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

- **Sigma Xi Book Award for Outstanding Research**, Princeton ORFE Department (2022)
- **Undergraduate Research Poster Session Winner**, Princeton Center for Statistics & Machine Learning (2022)
- **National Science Foundation Graduate Research Fellowship** (2022-Present)
- **First Place Undergraduate Poster Presentation**, WNY CRoFT Virtual Annual Meeting (2020)
- **Pre-College Rochester Data Science Challenge Gold Medalist**, Rochester Institute of Technology (2018)
- **National Merit Scholarship Recipient** (2018)
- **National AP Scholar** (2018)

PUBLICATIONS

Luo, J., Stellato, B. (2023). Equitable Data-Driven Resource Allocation to Fight the Opioid Epidemic: A Mixed-Integer Optimization Approach. *arXiv:2301.06179.*

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.

PRESENTATIONS

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
- Operations Research & Financial Engineering (ORFE) Senior Thesis Symposium, April 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

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 and fit the model parameters using a new technique called neural ordinary differential equations

- Compiled and standardized data from surveys, government databases, and monitoring networks to be used for model training
- Formulated an optimization problem that incorporates the model of the epidemic and socioeconomic equity considerations 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

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
- Constructed a justification document detailing results from the methodology, which ensures that Microsoft's random number generation infrastructure meets government standards and can be used by commercial and government partners
- Obtained data and performed energy calculations to estimate the global footprint of carbon emissions generated by government-required self-tests implemented in Windows 10 and Windows Server
- Created a research report that communicates whether the government-required self-tests could be a problem for sustainability

Explore Intern, Microsoft, Redmond, WA (Remote) ***June 2020-September 2020***

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

LEADERSHIP, TEACHING, & VOLUNTEER EXPERIENCE

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

Co-President, Princeton Data Science (PDS) ***November 2019-April 2022***

- 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
- Directed weekly officer meetings to discuss ideas, publicity, and logistics for future workshops and events

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

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)