Yanling Sang

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Education Background

University of California, Los Angeles, Samueli School of Engineering **Los Angeles, USA**
Master of Science in Civil Engineering ***Transportation Engineering*** *(In-progress)* *09/2024-Present*

- Overall GPA: **3.9**/4.0
- Key Coursework: Traffic Engineering Systems: Operations and Control, GIS and Spatial Data Science, Large-Scale Data Mining: Models and Algorithms, Intelligent Transportation Systems

Beijing Jiaotong University (in collaboration with Delft University of Technology) **Beijing, China**
Bachelor of Engineering in ***Traffic and Transportation*** *09/2020-06/2024*

- Overall GPA: **3.7**/4.0.
- Key Coursework: Operations Research (100), Physics(96), Transportation Economics (94), Transportation Facilities (91), Planning and Operating Public Transport System (90), Logistics and Supply Chain Management (90)

Publications and Patents

- **Y. Sang**, Y. Tang, A. Qu, and J. Zhao. "RoutineHub: A Framework for Persona-Conditioned Activity Chain Generation via Structured Templates and RAG-Augmented LLM Refinement." *Manuscript prepared for submission to Travel Behaviour and Society.*
- Y. Zhang*, **Y. Sang***, and M. Wu. "Congestion Pricing in New York City: Effects on Ride-Hailing, Transit, and Welfare." *Manuscript submitted to Transportation Research Part A: Policy and Practice.*
- **Y. Sang**. "Research on Demand Responsive Transit Route Optimization, Scheduling Models, and Solution Algorithms." *Highlights in Science, Engineering and Technology.* Presented at the 2nd International Conference on Civil Engineering, Architecture and Transportation (CEAT 2024).
- B. Wang, Y. Gao, A. Huang, and **Y. Sang**. "Game Models for Taxi Decision-Making Considering Online Ride-Hailing Competition in Airport." *2023 IEEE 8th International Conference on Intelligent Transportation Engineering (ICITE)*, (2023): 248–254. IEEE.
- B. Han, Y. Yu, Z. Xi, Y. Sun, F. Lu, S. Li, Z. Li, S. Huang, J. Hu, **Y. Sang**, and Y. Zhao. "Overview of Global Urban Rail Transit Operation Statistics and Analysis in 2023." *Urban Rail Transit*, 2024, *37*(1): 1–9.
- "Integrated Optimization of Train Diagram and Rolling Stock Circulation with Full-length and Short-length Routes of Virtual Coupling Trains in Urban Rail Transit." *Patent Application*, (Application Number: 202311592436.X), 2023.

Research Experience

RoutineHub: A Framework for Persona-Conditioned Activity Chain Generation **Cambridge, USA**
Advisor: ***Professor Jinhua Zhao****, MIT* *7/2025 – Present*

- Designed RoutineHub, an end-to-end activity chain generation framework combining symbolic reasoning and deep learning to predict personalized daily routines from Singapore HITS2012 dataset (21,936 users, 85,882 trips).
- Engineered a dual-architecture system: (1) Transformer-based sequence-to-sequence model with joint activity-time prediction and temporal consistency constraints; (2) LLM-augmented retrieval system with template-guided generation and uncertainty modeling.
- Implemented rare pattern mining with Bernoulli modeling and boosting mechanisms to capture low-frequency behavioral patterns, expanding activity taxonomy from 15 to 27 types through LLM-based subdivision.
- Achieved fine-grained temporal modeling with 15-minute precision slots and persona-based conditioning, incorporating demographic features, workday patterns, and activity dependencies for realistic schedule generation.
- **Outcome:** Preparing a manuscript for submission to the *Travel Behaviour and Society.*

Impact of Congestion Pricing on Ride-hailing and Subway in New York City **Berkeley, USA**
Advisor: Assistant ***Professor Manxi Wu****, UC Berkeley* *05/2025 – Present*

- Analyzed the short-run effects of NYC's $1.50 congestion surcharge (introduced January 5, 2025) on for-hire vehicles and subway ridership using 11.0M TLC trip records and 57.2M MTA ridership estimates .
- Applied two-way fixed effects difference-in-differences design with OD-pair and temporal fixed effects.
- Identified divergent platform responses with Uber trips declining 6% while Lyft increased 2–5%; subway ridership rose 1% indicating partial modal substitution from ride-hailing to public transit.

