

Zhaoxiang Li

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Education

Peking University

Beijing, China

Master of Science, Urban and Regional Planning

Sep.2022-Jul.2025 (Expected)

- GPA:3.67/4.00, Supervised by Prof. Pengjun Zhao
National Scholarship for Graduate Students of China, 2024, Rank 1/51

Tongji University

Shanghai, China

BEng, Transportation Engineering

Sep.2018-Jun.2022

- GPA:4.76/5.00, which is equivalent to 92.61 on 100 basis
National Scholarship for Undergraduate Students of China, 2020, Rank 1/225

Research Interests

Research Areas: Transportation, Energy & Environment, Decarbonization, Behavioral Science, Transportation Policies, Transport Equity, Urban Planning.

Research Vision: My research interests lie at the intersection of **Sustainable Mobility, Energy & Environment, Urban Planning, and Transport Equity**:

- Urban Mobility and Travel Behavior:** Leveraging high-precision transportation data to understand the mobility patterns of people and goods in urban areas, while exploring incentive mechanisms and intervention measures to promote more sustainable mobility.
- Green Transformations in Transportation:** Focused on technological innovation, governance, and strategic planning techniques to achieve green transformations in transportation systems, aimed at tackling climate and environmental challenges.
- Urban and Transportation Planning:** Using causal inference methods to assess the relationship between urban planning strategies, such as land use patterns and urban forms, and sustainable transportation.
- Social and Spatial Justice:** In relation to accessibility to essential services, climate change, and environmental impacts of transportation systems among different communities and groups.

Publications

(* indicates the corresponding author; † indicates co-first authors.)

Referred publications

- Li, Z., Ma, X., Pan, R., Yang, C., & Yuan, Q*. (2025). Explaining the spatial dynamics and identifying potential risks of hazardous materials truck movements. *Journal of Transport Geography*, 123, 104125.
- Li, Z., Zhao, P*, He, Z., & Xiao, Z. (2024). Non-linear Effects of CO₂ Emissions from Road Transport in Port Landside Area. *Transportation Research Part D: Transport and Environment*, 132, 104264.
- Zhao, P*, Li, Z., Xiao, Z., Jiang, S., He, Z., & Zhang, M. (2023). Spatiotemporal Characteristics and Driving Factors of CO₂ Emissions from Road Freight Transportation. *Transportation Research Part D: Transport and Environment*, 125, 103983.
- He, Z., Zhao, P*, Xiao, Z., Huang, X., Li, Z., & Kang, T. (2024). Exploring the Distance Decay in Port Hinterlands under Port Regionalization Using Truck GPS Data. *Transportation Research Part E: Logistics and*

5. He, Z., Zhao, P.*, Zhang, S., **Li, Z.**, Huang, G., Zhang, C., & Niu, Y. (2024). Analyzing Foreland Dynamics in China's Port Clusters under Global Major Events (2019–2022) by AIS Trajectory Data. *Ocean & Coastal Management*, 255, 107269.

Forthcoming publications

1. Zhao, P.*, **Li, Z.***, He, Z., Chen, Y., & Xiao, Z. (2025). Reducing the Road Freight's Emissions through Integrated Strategy in Port Cities. *Nature Communications*. (Under review)
2. Zhao, P.*, **Li, Z.[†]**, Liu, Q., & Jiang, S. (2025). Just Transition to Sustainable Road Freight Transport in China. *Nature Sustainability*. (Under review)
3. He, Z., Zhao, P.*, **Li, Z.**, Huang, G., Niu, Y., Zhang, C., & Huang, Z. (2024). Assessing the Adaptivity of Global Container Shipping Network during the Russia-Ukraine Conflict by AIS Trajectory Data. *Journal of Transport Geography*. (Under revision)

Conference Presentations

- The 24th COTA International Conference of Transportation Professionals (Summer 2024) **Shenzhen, China**
- The 15th International Conference on Applied Energy (Fall 2023) **Matsue & Tokyo, Japan**
- The 14th Workshop on Computational Transportation Science (Fall 2023) **Shanghai, China**
- The 28th Conference on Atmospheric Environment Science and Technology of China (Winter 2022)
Beijing, China

Research Experience

Key Laboratory of Earth Surface System and Human-Earth Relations **Shenzhen, China**
Ministry of Natural Resources of China, Peking University

Project 1: Carbon Footprint and Environmental Impacts of Urban Transportation Systems (*Shenzhen Science and Technology Program, Grant No. JCYJ20220818100810024, \$2,074,430*), Participant *Sep.2022-Present*

