

Muting (Don) Ma, Ph.D.

[✉](mailto:muting.ma@outlook.com) [in](https://linkedin.com/in/mutingma) [github](https://github.com/mutingma123)
[III](#) Operations Management Ph.D. Program - University of Alabama

Last Updated: January 1st, 2026

Optimization/Operations Modeler · Strategic Manager · Policy Analyst

Operations researcher with dual Ph.D. training, **8+** years of international experience, and **\$500K+** in funded research, specializing in optimization, game theory, and market dynamics modeling to solve **complex decision problems in technology transitions and sustainable operations**.

Education & Academic Training

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|--------------|---|
| 2025–Present | Ph.D. in Operations Management (In Progress), University of Alabama (UA) <i>Department: Information Systems, Statistics, and Management Science, Culverhouse College of Business</i> <i>Research Focus: Competitive dynamics modeling, Market equilibrium analysis</i> <i>Award: 2nd Place, Culverhouse Data Analytics Summit Poster Competition (2025)</i> |
| 2017–2022 | Ph.D. in Civil Engineering , University of Louisville (UofL) <i>Department: Civil and Environmental Engineering</i> <i>Dissertation: Optimal scheduling of connected and autonomous vehicles at reservation-based intersections</i> <i>Awards: Grosscurth Fellowship (2017), Doctoral Dissertation Completion Award (2022)</i> |

Theoretical Foundations & Coursework

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|------------------------------|--|
| Optimization Theory | Linear Programming (OM 600, UA), Stochastic Decision Models (OM 601, UA), Integer Modeling and Optimization (OM 603, UA), Foundation of Optimization I (IE 610, UofL), Inventory Management (OM 523, UA) |
| Statistical Methods | Mathematical Statistics I (ST 554, UA), Special Topics in Analytics (ST 597, UA), Predictive Modeling with Business Applications (BAN 501, UA) |
| Game Theory | Game Theory (EC 660, UA) |
| Computational Methods | Data Mining (CECS 632, UofL), Transportation Engineering (CEE 560, UofL) |
| Teaching Experience | Graduate Teaching Assistant for OM 310, UA - Introduction to Management Science |

Research Experience & Strategic Applications

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|--------------|---|
| 2025–Present | Graduate Teaching Assistant , University of Alabama <i>Ph.D. Operations Management Program</i> <ul style="list-style-type: none">Developing primal-dual optimization frameworks for manufacturer coopetition strategiesAnalyzing Nash equilibrium conditions in electric vehicle market transitionsQuantifying trade-offs between short-term profitability and long-term sustainability |
| 2022–2025 | Postdoctoral Research Associate , University of Alabama <i>Employer: Institute of Data & Analytics, Culverhouse College of Business</i> <i>Main Research: Feature selection algorithms, Bi-objective optimization, Large-scale simulation</i> <i>Alabama Mobility and Power Center – \$287,751 Grant</i> <ul style="list-style-type: none">Developed C2SLM framework achieving 20.1% improvement in market forecasting accuracyDesigned system dynamics model predicting EV adoption trends for Alabama marketBuilt decision support systems for electric vehicle adoption predictionDelivered insights to public agencies, automotive industry, and academic institutionsLed research team of 8+ members across multiple disciplinesMentored undergraduate, master's, and doctoral students |
| 2017–2022 | Graduate Research Assistant , University of Louisville |

NSF Industry-University Cooperative Research Centers – \$45,990 Grant

- Designed next-generation signal-free interchange control for connected vehicles
- Created traffic intersection optimization models handling **14,400 vehicles/hour** traffic capacity
- Achieved **5% delay reduction** at 1800 vehicles/hour/lane throughput
- Reduced average vehicle delays to **1.8-2.3 seconds** under extreme traffic demands

2019–2021

Graduate Research Assistant, University of Louisville

NCHRP IDEA Project 217 – \$137,000 Grant

- Developed real-time proactive intersection safety monitoring systems
- Deployed radar-based system adopted by transportation agencies nationwide

KYTC Highway Safety Improvement Program – \$39,318 Grant

- Designed safety countermeasures and visualization systems for Louisville (KY, USA) intersections

Quantified Research Impact

Funding & Leadership

- **\$509,059** total grants secured
- **\$287,751** largest single grant
- 8+ team members led

Lead researcher on 4 competitive federal/state grants
EV market analysis for Alabama Transportation Institute
Cross-functional research teams across disciplines

Technical Performance

- **20.1%** forecasting improvement
- **14,400** vehicles/hour capacity
- **98.5%** delay reduction
- **249%** throughput increase
- **92%** higher average speed

C2SLM model vs. industry benchmarks for EV demand
Handled **4×** higher demand than typical benchmarks (vs. 2,600-4,200 veh/h)
1.8-2.3s average delay vs. 140-169s baseline at extreme demand
Speed-maximization optimization vs. max-throughput baseline methods
Proposed trajectory model vs. alternative optimization objectives

Technical Competencies

Programming

C++, C#, Python, Java, SQL

Optimization Tools

Gurobi, CPLEX, Visual Studio

Statistical Software

R, Tableau

Systems

Linux

Methods

Linear/Integer Programming, Dynamic Programming, Game Theory, Stochastic Modeling

Publications & Research Contributions

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|-------|---|
| 2026+ | Ma, M. “Sustainable Life Management (SLM): Multi-Period Capital Allocation Under Uncertainty.” DOI: 10.5281/zenodo.18039750 |
| 2026+ | Ma, M. , Yavuz, M. “Socioeconomic Trade-offs in Connected Vehicle Markets: A Primal-Dual Framework.” SSRN: 5372729 |
| 2026 | Ma, M. , Li, Z., & Yavuz, M. “Connected and Automated Vehicles Scheduling at a Reservation-based Intersection using Dynamic Programming with Dominance Pruning.” <i>International Transactions in Operational Research</i> . DOI: 10.2139/ssrn.4097173 |
| 2025 | Ma, M. , Yavuz, M., et al. “C2SLM: A Correlation-based Clustering-assisted Sparse Learning Model for Electric Vehicle Market Demand Forecasting.” <i>Pattern Recognition</i> , 170, p.111984. DOI: 10.1016/j.patcog.2025.111984 |
| 2023 | Ma, M. & Li, Z. “A speed-maximization trajectory optimization model on a reservation based intersection control system.” <i>Transportation Research Part C</i> , 154, p.104266. DOI: 10.1016/j.trc.2023.104266 |
| 2022 | Li, Z. & Ma, M. “A Real-Time Proactive Intersection Safety Monitoring System Based on Radar Sensor Data.” <i>NCHRP IDEA Project 217</i> (Technical Report). TRB Link |
| 2021 | Ma, M. & Li, Z. “A time-independent trajectory optimization approach for connected and autonomous vehicles.” <i>Transportation Research Interdisciplinary Perspectives</i> , 9, p.100312. DOI: 10.1016/j.trip.2021.100312 |