Yuyang Ma

Ph.D. Student · USC · Industrial and Systems Engineering

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Summary

Operations research Ph.D. student focusing on **data-driven operational decision making** for logistics and mobility under uncertainty. Experience in robust optimization, fleet allocation, inventory planning, and adaptive pricing using **Python/Gurobi**. First-author paper accepted by *Transportation Science*.

Education

University of Southern California — Los Angeles, CA
Ph.D., Industrial and Systems Engineering — *Expected May 2028*
Advisor: Dr. Karmel S. Shehadeh.

Georgia Institute of Technology — Atlanta, GA
M.S., Operations Research · GPA: 3.83/4.0 — *Aug. 2021 – Dec. 2022*

University of Pittsburgh — Pittsburgh, PA
B.S., Industrial Engineering · GPA: 3.53/4.0 — *Sep. 2017 – May 2021*

Technical Skills

Optimization: Mixed-Integer Optimization, Optimization under Uncertainty; Decomposition Algorithm, Network Flows, Facility Location, Heuristics.
Programming and solvers: Python (gurobipy, NumPy, pandas, PyTorch, scikit-learn), SQL, R, MATLAB, Git; Gurobi, CPLEX, AMPL.
Machine learning: Transformer, GRU, LSTM, Time-Series Forecasting, Markov Decision Process, Deep Reinforcement Learning, PPO, Simulation-Based Policy Evaluation.

Research and Projects

Drone-Based Disaster Relief Logistics — Published Paper
Academic research; accepted by Transportation Science — *2024 – 2026*

- Developed a **two-stage robust optimization** model coupling facility location, inventory prepositioning and fleet sizing with post-disaster delivery and drone reassignment under linked facility and fleet disruptions.
- Implemented **column-and-constraint generation (C&CG)** for a K-adaptability approximation in Python/Gurobi, with warm starts and valid inequalities; evaluated instances with up to **70 demand sites and 40 drones**.
- In selected algorithm-ablation settings, warm starts yielded an approximately **11× speedup** over the no-warm-start variant. Evaluated adaptive reassignment on two earthquake case-study networks with simulated disruptions.

Adaptive Pricing and Relocation for Mobile EV Charging — Working paper
Academic research — *2025 – present*

- Formulating a **three-stage distributionally robust** model for mobile charging deployment, pricing and relocation under context- and price-dependent demand, with decisions adapting to observed demand.
- Applying ***K*-adaptability to pricing** while retaining fully adaptive allocation and relocation; exploiting an equivalent min-cost-flow LP for fixed-price integer recourse within a decomposition framework.
- Developed **inexact C&CG algorithms** in Python/Gurobi for efficient solution of the K-adaptability model, combining warm starts, symmetry reduction and adaptive master-problem tolerances.

Mobile Charging: RL-Based Pricing and Dispatching — USC
Course project — *2026 – present*

- Co-designed the problem formulation and pricing–choice–dispatch MDP; contributed across the simulation and learning workflow, including fixed-premium pricing settings and preliminary experiments using **simulated data**.
- Team study compares behavior-cloning-initialized **PPO dispatch** with heuristics and approximate DP on 256 independent simulated test days. At four vehicles, PPO profit was **within 1% of the best of five evaluated methods**; joint pricing–dispatch learning is ongoing.

Multi-Step Engine Emission Forecasting — Georgia Tech
Research project with Dr. Kamran Paynabar — *Jun. 2022 – Feb. 2023*

- Developed **Transformer, GRU and LSTM** models in PyTorch for multi-step emission forecasting; compared predictions with ARIMA-based baselines for an early-warning maintenance application.

Teaching and Honors

Teaching assistant for four courses in optimization, stochastic models, statistics and data analytics (2022–2024).
Gibson/Gottshall Fellowship, Lehigh University (2023, 2025).