- Constructed high resolution CO₂ and air pollutants (NO_x, PM) emission inventories of road transportation in China based on 51 billion GPS trajectory signals of heavy-duty trucks, utilizing COPERT model.
- Identified spatiotemporal patterns and drivers of CO₂ emission from road transportation using geospatial (MGWR) and machine learning (XGBoost + ALE) approaches.
- Established a mesoscale road traffic simulation model to simulate the impact of road network changes on traffic flow, and its subsequent effects on road transportation emissions reduction.
- Developed a scenario-based approach to assess the integrated effects of truck fleet electrification and road network development on deep decarbonization and air pollution emissions reduction in the Greater Bay Area (GBA) of China by 2035, under both the BAU scenario and the net-zero emission electricity grids scenario.

Project 2: Building Capacity for the Future City in Developing Countries (PEAK) (*UKRI's Global Challenge Research Fund, Grant No.ES/P011055/1, \$9,146,875*), Participant *Sep.2022-Present*

- Extracted human travel origin-destination (OD) data from 35 billion mobile signaling records during the 2019-2023 period and analyzed the mobility patterns in China before and after the COVID-19 epidemic.
- Proposed the Pollution-Benefit Matching Index (PBMI) to quantify the social inequalities of economic benefits and pollution burdens (NO_x, PM) from road freight transport activities in China at a 1 km grid scale.
- Evaluated the potential of policy interventions (e.g., pollution taxes, electrification, land use mix) to promote

environmental justice, using a simulation-based approach.

Project 3: Mechanism and Simulation of Sea-land Resources Flow via Big Data (National Natural Science Foundation of China, Grant No.42130402, **\$401,056**), Participant Sep.2022-Present

- Devised a data-driven algorithm to extract liner shipping networks and voyage information via 4.5 billion AIS (Automatic Identification System) data.
- Employed the complex network approach to demarcate the foreland structures of China's port clusters.
- Estimated the distance decay effect of freight flows in port-hinterland relationship (between the Shenzhen Port and primary freight facilities) by adopting the gravity model.
- Investigated the allocation of freight facilities related to the Shenzhen Port using the DBSCAN algorithm.

Key Laboratory of Road and Traffic Engineering
Ministry of Education of China, Tongji University

Shanghai, China

Project 1: Cloud Supervision Service System for Autonomous Vehicle Fleet Operation (National Innovation Training Project, Grant No.202010247139, **\$2,800**), **Principal Investigator** Jan.2020-May.2021

- Built a Bayesian network to extract features from autonomous vehicle on-road test data, constructed a CNN-LSTM model to identify autonomous vehicle risk events from the feature matrix.
- Constructed a federated learning framework to collect data from multiple vehicles with privacy preservation.
- Conducted causal analysis to identify the key factors for driving risk in a human-machine mixed driving environment using DREAM method.

Project 2: Travel Decision-making Mechanism and Control Method for Urban Heavy-duty Trucks (National Natural Science Foundation of China, Grant No.52302394, **\$41,488**), Participant Apr.2021-Jun.2022

- Proposed a data-driven approach (a dual-constraint PELT algorithm) for extracting stops and trips from GPS data, determined dwell time thresholds of HazMat truck stops.
- Developed a spatial clustering algorithm to identify stopping hotspots for HazMat transportation.
- Analyzed the mobility patterns of HazMat trucks based on the truncated power-law distribution.
- Modified the risk assessment method of the US DOT to calculate the potential risks of HazMat transportation.

Selected Awards and Honors

Membership: American Society Civil Engineering (ASCE)	2021-Present
Model Student Scholarship, Peking University (Rank 1/51)	2024
Outstanding Graduate of Shanghai (Awarded by Shanghai Education Commission, Rank 1/225)	2022
First Prize of the 16 th National Competition of Transport Science and Technology (Awarded by Ministry of Transport of China, Rank 1/1130)	2021
5th in 2021 American Society Civil Engineering Mid-Pacific Student Conference Transportation Contest	2021
Model Student Scholarship, Tongji University (Rank 1/225)	2021

Research Skills

- **Programming:** Python, C++, SQL, MATLAB, R, STATA, ArcGIS, QGIS, EPA MOVES, COPERT.
- **Machine Learning Framework:** Pytorch, TensorFlow.
- **Analytical Skills:** Econometrics, Statistics, Deep Learning, Computer Vision, Spatial Visualization and Data Management, Discrete Choice Analysis, Web Scrapping, Hypothesis Testing, Transportation Policy Analysis.