

# Sadegh Shirani

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## APPOINTMENT

**Assistant Professor Operations Management**  
MIT Sloan School of Management, Massachusetts, USA

July 2026

## EDUCATION

**PhD Operations, Information and Technology**  
Stanford Graduate School of Business, California, USA

2021-2026

**M.Sc. Management Sciences**  
University of Waterloo, Ontario, Canada

2019-2021

**M.Sc. Probability and Finance**  
Sorbonne University and École Polytechnique, Paris, France

2018-2019

**B.Sc. Mathematics**  
Sharif University of Technology, Tehran, Iran

2014-2018

**B.Sc. Industrial Engineering**  
Sharif University of Technology, Tehran, Iran

2012-2018

## RESEARCH INTERESTS

**LLM-based simulations:** Building generative agent systems to model human and human-AI behavior at scale

**Causal inference under limited observations:** Experimentation when network connections or unit types are unknown

**Sequential decision-making:** Designing learning and control algorithms for dynamic stochastic environments

**Applications:** Digital platforms, social media influence, healthcare delivery

## PUBLICATIONS AND WORKING PAPERS

### Working Papers

**Causal Effects with Unobserved Unit Types in Interacting Human-AI Systems** [[link](#)]

with W. Overman, M. Bayati, *Working paper (available online)*, 2026.

**Validating Causal Message Passing Against Network-Aware Methods on Real Experiments** [[link](#)]

with A. Tan, J. Nordlund, M. Bayati, *Working paper (available online)*, 2026.

**On Evolution-Based Models for Experimentation Under Interference** [[link](#)]

with M. Bayati, *Working paper (available online)*, 2025.

**Simulating and Experimenting with Social Media Mobilization Using LLM Agents** [[link](#)][[code](#)]

with M. Bayati, *Working paper (available online)*, 2025.

**Can We Validate Counterfactual Estimations in the Presence of General Network Interference?** [[link](#)][[code](#)]

with Yuwei Luo, William Overman, Ruoxuan Xiong, M. Bayati, *Under review at Management Science*, 2025.

★ Second place, INFORMS Revenue Management and Pricing (RMP) Jeff McGill Student Paper Award, 2025

★ Honorable mention, INFORMS Health Applications Society (HAS) Best Student Paper Competition, 2025

★ Oral presentation at the Conference on Digital Experimentation @ MIT, 2025

★ Accepted for presentation at the MSOM Technology, Innovation, and Entrepreneurship SIG, 2025

**Asymptotic Analysis of Multi-Class Advance Patient Scheduling** [[link](#)]

with H. Abouee-Mehrizi and M. K. S. Faradonbeh, *Major Revision at Management Science*, 2025.

★ Second place, INFORMS Health Applications Society (HAS) Best Student Paper, 2023

★ MSOM Healthcare Operations Management SIG, 2023

★ Finalist, CORS Student Paper Award, 2022

**Analysis of Thompson Sampling for Controlling Unknown Linear Diffusion Processes** [[link](#)]

with M. K. S. Faradonbeh and M. Bayati, *Under review at Operations Research*, 2025.

★ Short version in Neural Information Processing Systems (NeurIPS), 2022

## Journal Papers

### Causal Message Passing for Experiments with Unknown and General Network Interference [\[link\]](#)[\[code\]](#)

with M. Bayati, *Proceedings of the National Academy of Sciences (PNAS)* 121(40), 2024.

- ★ Honorable mention, George Nicholson Student Paper Competition, 2024
- ★ Finalist, MSOM Student Paper Competition, 2024
- ★ Oral presentation at the Conference on Digital Experimentation @ MIT, 2024

### Departure Time Choice Models in Urban Transportation Systems Based on Mean Field Games [\[link\]](#)

with M. Ameli, J. P. Lebacque, H. Abouee-Mehrizi, L. Leclercq, *Transportation Science* 56(6):1483-1504, 2022.

- ★ Best Paper, INFORMS TSL Urban Transportation SIG, 2022

## Refereed Conference Papers

### Higher-Order Causal Message Passing for Experimentation Under Unknown Interference [\[link\]](#)

with M. Bayati, Yuwei Luo, William Overman, Ruoxuan Xiong, *Neural Information Processing Systems (NeurIPS)*, 2024.

### Online Reinforcement Learning in Stochastic Continuous-Time Systems [\[link\]](#)

with M. K. S. Faradonbeh, *Proceedings of Thirty Sixth Conference on Learning Theory (COLT)*, 2023.

### Thompson sampling efficiently learns to control diffusion processes [\[link\]](#)

with M. K. S. Faradonbeh and M. Bayati, *Neural Information Processing Systems (NeurIPS)*, 2022.

### Bayesian Algorithms Learn to Stabilize Unknown Continuous-Time Systems [\[link\]](#)

with M. K. S. Faradonbeh, *IFAC International Workshop on Adaptive and Learning Control Systems*, 2022.

### Mean Field Games Framework to Departure Time Choice Equilibrium in Urban Traffic Networks [\[link\]](#)

with M. Ameli, J. P. Lebacque, H. Abouee-Mehrizi, L. Leclercq, *100th Transportation Research Board (TRB)*, 2021.

