

Muting (Don) Ma, Ph.D.

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 Operations Management Ph.D. Program - University of Alabama

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Operations Research Scholar · Optimization Theorist · Quantitative Methodologist

Operations researcher with dual Ph.D. training and 8+ years of scholarly experience, specializing in **optimization theory, game-theoretic modeling, and market dynamics**. Published in leading journals including *Pattern Recognition* and *Transportation Research Part C*. Lead contributor on **\$500K+** in competitively funded research. Committed to advancing theoretical foundations while mentoring the next generation of scholars.

Education

- 2025–Present** **Ph.D. in Operations Management** (In Progress), University of Alabama
Culverhouse College of Business, Department of Information Systems, Statistics, and Management Science (ISM)
Research Focus: Competitive dynamics modeling, Nash equilibrium analysis, sustainable operations
Advisor: Dr. Mesut Yavuz
Award: 2nd Place, Culverhouse Data Analytics Summit Poster Competition (2025)
- 2017–2022** **Ph.D. in Civil Engineering**, University of Louisville
Department of Civil and Environmental Engineering
Dissertation: Optimal scheduling of connected and autonomous vehicles at reservation-based intersections
Advisor: Dr. Zhixia Li
Awards: Grosscurth Fellowship (2017), Doctoral Dissertation Completion Award (2022)

Peer-Reviewed Publications

- 2025** **Ma, M.**, Yavuz, M., et al. “C2SLM: A Correlation-based Clustering-assisted Sparse Learning Model for Electric Vehicle Market Demand Forecasting.” *Pattern Recognition*, 170, p.111984. DOI: [10.1016/j.patcog.2025.111984](https://doi.org/10.1016/j.patcog.2025.111984)
- 2023** **Ma, M.** & Li, Z. “A speed-maximization trajectory optimization model on a reservation based intersection control system.” *Transportation Research Part C: Emerging Technologies*, 154, p.104266. DOI: [10.1016/j.trc.2023.104266](https://doi.org/10.1016/j.trc.2023.104266)
- 2021** **Ma, M.** & Li, Z. “A time-independent trajectory optimization approach for connected and autonomous vehicles.” *Transportation Research Interdisciplinary Perspectives*, 9, p.100312. DOI: [10.1016/j.trip.2021.100312](https://doi.org/10.1016/j.trip.2021.100312)

Working Papers & Papers Under Review

- Under Review** **Ma, M.**, Li, Z., & Yavuz, M. “Connected and Automated Vehicles Scheduling at a Reservation-based Intersection using Dynamic Programming with Dominance Pruning.” *International Transactions in Operational Research*. SSRN: [4097173](https://ssrn.com/abstract=4097173)
- Under Review** **Ma, M.**, Li, Z., Hudnall, M., Wang, Q., Yavuz, M., & Dula, J. “Socioeconomic Tradeoff on Connected and Automated Vehicles Scheduling at a Reservation-based Intersection.” *European Journal of Operational Research*. SSRN: [5372729](https://ssrn.com/abstract=5372729)
- Working Paper** **Ma, M.** “Sustainable Life Management (SLM): Multi-Period Capital Allocation Under Uncertainty.” DOI: [10.5281/zenodo.18039750](https://doi.org/10.5281/zenodo.18039750)

Technical Reports

2022 Li, Z. & Ma, M. "A Real-Time Proactive Intersection Safety Monitoring System Based on Radar Sensor Data." *NCHRP IDEA Project 217*. [Transportation Research Board](#)

