

# Lei QIN

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

## EDUCATION

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### 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

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### 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.

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## PUBLICATIONS

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### 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 D*, under review.

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## HONORS

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

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

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### 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)