## TEACHING ASSISTANTSHIP

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### Graduate School of Business, Stanford University

Business Intelligence from Big Data

Winter 2024, 2025

### Department of Management Sciences, University of Waterloo

Financial Management for Engineers

Winter 2021, Spring 2021

Advanced Calculus and Numerical Methods

Fall 2020

### Department of Mathematical Sciences, Sharif University of Technology

Stochastic Analysis

Spring 2016, 2017, 2018

Linear Algebra

Spring 2016, Fall 2016

### Graduate School of Management and Economics, Sharif University of Technology

Financial Engineering

Fall 2017

Financial Economics

Fall 2016

## AWARDS AND DISTINCTIONS

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|---------------------------------------------------------------------------------------------|------|
| Gerald J. Lieberman Award, Stanford University                                              | 2025 |
| Academic Career Advancement Fellowship, Stanford University                                 | 2025 |
| Second place, INFORMS Revenue Management and Pricing (RMP) Jeff McGill Student Paper Award  | 2025 |
| Honorable mention, INFORMS Health Applications Society (HAS) Best Student Paper             | 2025 |
| Machine Learning in Economics Summer Institute Fellow, The University of Chicago            | 2024 |
| Honorable mention, George Nicholson Student Paper Competition                               | 2024 |
| Finalist, MSOM Student Paper Competition                                                    | 2024 |
| Second place, INFORMS Health Applications Society (HAS) Best Student Paper                  | 2023 |
| The Institutional Venture Partners Fellowship, Stanford University                          | 2022 |
| Best Paper Award, INFORMS TSL Urban Transportation SIG                                      | 2022 |
| Finalist, CORS Student Paper Award                                                          | 2022 |
| International Student Award, University of Waterloo                                         | 2019 |
| Paris Graduate School for Mathematics Fellowship, Fondation Sciences Mathématiques de Paris | 2018 |

## SERVICE

**Referee** Operations Research, Mathematics of Operations Research, Biometrika, Health Care Management Science, Naval Research Logistics, World Congress of the International Federation of Automatic Control (IFAC), Transportation Research Record, Transportation Research Board Annual Meeting.

**Organizer & Session chair** Session on Stochastic Models for Experimentation, INFORMS APS 2025

**Data Analyst** Urmia Lake Restoration Program, Tehran, Iran 2017-2018

**Chair** Scientific Association of the Department of Industrial Engineering, SUT, Tehran, Iran 2017-2018

**Executive Secretary** Scientific Association of the Department of Industrial Engineering, SUT, Tehran, Iran 2015-2016

## PRESENTATIONS

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|----------------------------------------------------------------------------------------------------|------|
| Conference on Digital Experimentation @ MIT, Boston, MA, USA                                       | 2025 |
| Revenue Management and Pricing Conference, Columbia University, New York, NY, USA                  | 2025 |
| Applied Probability Society Conference, Georgia Institute of Technology, Atlanta, GA, USA          | 2025 |
| ACM SIGMETRICS Causal Inference Workshop, Stony Brook University, Stony Brook, NY, USA             | 2025 |
| Stanford Causal Science Center Conference on Experimentation, Stanford, CA, USA                    | 2025 |
| George Nicholson Student Paper Competition, Seattle, WA, USA                                       | 2024 |
| MSOM Student Paper Competition, Seattle, WA, USA                                                   | 2024 |
| INFORMS Annual Meeting, Seattle, WA, USA                                                           | 2024 |
| Conference on Digital Experimentation @ MIT, Boston, MA, USA                                       | 2024 |
| High-dimensional Data Workshop, Southern Methodist University, Dallas, TX, USA                     | 2024 |
| MSOM Conference, Twin Cities, MN, USA                                                              | 2024 |
| Stanford Causal Science Center Conference on Experimentation, Stanford, CA, USA                    | 2024 |
| Stanford Causal Science Center Conference, Stanford, CA, USA                                       | 2023 |
| INFORMS Annual Meeting, Phoenix, AZ, USA                                                           | 2023 |
| INFORMS Healthcare Conference, Toronto, ON, Canada                                                 | 2023 |
| MSOM Healthcare Operations Management SIG Day, Montréal, QC, Canada                                | 2023 |
| Stanford Data Science Conference, Stanford, CA, USA                                                | 2023 |
| INFORMS Annual Meeting, Indianapolis, IN, USA                                                      | 2022 |
| MSOM Conference, Munich, Germany                                                                   | 2022 |
| CORS/INFORMS International Conference, Vancouver, Canada                                           | 2022 |
| Tehran Institute for Advanced Studies, Tehran, Iran                                                | 2022 |
| Stochastic Analysis and Applications Conference in Honor of Professor Bijan Zangeneh, Tehran, Iran | 2021 |

## COMPUTER SKILLS

### Programming

- Python
- MATLAB
- R programming
- C/C++

### General

- L<sup>A</sup>T<sub>E</sub>X
- Microsoft Office
- Tableau
- Visual Paradigm