *The new Palgrave dictionary of economics*, pages 665–670. Springer.

Bloom, N., Jones, C. I., Van Reenen, J., and Webb, M. (2020). Are ideas getting harder to find? *American Economic Review*, 110(4):1104–1144.

Bolton, P. and Harris, C. (1999). Strategic experimentation. *Econometrica*, 67(2):349–374.

Jones, C. I. (1995). R & d-based models of economic growth. *Journal of political Economy*, 103(4):759–784.

Jovanovic, B. and Rob, R. (1989). The growth and diffusion of knowledge. *The Review of Economic Studies*, 56(4):569–582.

Keller, G. and Rady, S. (2010). Strategic experimentation with poisson bandits. *Theoretical Economics*, 5(2):275–311.

Keller, G., Rady, S., and Cripps, M. (2005). Strategic experimentation with exponential bandits. *Econometrica*, 73(1):39–68.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2):S71–S102.

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

ECONOMICS

February 15, 2026

NBER Innovation Research Boot Camp 2026
National Bureau of Economic Research

Dear Members of the Innovation Research Boot Camp Selection Committee,

I am writing in enthusiastic support of **Guglielmo Imperiali** for admission to the NBER Innovation Research Boot Camp.

Guglielmo is currently a third-year PhD student in our economics Ph.D. program at Columbia University. I first met Guglielmo when he entered our Ph.D. program in the Fall of 2023. In that semester, Guglielmo excelled in my first-year Ph.D. macro course, earning one of top grades of his cohort. I have since become one of Guglielmo's main advisors, along with Conor Walsh in the business school.

Guglielmo's research agenda sits at the intersection of macroeconomics and innovation. He is currently working on a project of innovation through sequential experimentation and asks how this research process affects economic growth.

In this project, Guglielmo is developing a bandit-style framework for R&D in an endogenous growth model. The researchers (firms) in his model are uncertain about a new technology. As in bandit problems they face a trade-off between between costly exploration (risky experimentation) and technological breakthroughs. As a result, researchers learn from their failures and reallocate effort as evidence accumulates. Guglielmo is currently in the process of embedding this bandit problem in a micro-founded general equilibrium macro model with market competition. The ultimate goal is to micro-found the "innovation production function" by explicitly modeling the research strategy. This is a difficult problem because it introduces strategic interaction among innovators: market competition affects experimentation incentives. The end goal is to consider how market competition affects the research strategies of firms, and how this ultimately impacts innovation and macroeconomic growth.

I can say without hesitation that Guglielmo is one of the most promising young researchers in our program—he is intellectually ambitious, technically strong, and thoughtful. He would benefit greatly from this boot camp as he would be exposed to the frontier of research in innovation and endogenous growth. As his work is

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heavily influenced by both the micro and macro perspective, this boot camp would provide an ideal setting for him to sharpen his research skills and engage with the top research in the field in both micro and macro. He brings to the table strong quantitative and technical skills, and a healthy appetite to learn new tools and methods.

To conclude, I give **Guglielmo Imperiali** my strongest possible recommendation to the NBER Innovation Research Boot Camp. I am confident that he would both benefit from and contribute meaningfully to the Innovation Research Boot Camp community.

Please do not hesitate to contact me with further questions.

Best regards,



Jennifer La'O