Lei QIN

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Research Interests: Multimodal travel behavior, Complex transportation network analysis, Mobility equity

EDUCATION

THE UNIVERSITY OF HONG KONG   **Hong Kong, China**

Master of Science in Urban Design and Transport   *Sep 2023 - Jul 2025*

- Graduation with Distinction.
- **Core courses:** Transport Network Analysis and Modelling (A+), Spatial Mobilities Analysis (A-), Spatial Planning Analysis (A-), Programming and Foundations in Urban Data Analysis (B+), Survey and data analysis in transport studies (B+).

HARBIN INSTITUTE OF TECHNOLOGY   **China**

Bachelor of Engineering in Traffic Engineering   *Sep 2016 - Jun 2020*

- **Core courses:** Operations research (A), Transportation geographic information System (A-), Algebra and Geometry (A-), Fundamentals of Traffic Engineering (A-).

RESEARCH EXPERIENCE

Leveraging Large Language Models for Road Trip Itinerary Recommendation in the Greater Bay Area

Hong kong, China

Research Assistant, The university of Hong Kong   *Jul 2025 - Feb 2026 (Expected)*

- Developing a travel route optimization algorithm using Proximal Policy Optimization (PPO), focusing on modeling multi-modal transportation and complex transfer scenarios.
- Implemented and coded a user itinerary ingestion pipeline that extracts trip details from URLs (e.g. Rednote), images (using Optical Character Recognition), and videos (using FFmpeg + Rapid Whisper), generating personalized, preference-based road trip plans.

The digital economy enhances overall life satisfaction but reduces equity among vulnerable groups

Co-author   *Dec 2024 - Mar 2025*

- Applied ERNIE 3.0 and DeBERTaV3 to classify and quantify 10M+ Weibo posts, developing a fine-grained life satisfaction index validated against survey benchmarks.
- Designed a spatial econometric framework integrating ridge regression, XGBoost, and GeoShapley to capture nonlinear and geographically heterogeneous effects of the digital economy on residents' well-being.
- Coded and analyzed disparities across vulnerable groups (elderly, low-income, low-education) and proposed digital inclusion strategies to promote equitable urban development.

Geo-embedded graph network: Decoding urban spatiotemporal ride-hailing demand through street contextual features

Co-author   *Jun 2024 - Dec 2024*

- Developed Graph Neural Network architectures integrating road network topology with multi-scale urban features, enabling accurate prediction and interpretation of spatiotemporal ride-hailing demand.
- Formulated a loss function tailored to highly imbalanced training data, enhancing stability and yielding a 10% gain in predictive accuracy.
- Applied Integrated Gradients (Captum, PyTorch) to the GraphSAGE model for interpretability, uncovering the contribution of micro- and macro-level features in shaping demand distribution.

PUBLICATIONS

Journal Articles

- Jin, R. and **Qin, L**. (2025) The 5D framework as a rigid theory for urban quantification: Six critical reflections based on LLM. *Land Use Policy*, under review.
- Jin, R., Shao, C., **Qin, L**. and Zhao, W. (2025) The digital economy enhances overall life satisfaction but reduces equity among vulnerable groups. *Applied Geography*, under review.
- Jin, R. and **Qin, L**. (2025) Inconsistencies between drivers and impacts of urban commuting: A semi-automated systematic review using LLMs. Transport Policy, under review.
- Jin, R., Gong, W. and **Qin, L**. (2025) A geo-embedded graph neural network framework for ride-hailing demand: Interpretable modeling of spatiotemporal dynamics driven by street contextual features. *Transportation Research Part B*, under review.

HONORS

- Awarded the 2nd prize scholarship of Harbin Institute of Technology, *May 2017*.
- Awarded the 3rd prize scholarship of Harbin Institute of Technology, *Nov 2017*.
- Awarded the social work scholarship of Harbin Institute of Technology, *Nov 2018*.
- The 2nd Prize of the 3rd National College Intelligent Transportation Innovation and Entrepreneurship Competition (Awarded by China Automation Association, National Federation of Universities Traffic Equipment and Control Engineering).

SKILLS (Skill ratings: *** Proficient, ** Intermediate, * Familiar)

Technical Skills:

- **Programming:** Python (***), Java (*), R (*)
- **Analysis Software:** Arcgis (***), Origin (**), Spss (**)
- **Traffic Simulation:** Vissim(***), TESSNG(**)
- **Engineering:** Rhino(**), Grasshopper(**), Autocad(**)
- **Graph Software:** Photoshop(***), Illustrator(***), Indesign(*)

Language Skills: Mandarin (Native), English (IELTS 6.5, Sobtained Sep 2022)