Songyuan Teng
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January 29, 2026

Dear Members of the Selection Committee,

I am a sixth-year Ph.D. candidate in Economics at Yale University, and I am writing to apply to the NBER Innovation Research Boot Camp 2026. My research studies the economics of innovation using micro-level measurement from the pharmaceutical industry, with a focus on how new knowledge and "recombinations" of existing knowledge shape firm dynamics, productivity growth, and innovation policy.

This boot camp offers an exceptional opportunity to engage with frontier research in the economics of innovation and connect with the broader innovation research community, including participants in the NBER Summer Institute Innovation Policy meeting. My research is inspired by and closely related to the work of many invited speakers, and I would greatly value the chance to learn from them and other speakers and participants, share my research, and receive their feedback. I expect the program will deepen my understanding of innovation processes and outcomes while broadening my perspective on the empirical methods, theoretical frameworks, and first-order policy discussions that shape this field.

I would be honored to participate in the program and am available for the full program. My CV, transcript, and statement of research and intent are included. My recommendation letter writer will be Professor Samuel Kortum, Departmental Chair and James Burrows Moffatt Professor of Economics at Yale University.

I sincerely appreciate your consideration.

Sincerely,

Songyuan Teng

November 2025

Songyuan Teng

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E-mail: songyuan.teng@yale.edu

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Fields of Concentration:
Primary Field: Macroeconomics
Secondary Field: Economic Growth, Innovation

Qualifying Examinations Completed:
2022: (Oral) Macroeconomics, Financial Economics
2021: (Written) Macroeconomics, Microeconomics

Dissertation Title: Essays on the Macroeconomics of Economic Growth

Committee:
Professor Michael Peters (Co-Chair)
Professor Fabrizio Zilibotti (Co-Chair)
Professor Samuel Kortum

Education:
Ph.D., Economics, Yale University, 2026 (expected)
M.Phil., Economics, Yale University, 2023
M.A., Economics, Yale University, 2022
B.Sc., Quantitative Finance, Hong Kong University of Science and Technology, 2020

Fellowships, Honors and Awards:
University Dissertation Fellowship, Yale University, 2025 – 2026
Nathan Hale Associates Fellow, Yale University, 2021
Doctoral Fellowship and Cowles Foundation Fellowship, Yale University, 2020 – 2026

Teaching Experience:
Fall 2024, Teaching Assistant to Prof. Benjamin Polak, Game Theory (Undergraduate/MBA cross registration), Yale University
Spring 2024, Teaching Assistant to Prof. Fabrizio Zilibotti, Introductory Macroeconomics (Undergraduate), Yale University
Fall 2023, Teaching Assistant to Prof. Michael Peters, Introductory Macroeconomics (Undergraduate), Yale University

Spring 2023, Teaching Assistant to Prof. Tony Smith, Computational Methods in Economics (Undergraduate/Ph.D. cross registration), Yale University

Fall 2022, Teaching Assistant to Prof. Eduardo Dávila, Financial Economics (Undergraduate), Yale University

Work Experience:

Projects Officer, International Monetary Fund, July – August 2022

Publications:

"Dynamic Bank Expansion: Spatial Growth, Financial Access, and Inequality" (2023) [with Yan Ji and Robert Townsend], *Journal of Political Economy,* Volume 131, Issue 8, p. 2209-2275

Working Papers:

*"*Innovation through Recombination" (October 2025), *Job Market Paper*

Work In Progress:

*"*Learning Complementarity via Experiment: A Bayesian Theory of Combinatorial Innovation" (October 2025)

Seminar and Conference Presentations:

2021: Asian Meeting of the Econometric Society, China Meeting of the Econometric Society, Society for Economic Dynamics

Languages:

Chinese (native), English (fluent)

Yale University

Unofficial Academic Transcript

This is not an official transcript. Courses which are in progress may also be included on this transcript.

