

Shanting Wang

sw997@cornell.edu | Personal Website | Google Scholar | LinkedIn

RESEARCH INTERESTS

Optimal control and decision-making for autonomous systems; multi-agent reinforcement learning; game-theoretic adaptive control with regret guarantees; vision-language models for safe autonomous navigation; connected and automated vehicles in mixed traffic.

EDUCATION

Cornell University <i>Ph.D. in Systems Engineering</i>	Ithaca, NY Sep. 2024 – Present
Cornell University <i>M.S. in Systems Engineering</i>	Ithaca, NY Sep. 2022 – June 2024
University of Waterloo <i>B.A.Sc. in Civil Engineering (with Distinction)</i>	Toronto, Canada Sep. 2017 – June 2022

PUBLICATIONS

Journal Papers

- **Wang, S.**, Typaldos, P., Li, C., and Malikopoulos, A. A., “VisioPath: Vision-Language Enhanced Model Predictive Control for Safe Autonomous Navigation in Mixed Traffic,” *IEEE Open Journal of Control Systems* (accepted, 2025). [Paper]
- Bang, H., Dave, A., Tzortzoglou, F., **Wang, S.**, and Malikopoulos, A. A., “On Mobility Equity and the Promise of Emerging Transportation Systems,” *IEEE Transactions on Intelligent Transportation Systems* (2025). [Paper]

Conference Papers

- **Wang, S.**, Sun, W., and Malikopoulos, A. A., “Regret Minimization in Zero-Sum Linear Quadratic Games with Unknown Dynamics,” *IEEE Conference on Decision and Control (CDC)* (submitted, 2026). [Paper]

Papers in Preparation

- **Wang, S.**, Typaldos, P., and Malikopoulos, A. A., “CorrA: LLM-Guided Corridor-Aware Model Predictive Control for Dynamic Obstacle Avoidance” (in preparation for submission to a robotics venue). [Paper]

RESEARCH EXPERIENCE

Graduate Research Assistant Sep. 2024 – Present
IDS Lab, Cornell (Advisor: Prof. Andreas Malikopoulos) Ithaca, NY

- *Regret Minimization in Zero-Sum Linear Quadratic Games [CDC 2026, submitted]*
 - Studied online learning for adversarial control by developing a certified framework combining regularized least squares, confidence sets, and surrogate-model selection for stable policy updates; proved a sublinear $O(\sqrt{T})$ regret bound together with convergence guarantees.
- *VisioPath: Vision-Language Enhanced MPC [IEEE OJ-CSYS, accepted 2025]*
 - Addressed safe mixed-traffic navigation by developing a framework that integrates bird’s-eye-view perception, zero-shot vision-language reasoning, and DDP-based MPC; achieved 12% lower travel time and up to 70% fewer dangerous incidents than baseline MPC in simulation, with zero collisions in closed-loop scaled-city experiments.
- *CorrA: LLM-Guided Corridor-Aware MPC [in preparation]*
 - Tackled real-time obstacle avoidance in uncertain traffic by using LLM reasoning to generate adaptive safety corridors for constrained MPC; reduced planning runtime by up to 15× to about 10 ms while maintaining collision-free navigation in multi-vehicle scenarios.
- *Connected and Automated Vehicles in Mixed Traffic*
 - Developed an LSTM-based trajectory prediction model for human-driven vehicles and applied inverse reinforcement learning to construct information states, enabling optimal control strategy synthesis for CAVs operating in dynamic mixed-traffic environments. Validated control policies through large-scale numerical simulations in SUMO and CARLA.

Thesis Research

Advisor: Prof. Ricardo Daziano (Minor Advisor: Prof. Andreas Malikopoulos) May 2023 – May 2024
Ithaca, NY

- Investigated consumer preference heterogeneity for electric, hybrid, and gasoline vehicles using hybrid latent class models with mixed logit. Designed A/B experiments to quantify the psychological impact of range anxiety on EV adoption; optimized model parameters via maximum likelihood estimation and Monte Carlo simulation with k-fold cross-validation.

- Proposed a Mobility Equity Metric (MEM) quantifying transportation accessibility by integrating geographical distances and monetary costs; conducted cross-city comparative analyses with geospatial heat maps using GeoPandas.

Research Assistant

Sep. 2023 – May 2024

Advisor: Prof. Oliver Gao – uTECH Project

Ithaca, NY

- Engineered an activity-based modeling framework capturing real-time trip dynamics for air pollution estimation; designed entity-relationship diagrams and data transformation pipelines for large-scale geospatial datasets.

EXPERIMENTAL & TESTBED EXPERIENCE

IDS Lab Scaled-City Testbed

2024 – Present

- Operated the IDS Lab 1:25 scaled-city testbed for physical validation of optimal control and autonomous navigation algorithms. Developed ROS2 (C++) path tracking controllers and navigation stacks, integrating Vicon motion-capture feedback at 100 Hz for real-time closed-loop experiments with scaled robotic vehicles.
- Designed and executed hardware-in-the-loop experiments validating CorrA and VisioPath frameworks under realistic sensor noise, actuator constraints, and multi-vehicle interaction scenarios, achieving zero collisions across all experimental trials.

TEACHING & SERVICE

Seminar Coordinator — IDS-DDLC Seminar Series, Cornell University

2024 – Present

- Organized the Data-Driven Learning and Control (DDLC) seminar series: managed speaker invitations (e.g., Prof. Jean-Jacques Slotine, MIT), scheduling, recording, and YouTube/LinkedIn dissemination.

INDUSTRY EXPERIENCE

Project Research Assistant — Ontario Ministry of Transportation, Canada

Sep. 2019 – Dec. 2019

- Analyzed large-scale complaint and accident data on Ontario highways; applied NLP and Latent Dirichlet Allocation topic modeling to identify complaint hotspots and extract major issues.

Project Assistant — Hatch Ltd., Mississauga, Canada

Jan. 2019 – Apr. 2019

- Developed automated dashboards using MySQL and Power BI for project management productivity tracking in a mining digitalization project.

TECHNICAL SKILLS

Programming: Python, C++, R, MATLAB

Robotics & Middleware: ROS2, Vicon motion-capture integration, path tracking controllers

Simulation Platforms: CARLA, SUMO, MuJoCo, Vissim

Frameworks & Tools: Git, LaTeX, Linux, Docker, MySQL, Power BI