Xinyu LI, Ph.D.

Department of Landscape Architecture and Urban Planning
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EDUCATION

Ph.D. Geomatics, The Hong Kong Polytechnic University, Hong Kong, 2022, Dissertation: *Deep Learning for Short-term Bike Sharing Demand Forecast: Spatial Temporal Usage Characterization and Feature Fusion Strategies*

M.S. National Geo-survey and Public Policy, The Chinese University of Hong Kong, Hong Kong, 2017. Full scholarship for MSc Program, South-South Education Foundation, United Nation

B.S. Geographic Information Science, Tianjin Normal University, Tianjin, China, 2015

RESEARCH INTEREST

GeoAI, Spatial-Temporal Data Mining, Urban Digital Twin, Human Mobility, Traffic Demand Prediction, Shared Mobility, Urban Informatics, Data Visualization (Demo1, Demo2)

RESEARCH

Journal Publications (Google Scholar, Citation: 141)

1. **Li X.**, Xu Y*, Zhang X, Shi W., Yue Y, Li Q. Improving short-term bike sharing demand forecast through an irregular convolutional neural network. Transportation Research Part C: Emerging Technologies, 2023, 147: 103984. *(GitHub)*
2. **Li X.**, Xu Y*, Chen Q, Wang L, Zhang X., Shi W. Short-Term Forecast of Bicycle Usage in Bike Sharing Systems: A Spatial-Temporal Memory Network. IEEE Transactions on Intelligent Transportation Systems, vol. 23, no. 8, pp. 10923-10934, Aug. 2022.
3. Xu Y.*, **Li X.**, Shaw S L, Lu F, Yin L, Chen B. Effects of data preprocessing methods on addressing location uncertainty in mobile signaling data. Annals of the American Association of Geographers, 2020, 111(2): 515-539.

4. Xu Y.*, Zou D, Park S, Li, Q., Zhou, S., **Li X.** Understanding the movement predictability of international travelers using a nationwide mobile phone dataset collected in South Korea. Computers, Environment and Urban Systems, 2022, 92: 101753.

5. **Li, X.,** Wu D.*, Ye, X., & Sun, Q. (2024). Leveraging Connected Vehicle Data for Near-Crash Detection and Analysis in Urban Environments. arXiv preprint arXiv:2409.11341.

6. Ye. X, Du J., **Li X**.*, Shaw S., Fu Y., Dong X., Zhang Z., Wu L., Human-centered GeoAI Foundation Models: where GeoAI meets human dynamics *(Submitted to Urban Informatic)*

7. Ye. X., Li S., Li X., **Li X.,** Dadashova B., Li W., Du J., Wu D., Street view imagery in traffic crash and road safety analysis: A review *(Submitted to Cities)*

Conference Report & Papers

1. 10/2024, TRB Annual Meeting 2025, *Assessing volume delay function accuracy through multi-source traffic data: Insights from connected vehicle data and traffic simulation data (Accepted)*

2. 07/2023, The 30th International Conference on Geoinformatics, *Short-term bike sharing demand prediction through feature fusion in spatial and topological domains*

3. 10/2021, The 2021 City+ Milan Conference, Theme: Smart City Beyond, Webinar, *Short-Term Forecast of Bicycle Usage in Bike Sharing Systems: A Spatial-Temporal Memory Network*

4. 12/2021, The 4th International Symposium on Multimodal Transportation, Webinar, *Short-Term Forecast of Bicycle Usage in Bike Sharing Systems: A Spatial-Temporal Memory Network*

Grants Involved

Highly involved in the ideation, framework design, and proposal drafting of the funded projects below:

1. Optimizing Urban Vehicle Fleet Through Multi-Agent Reinforcement Learning: Integrating Built Environment Factors and Real-Time Road States, *2024 Seed Program for AI, Computing, and Data Science, Texas A&M Institute of Data Science (TAMIDS),* USD$ 20,000, 2025-2027 (PI).

2. Excellence in Research: Constructing Urban Digital Twins via Responsible Foundation AI for Community Resilience, *National Science Foundation,* USD$ 1,000,000, 2024-2027.

3. Campus Digital Twin, *Texas A&M University*, Office of Vice President of Planning, Assessment and Strategy, USD$ 900,000, 2023-2026.

