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February 8, 2026

Innovation Research Boot Camp,
National Bureau of Economic Research,
1050 Massachusetts Avenue,
Cambridge, MA 02138.

Dear Members of the Review Panel,

I am applying to the NBER Innovation Research Boot Camp 2026. I am an Economics PhD candidate on the 2025-2026 job market at Binghamton University, working in empirical industrial organization with applications in environmental economics and efficiency analysis using micro econometric tools. My research asks a simple question with real stakes: when firms face environmental pressure, what defines their choices of practical process change versus invention and technology creation, and what do those choices imply for productivity, competitiveness, and policy effectiveness.

My job market paper, "*Pollution Prevention or Green Innovation: Unraveling Firms' Environmental Choices*," compares process-based source reduction with patent based green innovation, bringing two corporate environmental actions that are often studied separately into a single framework. Using firm data linked to enforcement, patents, and emissions, I find evidence of partial substitution between these actions. Both reduce emissions, but their broader payoffs differ in ways that matter for how we think about innovation incentives: green innovation is more strongly tied to market power and lower future enforcement risk, while pollution prevention delivers more immediate environmental gains. The larger takeaway is that firms respond not only to regulation and costs, but also to how markets and institutions reward different forms of environmental action.

I am drawn to the boot camp because it will place my work in conversation with a small cohort and with faculty who approach innovation from both economics and strategic management. My next step is to expand my current work into a coherent model of firm innovation choices that links green innovation and operational responses to broader firm outcomes such as market power, regulatory exposure, and firm valuation, and then use that structure to speak more cleanly to innovation policy tradeoffs. I would gain a lot from feedback on how to formalize these mechanisms, choose the right innovation measures, and connect identification choices to the policy questions innovation economists care about. At the same time, I think my focus on green innovation would add something useful to the group because it naturally forces the question of when innovation generates private returns versus broader social gains, and how policy can shift firms toward the kinds of innovation that matter for both competitiveness and environmental performance.

Recommendation letter writer: Yingjun Su- Assistant Professor of Economics at Binghamton University (ysu6@binghamton.edu).

Thank you for considering my application.

Sincerely,

Sumaya Falak Memon.

Sumaya Falak Memon

Department of Economics,
Binghamton University
Library Tower 905
Binghamton, NY 13902

Phone: +1 (607) 372-4434
Email: smemon1@binghamton.edu
Web: sites.google.com/.../sumaya-memon
LinkedIn: linkedin.com/in/sumaya-memon

Education

Ph.D. Economics, SUNY Binghamton, USA — 2020–2026 (Expected)
M.S. Economics, IBA Karachi, Pakistan — 2017–2019
B.B.A., SZABIST Hyderabad, Pakistan — 2011–2015

Experience

Instructor, SUNY Binghamton — 2024–2025

- Economics of Poverty & Discrimination (Winter 2024)
- Introduction to Labor Economics & Industrial Relations (Co-instructor, Fall 2025)

Teaching Assistant, SUNY Binghamton — 2022–Present

- Economics of Labor (Fall 2022)
- Intro to Econometrics (Spring 2023, 2024, 2025, 2026)
- Evolution of Economic Ideas; Economic Development of East Asia (Fall 2023, 2024)

Program Associate, IRD Pakistan — 2019–2020

- Pakistan Deworming Initiative: data analysis, drafting materials, writing reports and policy briefs.

Teaching/Research Assistant, IBA Karachi, Pakistan — 2017–2019

Awards

HEC-Fulbright Ph.D. Scholarship — 2019
Graduate Tuition Award, SUNY Binghamton — 2020–2026

Conference Presentations

31st Ulvön Conference on Environmental Economics, Umeå, Sweden — June 10–12, 2025
AERE at Western Economic Association International Meetings, Denver, Colorado *(scheduled)* — June 29–July 3, 2026

Working Papers

Does Pollution Prevention Enhance Firm Efficiency? Insights from U.S. Manufacturing (with Subal Kumbhakar & Yingjun Su) — (*R&R at International Journal of Industrial Organization*)

Work in Progress

Pollution Prevention or Green Innovation? Unraveling Firms' Environmental Choices — *Job Market Paper*
Role of Preventive and Control Investments in Pollution Management: Swedish Manufacturing (with Shuyi Wang & Subal Kumbhakar)
Product Market Turnovers in India: Distortions, Creative Destruction, or Consumer Appeal? (with Wenya Wang & Subal Kumbhakar)

Academic Projects

"Estimating Production Functions in the Face of Regulations: A Case of U.S. Manufacturing" (Prospectus Defense) — Dec 2023

"Exploring Heterogeneity in the Cash Transfer Amount: Insights from a Cash Transfer Program in Pakistan" — May 2023

"Climate Change and the Environmental Aspects of the Water Sector in Sindh" – input to Sindh Water Policy — Sep 2019

Translated "Business Skills Training in Tharparkar, Sindh" modules (English–Sindhi), IBA Karachi & Government of Sindh — May 2018

"Climate Change and Environmental Aspects of Agricultural Sector in Sindh," World Bank–funded project — Dec 2017

