Yuebing LIANG

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RESEARCH INTERESTS

AI for Transport Planning, Human Mobility Modeling, Spatiotemporal Data Mining, Generative Urban Design

EDUCATION

The University of Hong Kong **Ph.D. in Urban Planning and Design** 10/2020 – 06/2024

- Supervisors: Prof. Zhao Zhan, Prof. Chris Webster, Prof. Eric Schuldenfrei, Prof. Zhou Jiangping
- Doctoral Thesis: Planning-Oriented Travel Demand Forecasting for Evolving Transportation Systems Using Deep Neural Networks

Tsinghua University **Master in Architecture** 09/2018 – 06/2020

- Courses：Urban Design, GIS Spatial Analysis, Big Data and Urban Planning, Real Estate Development
- Minor in Big Data Competency Enhancement Program. Courses: Data Structures, Big Data Systems, Database Technology, Data Visualization, C++ Programming

Tsinghua University **Bachelor in Architecture** 09/2014 – 06/2018

- Courses：Urban Design, Residential Planning, Transportation System Planning, Engineering Economics
- Dual Degree in Business Administration. Courses: Principles of Economics, Accounting, Corporate Finance

PROFESSIONAL EXPERIENCE

Tsinghua University **Tenure-Track Assistant Professor** 06/2025 –

- Department: Urban Planning (under School of Architecture)

Massachusetts Institute of Technology **Postdoc Associate** 06/2024 – 06/2025

- Supervisors: Prof. Zhao Jinhua

Massachusetts Institute of Technology **Visiting PhD Student** 06/2023 – 05/2024

- Supervisors：Prof. Carlo Ratti, Prof. Paolo Santi

Washington University **Visiting Master Student** 01/2020 – 04/2020

- Supervisor：Prof. Jon E. Froehlich

New York University **Visiting Master Student** 05/2019 – 08/2019

- Supervisor：Prof. Debra Laefer

PUBLICATIONS

† co-first author; * corresponding author.

Journal Papers

[1] Qiao, Q., Ren, C., Chen, S., **Liang, Y.**, Lai, Y., Zhou, Y., Schuldenfrei, E. *, Sarkar, C., Webster, C., 2025. Architectural design and building-level infections during the early stage of COVID-19: A study of 2597 public housing in Hong Kong. *Building and Environment*, accepted in March 2025.

[2] **Liang, Y.**, Zhao, Z*., Ding, F., Tang, Y. and He, Z., 2024. Time-aware trip generation for bike sharing planning: A multi-task memory-augmented graph neural network. *Information Fusion*, p.102294.

[3] **Liang, Y.**, Liu, Y., Wang, X. and Zhao, Z. *, 2024. Exploring large language models for human mobility prediction under public events. *Computers, Environment and Urban Systems*, accepted in July 2024.

[4] **Liang, Y.**, Zhao, Z. *, Webster, C. J., 2024. Generating sparse origin-destination flows on shared mobility networks using probabilistic graph neural networks. *Sustainable Cities and Society*, 114: 105777.

[5] **Liang, Y.**, Zhao, Z. * and Zhang, X., 2024. Modeling taxi cruising time based on multi-source data: A case study in Shanghai. *Transportation*, 51(3): 761-790.

[6] Feng, J. *, **Liang, Y.**, Hao, Q. and Xu, K., and Qiu, W., 2024. Comparing effectiveness of point-of-interest data and land use data in theft crime modelling: a case study in Beijing. *Land Use Policy*, 147: 107357.

[7] **Liang, Y.**, Huang, G. and Zhao, Z. *, 2023. Cross-mode knowledge adaptation for bike sharing demand prediction using domain-adversarial graph neural networks. *IEEE Transactions on Intelligent Transportation Systems*, 25(5): 3642-3653.

[8] Huang, G., **Liang, Y.** and Zhao, Z. *, 2023. Understanding market competition between transportation network companies using big data. *Transportation Research Part A: Policy and Practice*, *178*, p.103861.

[9] **Liang, Y.**, Ding, F., Huang, G. and Zhao, Z. *, 2023. Deep trip generation with graph neural networks for bike sharing system expansion. *Transportation Research Part C: Emerging Technologies*, *154*, p.104241.

[10] Zhao, Z. †* and **Liang, Y.** †, 2023. A deep inverse reinforcement learning approach to route choice modeling with context-dependent rewards. *Transportation Research Part C: Emerging Technologies*, *149*, p.104079.

[11] **Liang, Y.**, Zhao, Z.* and Sun, L., 2022. Memory-augmented dynamic graph convolution networks for traffic data imputation with diverse missing patterns. *Transportation Research Part C: Emerging Technologies*, *143*, p.103826.

[12] **Liang, Y.**, Huang, G. and Zhao, Z.*, 2022. Joint demand prediction for multimodal systems: A multi-task multi-relational spatiotemporal graph neural network approach. *Transportation Research Part C: Emerging Technologies*, *140*, p.103731.