4. Leveraging Probe-Based Data to Enhance Long-Term Planning Models, *Texas Department of Transportation, Research and Technology Implementation Division,* USD$ 346,904, 2022-2024.
5. Utilizing Telematics to Understand Driving Behavior During Missed Exits and Wrong Turns, *Texas Department of Transportation, Research and Technology Implementation Division,* USD$ 403,695, 2023-2025.
6. Big Data and Geospatial Technologies for Smart Tourism, The Hong Kong Polytechnic University, HK$ 800,000, 2021-2023.
7. Coupling Mobile Phone and Socioeconomic Datasets: A New Approach to Quantifying Dynamic Social Segregation in A Hybrid Physical-Virtual Space, *Research Grant Council (RGC) of Hong Kong*, HK$ 886,800, 2019-2022.
8. Feature Representation in A Coupled Continuous and Network Space: A New Approach for Travel Demand Forecast for Urban Bike-Sharing Systems, *National Natural Science Foundation of China,* RMB 560,000, 2022-2025
9. Integrating Spatiotemporal Features for Travel Demand Analysis and Forecast of Dockless Bike Sharing in Urban Areas, *National Natural Science Foundation of China,* RMB 251,000, 2019-2021

WORKING AND TEACHING EXPERIENCE

Postdoctoral Researcher **01.2024 – to date**

Department of Landscape Architecture and Urban Planning, Texas A&M University
Texas A&M Transportation Institute

Project: Excellence in Research: Constructing Urban Digital Twins via Responsible Foundation AI for Community Resilience/Utilizing telematics to understand driving behavior during missing exits.

- Design the research framework to study the correlation between near-missing points and environmental variables.
- Participated in the research, design, and development of big data mining and deep learning architecture.

Project: 0-7166 Leveraging Probe-Based Data to Enhance Long-Term Planning Models

Project: 0-7200 Utilizing Telematics to Understand Driving Behavior During Missed Exits and Wrong Turns *(funding source: Texas Department of Transportation, Research and Technology Implementation Division)*

- Design the framework to identify near-crash events, unsafe, and inefficient locations of Texas state highways using connected vehicle data.

- Leverage the multi-source transportation data to validate the Bureau of Public Roads (BPR) function in travel demand model.

Research Assistant **09.2021 – 08.2023**

Department of Land Surveying and Geo-Informatics, The Hong Kong Polytechnic University

Project: Feature Representation in A Coupled Continuous and Network Space: A New Approach for Travel Demand Forecast for Urban Bike-Sharing Systems

- Designed and formulated a deep learning model to forecast the bicycle usage demand
- Participated in the research, design, and development of deep learning architecture.

Research Assistant **09.2018 – 09.2021**

Department of Land Surveying and Geo-Informatics, The Hong Kong Polytechnic University

Project: Integrating Spatiotemporal Features for Travel Demand Analysis and Forecast of Dockless Bike-Sharing in Urban Areas

- Designed and formulated a hybrid deep learning model to predict bike-sharing usage demand for two types of bike-sharing systems.
- Participated in the research, design, and development of deep learning architecture and was responsible for data collection and quality control.

Research Assistant **09.2017 – 09.2018**

Department of Land Surveying and Geo-Informatics, The Hong Kong Polytechnic University

Project: Development of Web GIS for Disaster Analysis and Prediction

- Wildfire simulation using environmental and geographic data
- Risk analysis and mapping
- Object detection using deep learning approaches
- Progress report and evaluation meeting
- Contact person for industry partner

Teaching Experience

2018 Spring Semester	LSGI3431A: System Customization and Development
2019 Spring Semester	LSGI3431A: System Customization and Development

2019 Autumn Semester	LSGI3292A: Internet GIS and Web Services
2020 Autumn Semester	LSGI3245: Geospatial Database Management and Design
2021 Autumn Semester	LSGI3245: Geospatial Database Management and Design
2022 Autumn Semester	Supervised BSc Final Year Project *Title: A Study of Road Crossing Safety in Hong Kong through User Control Simulation, NG Ka Ho* *Title: Bikeability Assessment and Analysis through Residential Questionnaire and GIS Technology, LEUNG Marcella Yin*

CORE SKILLS

Deep Learning	PyTorch, TensorFlow, CUDA coding
Engine Development	UNITY Development, and Virtual Reality (VR) Development
Programming	Python, C/C++/C#, Django, SQL, JavaScript
Geospatial Analysis	ArcGIS, QGIS, GeoPandas
Remote Sensing	ENVI with IDL Development
Data Collection	Scrapy, Requests
Big Data Analysis	SQL, Hadoop, line-by-line & parallel processing
Visualization	deck.gl, kelper.gl, Adobe Illustrate, Adobe Premiere
Language	English (Fluent), Mandarin (Native)

HONORS & AWARDS

10. 2018, Full scholarship for Postgraduate (PhD) Program, HKPolyU
11. 2016, Full scholarship for MSc Program, South-South Education Foundation, United Nation
12. 2014, First -class Undergraduate Scholarship, Tianjin Normal University, China
13. 2013, First -class Undergraduate Scholarship, Tianjin Normal University, China