Extracurriculars

Treasurer, Economics Graduate Student Organization, Binghamton University — 2021–2022

Skills, Languages, & Others

- Stata, R, LaTeX; data analysis and document preparation.
- Languages: English (Proficient), Urdu (Native), Sindhi (Mother Tongue).
- Citizenship: Pakistan (F-1 Visa, OPT Eligible)

References

Prof. Subal C. Kumbhakar (Chair)
Distinguished Professor of Economics
Binghamton University
Email: kkar@binghamton.edu

Yingjun Su (Co-Chair)
Assistant Professor of Economics
Binghamton University
Email: ysu6@binghamton.edu

Wenya Wang
Lecturer of Economics
Binghamton University
Email: wwang21@binghamton.edu

My research is in empirical industrial organization with applications in environmental economics and efficiency analysis using micro econometric tools. I ask how firms reconcile economic performance with environmental responsibility, and how they internalize regulation and external pressure through real changes in technology and operations. I focus on two tools that firms increasingly use to manage pollution. One is process-based source reduction, the other is technology driven green innovation through patenting. I study these choices because they are not symbolic. They shape productivity and competitiveness, and they also shape how markets and regulators respond to firms over time.

My current work centers on measuring the economic and environmental consequences of pollution prevention, and on understanding why firms choose prevention versus innovation. In "*Does Pollution Prevention Enhance Firm Efficiency*?" I study publicly traded US manufacturing firms that report to the EPA Toxics Release Inventory and estimate both economic efficiency and environmental efficiency using a stochastic frontier framework with a by production structure. The results suggest that source reduction improves both dimensions. Similarly, my job market paper, "*Pollution Prevention or Green Innovation: Unraveling Firms' Environmental Choices*," brings the prevention and innovation margins into a single framework. I link emissions data to patents, enforcement, and firms' financial data to study both environmental outcomes and market outcomes. The main idea is that firms face multiple ways to respond to environmental pressure, and those ways can compete inside the firm. The evidence points to partial substitution between process-based source reduction and patent based green innovation, and to systematic differences in payoffs. Both actions reduce emissions, but green innovation is more strongly tied to outcomes such as pricing power and lower future enforcement risk. I interpret these patterns as evidence that firms respond not only to regulation and compliance costs, but also to how markets and institutions reward different forms of environmental action.

Looking ahead, I am working on a project with collaborators at Umeå University that studies preventive and end of pipe abatement investments in Swedish manufacturing, across multiple pollutants such as CO2, NOx, and SO2. The Swedish data allow prevention and control expenditures to be separated, which creates a rare opportunity to evaluate cost effectiveness and productivity implications in a mature regulatory setting. Second, I am developing a separate project on product market turnover in Indian manufacturing to understand resource reallocation and aggregate growth when distortions and consumer appeal shape product line entry and exit. These projects broaden my toolkit and help me remain grounded in firm decision making across settings, while keeping the common theme of how incentives and constraints shape firm dynamics.

I am applying to the NBER Innovation Research Boot Camp because my core question is increasingly an innovation question, and I am building toward a working model of firms' innovation choices that links green innovation and operational responses to outcomes such as productivity, market power, regulatory exposure, and firm valuation, and then uses that structure to speak to innovation policy tradeoffs. The boot camp is the right place to stress test and refine this framework, especially given the speakers span both economics and strategic management. I want to sharpen how I translate innovation policy and regulatory incentives into a welfare relevant interpretation, while also taking seriously the organizational channels that determine whether firms innovate through patenting, operational change, or both. I also think this focus on green innovation can add to innovation policy discussions because it offers a setting where private returns and social gains may diverge, and where the policy implications are not always obvious from innovation counts alone.

BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

OFFICE OF THE REGISTRAR
State University of New York at Binghamton
Binghamton, New York 13902-6000

Record of: Sumaya Falak Memon
Date Issued: 25-JUN-2025
Level: Graduate

Date of Birth: 23-APR-1993
Student ID: B00863550
SSN:

Issued To: SUMAYA MEMON
SMEMON1@BINGHAMTON.EDU
REFNUM:58199726

Transcript key:
https://www.binghamton.edu/registrar/student/transcripts/transcript-key.html

Course Level: Graduate
Only Admit: Fall 2020

Current Program
Doctor of Philosophy
Program : Harpur Doctor of Philosophy
College : GD Harpur
Major : Economics

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
INSTITUTION CREDIT:						
Fall 2020						
GD Harpur						
Economics						
ECON	603	AdvMath.Analysisfor Economists	1.00	A	4.00	
ECON	611	Microeconomic Theory I	4.00	B+	13.20	
ECON	613	Macroeconomic Theory I (DIS)	4.00	A-	14.80	
ECON	615	Economic Statistics	4.00	B+	13.20	
Ehrs: 13.00 GPA-Hrs: 13.00 QPts: 45.20 GPA: 3.47						
Graduate Good Standing						
Spring 2021						
GD Harpur						
Economics						
ECON	612	Microeconomic Theory II	4.00	A-	14.80	
ECON	614	Macroeconomic Theory II	4.00	B	12.00	
ECON	616	Econometrics	4.00	A-	14.80	
Ehrs: 12.00 GPA-Hrs: 12.00 QPts: 41.60 GPA: 3.46						
Graduate Good Standing						
Fall 2021						
GD Harpur						
Economics						
ECON	617	Applied Econometrics	4.00	B+	13.20	