Transcript Data

STUDENT INFORMATION

Name
Songyuan Teng

Current Program

Doctor of Philosophy

College
Graduate School of Arts & Sci

Major
Economics

DEGREE AWARDED

Sought
Doctor of Philosophy

Awarded
Master of Arts

Degree Date
05/23/2022

Awarded
Master of Philosophy

Degree Date
12/21/2023

INSTITUTION CREDIT

Term: Fall 2020

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
ECON	500	Graduate	GG	General Economic Theory: Microeconomics	HP	1.000	
ECON	510	Graduate	GG	General Economic Theory: Macroeconomics	H	1.000	
ECON	550	Graduate	GG	Econometrics I	H	1.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	3.000	3.000	3.000
Cumulative	3.000	3.000	3.000

Term: Spring 2021

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
ECON	501	Graduate	GG	General Economic Theory: Microeconomics	H	1.000	
ECON	511	Graduate	GG	General Economic Theory: Macroeconomics	H	1.000	
ECON	551	Graduate	GG	Econometrics II	H	1.000	
ECON	581	Graduate	GG	American Economic History	H	1.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	4.000	4.000	4.000
Cumulative	7.000	7.000	7.000

Term: Fall 2021

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
ECON	525	Graduate	GG	Adv Macroeconomics I	H	1.000	
ECON	556	Graduate	GG	TopicsEmpiricalEcon&PublicPlcy	HP	1.000	
ECON	670	Graduate	GG	Financial Economics I	H	1.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	3.000	3.000	3.000
Cumulative	10.000	10.000	10.000

Term: Spring 2022

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Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
ECON	526	Graduate	GG	Adv Macroeconomics II	H	1.000	
ECON	531	Graduate	GG	Mathematical Economics II	H	1.000	
ECON	672	Graduate	GG	Behavioral Finance	H	1.000	
GSAS	901	Satisfactory/ Unsatisfactory	GG	Pre-CandidacyAppldRsrchExprnc	SAT	0.000	
MATH	251	Audit	GG	Stochastic Processes	NA	1.000	
MGMT	737	Graduate	GG	Applied Empirical Methods	H	1.000	
MGMT	746	Audit	GG	Financial Crises	AUD	1.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	4.000	4.000	4.000
Cumulative	14.000	14.000	14.000

Term: Fall 2022

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
ECON	525	Audit	GG	Adv Macroeconomics I	NA	1.000	
ECON	540	Satisfactory/ Unsatisfactory	GG	Student Wkshp Macroeconomics	SAT	1.000	
ECON	678	Audit	GG	Macro Finance	AUD	1.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	1.000	1.000	1.000
Cumulative	15.000	15.000	15.000

Term: Spring 2023

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
ECON	541	Satisfactory/ Unsatisfactory	GG	StudentsWrkshpMacroeconomics	SAT	1.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	1.000	1.000	1.000
Cumulative	16.000	16.000	16.000

Term: Fall 2023

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
DISR	999	Credit/No Credit	GG	Diss Research - in Residence	CR	0.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	0.000	0.000	0.000
Cumulative	16.000	16.000	16.000

Term: Spring 2024

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
DISR	999	Credit/No Credit	GG	Diss Research - in Residence	CR	0.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	0.000	0.000	0.000
Cumulative	16.000	16.000	16.000

Term: Fall 2024

Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
DISR	999	Credit/No Credit	GG	Diss Research - in Residence	CR	0.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	0.000	0.000	0.000
Cumulative	16.000	16.000	16.000

Term: Spring 2025

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Subject	Course	Grade Mode	Level	Title	Grade	Credit Hours	R
DISR	999	Credit/No Credit	GG	Diss Research - in Residence	CR	0.000	

Term Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Current Term	0.000	0.000	0.000
Cumulative	16.000	16.000	16.000

TRANSCRIPT TOTALS

Events
Qualifying Examination Passed

Events
Prospectus Approved

Events
Admitted to Candidacy

Transcript Totals (Graduate: Graduate School)	Attempt Hours	Passed Hours	Earned Hours
Total Institution	16.000	16.000	16.000
Total Transfer	0.000	0.000	0.000
Overall	16.000	16.000	16.000

COURSE(S) IN PROGRESS

Term: Fall 2025

Subject	Course	Grade Mode	Level	Title	Credit Hours	Start and End Dates
DISR	9999	Credit/No Credit	GG	Diss Research - in Residence	0.000	

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Statement of Research and Application Intent

Songyuan Teng

My research focuses on the macroeconomics of growth and innovation. Specifically, I study (i) the nature of innovation and its implications for growth, and (ii) the frictions to innovation and economic growth, and how they shape macroeconomic outcomes. Methodologically, I pair granular measurement (e.g., chemical substructures in drugs) with micro-founded quantitative models disciplined by micro data to deliver positive and policy-relevant normative insights.