[13] **Liang, Y.** and Zhao, Z.*, 2020. Nettraj: A network-based vehicle trajectory prediction model with directional representation and spatiotemporal attention mechanisms. *IEEE Transactions on Intelligent Transportation Systems*, *23*(9), pp.14470-14481.

[14] Huang, H.*, Liu, Y., **Liang, Y.**, Vargas, D. and Zhang, L., 2020. Spatial perspectives on coworking spaces and related practices in Beijing. *Built Environment, 46*(1), pp.40-54.

[15] **Liang, Y.***, 2020. A comparative study on the spatial characteristics and influencing factors of co-working and traditional office rental prices. *Beijing Planning and Construction* (in Chinese), 01, pp. 60-65.

Conference Papers

[1] **Liang, Y.**, Wang, S.*, Yu, J., Zhao, Z., Zhao, J., Pentland, S., 2025. Analyzing sequential activity and travel decisions with interpretable deep inverse reinforcement learning. In *104th Transportation Research Board Annual Meeting* (TRB), Washington, DC, USA.

[2] Wang, Q., Wang, S.*, **Liang, Y.**, Zhao, J., 2025. Generative urban design: human-guided automatic urban design via diffusion models. In *104th Transportation Research Board Annual Meeting* (TRB), Washington, DC, USA.

[3] Ding, F., **Liang, Y.**, Wang, Y., Yang, Y., Zhou., Y., Zhao, Z.*, 2024. A graph deep learning model for station ridership prediction in expanding metro networks. In Proceedings of the 2nd ACM SIGSPATIAL International Workshop on Advances in Urban-AI, Atlanta, GA.

[4] **Liang, Y.**, Ding, F., Tang, Y. and Zhao, Z.*, 2023. Time-aware trip generation for bike sharing system planning. In *12th ACM SIGKDD International Workshop on Urban Computing* (UrbComp'23), Long Beach, CA, USA.

[5] **Liang, Y.**, Ding, F., Huang, G. and Zhao, Z.*, 2023. Predicting potential demand for bike sharing system expansion using a multi-graph attention network. In *16th World Conference on Transport Research* (WCTR),

Montreal, Canada.

[6] **Liang, Y.**, Huang, G. and Zhao, Z.*, 2022. Bike sharing demand prediction based on knowledge sharing across modes: A graph-based deep learning approach. In *IEEE 25th International Conference on Intelligent Transportation Systems* (ITSC) (pp. 857-862), Macao, China.

[7] **Liang, Y.** and Zhao, Z.*, 2022. Unraveling spatial, temporal and behavioral factors affecting trip-level taxi cruising time using large-scale GPS trajectories. In *101th Transportation Research Board Annual Meeting* (TRB), Washington, DC, USA.

[8] Feng, J.*, **Liang, Y.**, Hao, Q., Xu, K. and Qiu, W., 2022. POI data versus land use data: Which are most effective in modelling theft crime. In *27th Annual Association for Computer-Aided Architectural Design Research in Asia* (CAADRIA), Sydney, Australia.

In Preparation

[1] **Liang, Y.**, Laefer, D. F.* and Vo, A. V., Buffering strategies to overcome LiDAR spatial discontinuities. *The Photogrammetric Record*, in revision, originally submitted in Apr 2024.

[2] Wang, Q., **Liang, Y.**, Zheng, Y., Xu, K., Zhao, J. and Wang, S.* Generative AI for Urban Planning: Synthesizing Satellite Imagery via Diffusion Models. *Computers, Environment and Urban Systems*, in revision, originally submitted in Dec 2024.

[3] Yu, C., Yang, C., De Vos, J., **Liang, Y.**, Zheng, Y., Dong, W. and Yuan, Q.*, Bus ridership decline in the past two decades: A review from an interdisciplinary perspective of transportation, economics, behaviour, and sociology.

[4] Zheng, Y.*, **Liang, Y.**, Li, D., Zhuang, D., Wang, S. and Zhao, J., Consumption complexity as a driver of urban economic development.

[5] Shu, B., **Liang, Y.**, Rao, J., Zhuang, D. and Kang, Y.*, Enrichment of POI semantic information with large language models: An example of next location prediction.

[6] Tang, Y., Deng, W., Lei, S., **Liang, Y.**, Ma, Z. and Zhao, Z.*, RouteKG: A knowledge graph-based framework for route prediction on road networks.

[7] **Liang, Y.**, Wang, S.*, Yu, J., Zhao, J. and Pentland, S., Analyzing sequential activity and travel decisions with interpretable deep inverse reinforcement learning.

[8] **Liang, Y.**, Zhao, P.*, Abbiasov, T., Santi, P.* and Ratti, C., Quantifying mobility shift and inequality with remote work by large-scale mobile-based trajectories in the United States.

[9] Sabouri, S.*, **Liang, Y.**, Zhao, P., Abbiasov, T., