JOYCE LUO

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA ***Expected May 2027***
PhD in Operations Research

Princeton University, Princeton, NJ ***May 2022***
BSE in Operations Research & Financial Engineering (ORFE)
Minors: Statistics & Machine Learning, Computer Science

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.

PRESENTATIONS

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

- 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 NLP

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, 15.774/15.780 Analytics of Operations Management ***September 2025-Present***

- 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***

- Organize and teach recitations for EMBAs, 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)