Current research. My job market paper, "Innovation through Recombination," examines how new ideas emerge by recombining existing knowledge. Using pharmaceutical data where I can distinguish between discovering new chemical building blocks (novelty) and assembling them into products (recombination), I document the rising importance of recombination, trace firm life-cycles from knowledge accumulation to recombination, and uncover value premia for novelty. I develop a theory of firm dynamics that distinguishes knowledge stocks from product portfolios and in which growth is sustained by the expanding scope of recombination. The calibrated model reveals sharp policy trade-offs: subsidizing novelty boosts short-run growth, while subsidizing recombination raises long-run growth with heterogeneous effects across firms. In ongoing work, "Learning Complementarity via Experiment," I study how firms learn about ingredient complementarities through costly experimentation. Using graph neural networks to solve the dynamic problem, I show that novelty and recombination are mutually reinforcing, and that gains from diffusion policies depend critically on how disclosed information complements a firm's existing knowledge.

Future work. My future work advances two directions. First, I will link ingredient-based measures to pharmaceutical worker-mobility data to quantify knowledge diffusion through labor reallocation. Second, I will analyze patent text data using large language models to map how recombination operates within and across markets.

Application intent. This boot camp offers an exceptional opportunity to engage with frontier research in the economics of innovation and connect with the broader innovation research community, including participants in the NBER Summer Institute Innovation Policy meeting. My research is inspired by and closely related to the work of many invited speakers, and I would greatly value the chance to learn from them and other speakers and participants, share my research, and receive their feedback. I expect the program will deepen my understanding of innovation processes and outcomes while broadening my perspective on the empirical methods, theoretical frameworks, and first-order policy discussions that shape this field. The interdisciplinary environment will help me refine my research agenda and develop collaborations that advance our understanding of how innovation shapes economic growth.

January 29, 2026

Dear Brett,

What follows is my recommendation for Songyuan Teng, who has applied to the Innovation Research Boot Camp 2026.

Songyuan is a Yale PhD candidate currently on the market. He has some good flyouts but is still waiting on offers. I think Songyuan is an excellent candidate for the Innovation Bootcamp. His job-market paper features novel data construction, novel empirical work, and novel modeling, combining these ingredients to get new insights about the elusive innovative process. His starting point is to take Weitzman (1998), and Jones (2023) seriously: perhaps many innovations are simply new combinations of existing ideas or ingredients. He was determined to find a setting in which he could measure this phenomenon and make it more than just a metaphor.

Measurement led Songyuan to the pharmaceutical industry. He got deeply into the chemistry of drug discovery and the chemical makeup of small-molecule drugs in particular. He settled on building a dataset of anti-allergics, with a steady flow of around 650 new patented drugs per year over two decades starting in 1990. Within this set, about 80% are recombinations that introduced no new functional groups, a fraction that has been rising over time. Within these combinations, about half did not even contain any functional group that the discovering firm had not previously used.

These findings motivate Songyuan's model of innovation by firms. A firm has two state variables: (i) the number of drugs it has discovered and (ii) the number of ingredients it has discovered. The firm chooses between innovating on a new drug that involves a new ingredient (functional group) and innovating by simply recombining its existing set of ingredients. A calibrated version of this model is very successful in matching the firm-level facts.

Given his contributions so far, I think Songyuan will value an introduction to the broader community of researchers that share his interest in the economics of innovation, while following a variety of methodologies. Songyuan would also be a good contributor to the group as he is friendly and is also an excellent presenter of his work. Songyuan's personality and research style are reminiscent of an earlier Yale PhD student, Bernardo Ribeiro, who got a huge boost from the Bootcamp.

Samuel Kortum
James Burrows Moffatt Professor of Economics
Chair, Department of Economics
Yale University