Zhaoxiang Li

School of Urban Planning and Design, Peking University

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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

Transportation, Energy & Environment, Decarbonization, Air Pollution, Health Effects, Environmental Justice.

Publications

Referred publications

1. **Li, Z.**, Zhao, P., He, Z., & Xiao, Z. (2024). Non-linear Effects of CO_2 Emissions from Road Transport in Port Landside Area. *Transportation Research Part D: Transport and Environment*, 132, 104264.

2. Zhao, P., **Li, Z.**, Xiao, Z., Jiang, S., He, Z., & Zhang, M. (2023). Spatiotemporal Characteristics and Driving Factors of CO_2 Emissions from Road Freight Transportation. *Transportation Research Part D: Transport and Environment*, *125*, 103983.

3. 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.

4. 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 Transportation Review*, *181*, 103390.

Forthcoming publications

1. **Li, Z.**, Ma, X., Pan, R., Yang, C., & Yuan, Q. (2024). Explaining the Spatial Dynamics and Identifying Potential Risks of Hazardous Materials Truck Movements. *Journal of Transport Geography*. **(Accepted)**

2. **Li, Z.**, Zhao, P., He, Z., Chen, Y., & Xiao, Z. (2024). Reducing the Road Freight's Emissions through Integrated Strategy in Port Cities. *Nature Communications*. (Under second-round review)

3. Zhao, P., **Li, Z.** (co-first author), Liu, Q., & Jiang, S. (2024). Just Transition to Sustainable Road Freight Transport in China. *Nature Sustainability*. (Under review)

4. 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)

Academic Conferences

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 CO_2 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 the COPERT model.
- Identified patterns and drivers of road transportation emission using geospatial and machine learning 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 100% renewable energy electricity grids scenarios.

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 tax, electrification) to promote environmental justice.

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 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 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   **Shanghai, China**
Ministry of Education of China, Tongji University

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, constructed a CNN-LSTM model to identify vehicle risk driving events.
- Constructed a federated learning (FL) framework to collect data from multiple vehicles with privacy preserving.
- Conducted causal analysis 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 for extracting stops and trips from GPS data, determined dwell time thresholds of truck stops, analyzed the mobility patterns of HazMat trucks based on the truncated power-law distribution.
- Developed a dual-constraint PELT algorithm to identify stop hotspots, calculated potential risks of HazMat transport.

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 16th 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, Emission Estimation Modelling, Energy Policy Analysis, Spatial Visualization and Data Management, Discrete Choice Analysis, Web Scrapping.