********** CONTINUED ON NEXT COLUMN **********

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
Institution Information continued:						
ECON	682	Environmental And Natural Res.	4.00	A	16.00	
ECON	696G	Macro Perspectives	4.00	A	16.00	
Ehrs: 12.00 GPA-Hrs: 12.00 QPts: 45.20 GPA: 3.76						
Graduate Good Standing						
Spring 2022						
GD Harpur						
Economics						
ECON	618	PanelData&StochasticFrntr Model	4.00	A	16.00	
ECON	641	Labor Economics	4.00	A	16.00	
ECON	683	Seminar in Environmental Econ	4.00	B+	13.20	
Ehrs: 12.00 GPA-Hrs: 12.00 QPts: 45.20 GPA: 3.76						
Graduate Good Standing						
Fall 2022						
GD Harpur						
Economics						
ECON	619	Time Series Analysis	4.00	B+	13.20	
ECON	693	Phd Seminar I	1.00	A	4.00	
ECON	697	Independent Study	4.00	A	16.00	
Ehrs: 9.00 GPA-Hrs: 9.00 QPts: 33.20 GPA: 3.68						
Graduate Good Standing						
Spring 2023						
GD Harpur						
Economics						
ECON	694	Phd Seminar II	1.00	S	0.00	
Ehrs: 1.00 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00						
Graduate Good Standing						
Fall 2023						
GD Harpur						

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Amber Stallman, Director of Financial Aid and Student Records

BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

OFFICE OF THE REGISTRAR
State University of New York at Binghamton
Binghamton, New York 13902-6000

Record of: Sumaya Falak Memon
Date Issued: 25-JUN-2025
Level: Graduate

Date of Birth: 23-APR-1993
Student ID: B00863550
SSN:

Transcript key:
https://www.binghamton.edu/registrar/student/transcripts/transcript-key.html

Term Information continued:
Economics

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
ECON	699	Dissertation	1.00	S	0.00	

Ehrs: 1.00 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00
Graduate Good Standing

Spring 2024
GD Harpur
Economics

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
ECON	699	Dissertation	1.00	S	0.00	

Ehrs: 1.00 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00
Graduate Good Standing

Fall 2024
GD Harpur
Economics

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
ECON	699	Dissertation	1.00	S	0.00	

Ehrs: 1.00 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00
Graduate Good Standing

Spring 2025
GD Harpur
Economics

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
ECON	699	Dissertation	1.00	S	0.00	

Ehrs: 1.00 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00
Graduate Good Standing
Last Standing: Graduate Good Standing

Fall 2025
IN PROGRESS WORK

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
ECON	699	Dissertation	1.00	IN PROGRESS		

In Progress Credits 1.00

********** CONTINUED ON NEXT COLUMN **********

********** TRANSCRIPT TOTALS **********

	Earned Hrs	GPA Hrs	Points	GPA
TOTAL INSTITUTION	63.00	58.00	210.40	3.62
TOTAL TRANSFER	0.00	0.00	0.00	0.00
OVERALL	63.00	58.00	210.40	3.62

********** END OF TRANSCRIPT **********



Amber Stallman, Director of Financial Aid and Student Records
Transcript Legend: https://www.binghamton.edu/registrar/student/transcripts/transcript-key.html

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To the Selection Committee,

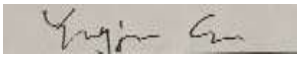
I am pleased to recommend **Ms. Sumaya Falak Memon** for the **NBER Innovation Research Boot Camp 2026**. I am an Assistant Professor of Economics at Binghamton University (SUNY), and I have worked closely with Sumaya since Fall 2023 as her co-advisor and coauthor. She is among the strongest Ph.D. students I have worked with, with excellent quantitative skills and remarkable research independence.

Sumaya's research focuses on firm innovation and environmental strategy, particularly how firms choose between green patenting and source reduction strategies. She has independently assembled a rich dataset linking firm financials, EPA emissions and enforcement records, pollution prevention activities, and patent measures of innovation. This is demanding work, and she has handled it with unusual persistence, care, and maturity.

Her job market paper brings these elements together in a unified framework and offers novel evidence on how regulatory and market incentives shape firms' innovation choices. She has a separate coauthored paper with me that explores the effect of source reduction activities on US manufacturing firms' environmental and economic efficiency, which is under revision at the *International Journal of Industrial Organization*. She communicates clearly, engages deeply with feedback, and thrives in collaborative research settings.

I strongly recommend Sumaya for the Boot Camp. I have no doubt she will benefit from the program and contribute meaningfully to it.

Sincerely,



Yingjun Su
Assistant Professor of Economics
Binghamton University, SUNY