- Revealed heterogeneous impacts: short trips and low-fare rides declined significantly (9% and 35% respectively) while base fares increased though driver pay gains remained limited.
- **Outcome:** Manuscript submitted to *Transportation Research Part A* titled "Congestion Pricing in New York City: Effects on Ride-Hailing, Transit, and Welfare".

Tourist Mobility Modeling for Tokyo via Survey Data **Los Angeles, USA**

Advisor: ***Professor Jiaqi Ma****, UCLA, under UCLA Mobility Lab* *12/2024 – 05/2025*

- Fused GPS pins with Tokyo Visitor Survey records to create a zonal mobility dataset.
- Developed an Random Forest model to predict nights stayed and locations visited from demographic features.
- Generated trajectories that matching survey chain length and activity type distribution using **LLM**.
- **Outcome:** Built a full pipeline for generating synthetic tourist activity chain at high spatiotemporal resolution.

QuantV2X: Communication–Compute Co-Design for Cooperative Perception **Los Angeles, USA**

Advisor: ***Professor Jiaqi Ma****, UCLA* *08/2025 – Present*

- Built a C-V2X testbed and benchmarked message representations (PointCloud, BEV, Boxes, PointCluster) to quantify bandwidth–accuracy–latency trade-offs.
- Designed a dual-quantization stack (INT8 models + feature codebooks) with calibration and vector quantization, achieving order-of-magnitude feature compression while preserving accuracy, and enabling low-latency TensorRT edge deployment.
- Established end-to-end benchmarks and a reproducible pipeline that unify model–communication co-design and multi-agent cooperation, covering bandwidth/latency limits, packet loss, and cross-agent sync for fair, repeatable evaluation.
- Provides a reusable baseline and evaluation suite for future quantization choices under compute and bandwidth budgets.
- **Outcome:** *Prepared as my M.S. thesis and planned as a contributing component to a team-authored NeurIPS submission.*

Game Models for Taxi Decision-Making Considering Online Ride-Hailing Competition **Beijing, China**

Advisor: ***Professor Ailing Huang****, BJTU* *02/2022 – 01/2024*

- Constructed non-cooperative and cooperative game models of the two groups with taxi drivers and online car-hailing.
- Established the income function to explore the conditions for the two games to reach Nash equilibrium.
- Conducted empirical analysis utilizing actual survey data from Beijing Capital International Airport.
- **Outcome:** Published a paper in *IEEE International Conference on Intelligent Transportation Engineering (ICITE).*

Trajectory-Based Optimization of Night Customized Bus Route for Urban Transport Hubs **Beijing, China**

Advisor: ***Professor Ailing Huang****, BJTU & Assistant* ***Professor Yimeng Zhang****, SWJTU* *02/2024 – 05/2024*

- Extracted features from taxi/ride-hailing trajectory data and passenger travel characteristics.
- Constructed a mixed-integer programming model for customized bus route and vehicle scheduling.
- Designed a genetic algorithm for solving the proposed model.
- **Outcome:** Won the *Outstanding Thesis Award at Beijing Jiaotong University*

MBSE-Driven Design and Simulation of a CAV Cyber-Physical System Architecture **Beijing, China**

Advisor: ***Professor Xiaoping Ma****, BJTU* *09/2022 – 10/2022*

- Proposed reference architecture for cyber-physical systems (CPS) for connected and autonomous vehicles (CAVs) based on digital twin technology.
- Validated and optimized single-intersection signal timing via simulations in VISSIM and Synchro.
- **Outcome:** Won third prize at *Transportation Science and Technology Competition at Beijing Jiaotong University.*

Internship Experience

Qingdao Kaiyuan Kerun Electronics Co., LTD **Qingdao, China**

Traffic Engineering Intern *07/2023*

- Redesigned a deformed (Y-shaped) intersection in Jiaozhou, Qingdao, proposing three improvement schemes.
- Applied Synchro and VISSIM, achieving up to 28% reduction in average stop delay and improving left-turn flow and safety.

Competitions and Activities

Urban Futures: Online Research Seminar, University of Cambridge, paper accepted by CEAT 2024 *10/2023*

MATHORCUP Mathematical Modeling Competition, Won third prize at Beijing Jiaotong University *04/2023*

Skills

Computer Skills: Python, MATLAB, SPSS, Gurobi, VISSIM, CAD, MATSim and AutoCDA

Standardized Tests: IELTS total score: 7.0; GRE: Verbal: 160 Quantitative: 168 Analytical Writing: 4.0