

# JOYCE LUO

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## EDUCATION

**Massachusetts Institute of Technology, Cambridge, MA**

PhD in Operations Research

*Expected May 2027*

**Princeton University, Princeton, NJ**

BSE in Operations Research & Financial Engineering (ORFE)

Minors: Statistics & Machine Learning, Computer Science

*May 2022*

## SELECTED AWARDS & HONORS

- **National Science Foundation Graduate Research Fellowship** (2022-Present)
- **Sigma Xi Book Award for Outstanding Research**, Princeton ORFE Department (2022)
- **Undergraduate Research Poster Session Winner**, Princeton Center for Statistics & Machine Learning (2022)
- **First Place Undergraduate Poster Presentation**, WNY CROFT Virtual Annual Meeting (2020)

## PUBLICATIONS

### Published

**Luo, J.**, Stellato, B. (2024). Frontiers in Operations: Equitable Data-Driven Facility Location and Resource Allocation to Fight the Opioid Epidemic. *Manufacturing & Service Operations Management*, 26(4), 1229-1244.

**Luo, J.**, Chen, L., Lu, X., Yuan, J., Xie, Z., Li, D. (2021). Analysis of potential associations of JUUL flavours with health symptoms based on user-generated data from Reddit. *Tobacco Control*, 30(5), 534-541.

Lu, X., Chen, L., Yuan, J., **Luo, J.**, Luo, J., Xie, Z., Li, D. (2020). User Perceptions of Different Electronic Cigarette Flavors on Social Media: Observational Study. *Journal of Medical Internet Research*, 22(6), e17280.

Chen, L., Lu, X., Yuan, J., **Luo, J.**, Luo, J., Xie, Z., Li, D. (2020). A Social Media Study on the Associations of Flavored Electronic Cigarettes With Health Symptoms: Observational Study. *Journal of Medical Internet Research*, 22(6), e17496.

### Under Review

Canellas, M., **Luo, J.**, Pachamanova, D., Perakis, G. Fair Online Hospital Diagnostic Service Scheduling: Helping Both Patients and Providers. Major Revision at *Production & Operations Management*.

**Luo, J.**, Dehghani, M., Vahdat, V., Alagoz, O., Estes, C., Tyson, C., Ebner, D.W., Limburg, P.J. Adherence Modeling in Colorectal Cancer Screening Through the Longitudinal Adherence Trajectory (LAT) Framework. Under Review at *Value in Health*.

### Working Papers

**Luo, J.**, Pachamanova, D., Perakis, G. Optimizing Supporter Communications in Digital Mental Health: A Causal Framework.

## PRESENTATIONS

*Fair Online Hospital Diagnostic Service Scheduling: Helping Both Patients and Providers*.

- 2025 INFORMS Annual Meeting Invited Session: Responsible & Sustainable Operations, October 2025
- 2025 MSOM Conference Session: Resourcing and Scheduling in the Healthcare Value Chain, June 2025

*Equitable Data-Driven Facility Location and Resource Allocation to Fight the Opioid Epidemic.*

- 2025 MSOM Conference Session: MSOM Frontiers in Operations, June 2025

*Addressing Healthcare Provider Burnout: Fair Online Hospital Diagnostic Service Scheduling.*

- 2025 POMS Conference Session: Workforce and Resource Optimization in Healthcare, May 2025

*Reinforcement Learning for Optimizing Supporter Messaging.*

- 2024 MIT Sloan Health Systems Initiative Lab Workshop, October 2024

*Addressing Healthcare Provider Burnout: A Revenue Management Approach to Fair Hospital Diagnostic Service Scheduling.*

- 2024 INFORMS Annual Meeting Invited Session: Revenue Management: From Theory to Practice, October 2024

*To Open or Not to Open: Efficient Scheduling and Capacity Management for Diagnostic Services.*

- 2023 INFORMS Annual Meeting Flash Session: Practice-driven Healthcare Research in Collaboration with Hospitals and Clinicians, October 2023

*Equitable Data-Driven Resource Allocation to Fight the Opioid Epidemic: A Mixed-Integer Optimization Approach.*

- Princeton Research Day, May 2022
- Princeton Center for Statistics & Machine Learning Undergraduate Research Poster Session, May 2022
- Top ORFE Theses Department Showcase, May 2022

*Analysis of potential associations of JUUL flavours with health symptoms based on user-generated data from Reddit.*

- WNY CRoFT Virtual Annual Meeting, September 2020

## RESEARCH EXPERIENCE

**Research Assistant, Massachusetts Institute of Technology, Cambridge, MA**

**September 2022-Present**

**Advisor: Georgia Perakis**

- Research area: healthcare and service operations management, optimization, machine learning
- Current projects related to improving patient wait times and provider resource allocation for hospital diagnostic services through a novel online algorithm; optimizing support messaging for mental health patients using reinforcement learning, causal inference, and natural language processing

**Undergraduate Senior Thesis, Princeton University, Princeton, NJ**

**June 2021-April 2022**

**Advisor: Bartolomeo Stellato**

- Modeled the dynamics of the US opioid epidemic using an ordinary differential equation-based model
- Compiled and standardized data from surveys, government databases, etc. to be used for model training
- Formulated an optimization problem that incorporates the epidemic model and socioeconomic equity in order to recommend optimal opioid treatment facility locations and treatment budget allocations across the US