Research Experience

- 2025–Present** **Doctoral Researcher**, University of Alabama
Advisor: Dr. Mesut Yavuz, Department of ISM
• Developing primal-dual optimization frameworks for analyzing manufacturer competition strategies in technology transitions
• Investigating Nash equilibrium conditions and welfare implications in electric vehicle market adoption
• Theoretical contributions: Characterizing trade-offs between firm profitability and societal sustainability objectives
- 2022–2025** **Postdoctoral Research Associate**, University of Alabama
Institute of Data & Analytics, Culverhouse College of Business
Research Areas: Machine learning, bi-objective optimization, large-scale simulation
• Developed C2SLM framework—novel sparse learning methodology combining correlation-based clustering with feature selection
• Designed system dynamics models for technology adoption forecasting with theoretical grounding in diffusion theory
• Led interdisciplinary research team of 8+ members; mentored undergraduate, master's, and doctoral students
• Lead researcher role: Alabama Mobility and Power Center (**\$287,751**)
- 2017–2022** **Doctoral Researcher**, University of Louisville
Advisor: Dr. Zhixia Li, Department of Civil and Environmental Engineering
• Developed theoretical foundations for optimal vehicle scheduling at signal-free intersections using dynamic programming
• Formulated novel trajectory optimization models with provable optimality conditions
• Extended dominance pruning techniques to reduce computational complexity in large-scale scheduling problems
• NSF I/UCRC funded research (**\$45,990**)
- 2019–2021** **Graduate Research Assistant**, University of Louisville
NCHRP IDEA Project 217 (\$137,000) & KYTC Highway Safety Improvement Program (\$39,318)
• Developed real-time proactive safety monitoring systems with methodological contributions in sensor fusion
• Research outcomes adopted by transportation agencies for practical implementation

Teaching Experience

- 2025–Present** **Graduate Teaching Assistant**, University of Alabama
• OM 310: Introduction to Management Science (Undergraduate)
Linear programming, decision analysis, and optimization fundamentals
• OM 524: Manufacturing Scheduling & Control Systems (Graduate)
Scheduling algorithms, production planning, and control theory
• OM 525: Effective Quality Management (Graduate)
Statistical quality control, process improvement methodologies
- 2022–2025** **Research Mentor**, University of Alabama
• Supervised undergraduate research assistants on data analysis projects
• Mentored master's and doctoral students on research methodology and academic writing

Research Grants & Funding

- 2022–2025** **Alabama Mobility and Power Center**, \$287,751
Role: Lead Researcher. Electric vehicle market analysis and demand forecasting.

2019–2022	NCHRP IDEA Project 217 , \$137,000 <i>Role: Graduate Research Assistant. Real-time intersection safety monitoring systems.</i>
2019–2021	KYTC Highway Safety Improvement Program , \$39,318 <i>Role: Graduate Research Assistant. Safety countermeasures design and implementation.</i>
2017–2022	NSF Industry-University Cooperative Research Centers , \$45,990 <i>Role: Graduate Research Assistant. Connected vehicle intersection control.</i>
Total Funding: \$509,059	

Advanced Coursework

Optimization Theory	Linear Programming (OM 600), Stochastic Decision Models (OM 601), Integer Modeling and Optimization (OM 603), Foundations of Optimization I (IE 610), Inventory Management (OM 523)
Statistical Methods	Mathematical Statistics I (ST 554), Special Topics in Analytics (ST 597), Predictive Modeling (BAN 501), Advanced Mathematical Statistics (ST 697)
Game Theory	Game Theory (EC 660)
Computational Methods	Data Mining (CECS 632), Transportation Engineering (CEE 560)

Technical Skills

Programming	C++, C#, Python, Java, SQL
Optimization Solvers	Gurobi, CPLEX
Statistical Software	R, Tableau
Development Tools	Visual Studio, Linux
Methodological Expertise	Linear/Integer Programming, Dynamic Programming, Game Theory, Stochastic Modeling, Machine Learning

Awards & Honors

2025	2nd Place, Culverhouse Data Analytics Summit Poster Competition, University of Alabama
2022	Doctoral Dissertation Completion Award, University of Louisville
2017	Grosscurth Fellowship, University of Louisville

Professional Service & Affiliations

Representative Journal Reviewer	International Transactions on Operational Research, PLOS One, IEEE Transactions on Intelligent Transportation Systems, Energy Systems
Memberships	INFORMS, Transportation Research Board