**Undergraduate Researcher, Princeton University BEEHIVE Group, Princeton, NJ**

**December 2020-February 2022**

**Advisor: Barbara Engelhardt**

- Developed an offline reinforcement learning algorithm for continuous action spaces that recommends optimal anticoagulant dosing policies for ICU patients, using electronic health records (EHR) data
- Used data cleaning and imputation methods to process EHR data into a state space used for algorithm training

**Research Intern, University of Rochester CTSI, Rochester, NY**

**May 2019-June 2020**

**Advisor: Dongmei Li**

- Conducted data mining, data modeling, and statistical analysis using Python and SAS on social media data from Reddit in order to make conclusions about potential associations between different JUUL (e-cigarette) flavors and health problems
- Collected, cleaned, and used Natural Language Processing to put the Reddit posts into a form usable for analysis
- Developed a webpage crawler to gather posts and post information from e-cigarette related medical forums

## PROFESSIONAL EXPERIENCE

**Health Economics & Outcomes Research Intern, Exact Sciences, Cambridge, MA** **June 2025-August 2025**

- Developed a predictive model for capturing longitudinal patient adherence to various colorectal cancer (CRC) screening modalities
- Created a calibration procedure combining a multi-start optimization algorithm with simulation to fit the predictive model to population-level CRC screening adherence data
- Integrated the calibrated longitudinal adherence models with the company's CRC microsimulation pipeline used for various cost-effectiveness analyses

**Program Manager Intern, Microsoft, Redmond, WA (Remote)**

**June 2021-August 2021**

- Designed and documented a methodology, which consists of data collection and statistical analysis, that measures the entropy (randomness) of random number generation systems
- Created a justification document with results from the methodology, ensuring that Microsoft's random number generation infrastructure meets government standards and can be used by commercial and government partners
- Analyzed data and conducted energy calculations to estimate the carbon footprint of government-mandated self-tests in Windows 10 and Windows Server, and presented findings in a research report

**Explore Intern, Microsoft, Redmond, WA (Remote)**

**June 2020-September 2020**

- Developed and automated the creation of a virtual machine that provides enhanced security for Azure customers
- Defined the customer experience by creating product specs and engaging with customers
- Created impactful data dashboards that are used by product managers to gauge product usage

## TEACHING EXPERIENCE

**Teaching Assistant, 15.730 Data, Models, and Decisions**

**January 2026-Present**

- Organize and teach recitations for EMBA students, conduct office hours, grade student assignments, and develop course material

**Teaching Assistant, 15.774/15.780 Analytics of Operations Management**

**September 2025-December 2025**

**Rating: 6.64/7.0**

- Organize and teach recitations for MBAs and undergraduates, conduct weekly office hours, grade student assignments, and develop course material

**Lecturer, 15.S60 Computing in Optimization and Statistics**

**January 2025**

- Teach 3-hour lecture on machine learning in Python for graduate students and prepare course materials

**Teaching Assistant, 15.730 Data, Models, and Decisions**

**January 2024-May 2024**

**Rating: 6.70/7.0**

- Organize and teach recitations for EMBA students, conduct office hours, grade student assignments, and develop course material

**Undergraduate Course Assistant, ORF 307 – Optimization**

**January 2022-May 2022**

- Provided detailed feedback on student assignments and assisted with course organization

**Undergraduate Course Assistant, ORF 245 – Fundamentals of Statistics**

**January 2021-May 2021**

- Provided detailed feedback and assisted students with their assignments to contribute to their learning of the course material

**Tutor, McGraw Center for Teaching and Learning**

**September 2019-December 2021**

- Tutored students in engineering calculus and physics courses approximately 3 hours per week
- Facilitated group discussion and understanding about complicated topics in a study hall setting

## **PROFESSIONAL SERVICE & LEADERSHIP**

### **Seminar Series Coordinator, MIT ORC Spring Seminar Series**

**January 2025-May 2025**

- Find speakers and coordinate logistics for semester-long department seminar series

### **Vice President, MIT INFORMS Student Chapter**

**December 2022-December 2023**

- Assisted with the organization of department-wide community-building events

### **Co-President, Princeton Data Science (PDS)**

**November 2019-April 2022**

- Directed weekly officer meetings to discuss ideas, publicity, and logistics for future workshops and events
- Organized and directed workshops, research grants, and competitions to create a community and provide an environment where students can learn about and get hands-on experience with data science
- Facilitated initiative partnerships with the Center for Statistics and Machine Learning to secure funding and advisory support

### **Patient & Family Advocate, Strong Memorial Hospital - Neuromedicine ICU**

**June 2019-August 2019**

- Served as a volunteer 3 hours per week, assisting nurses, patients, and patient family members
- Conversed and interacted with patients and their family members to reduce stress and create a more welcoming environment

### **Board Member - Girl Scout Day Chair, Princeton Society of Women Engineers**

**September 2018-January 2020**

- Organized two engineering-focused Girl Scout Badge Workshops each year as part of community outreach
- Ran the Planning Committee for these events and recruit other Princeton SWE members to volunteer for the event

## **SKILLS**

**Computer Skills:** Python, Julia, R, Java, LaTeX, PowerShell, Stata, MATLAB, AMPL, SAS, SQL, C#, C++

**Additional Languages:** Chinese (Fluent) and Spanish (Novice)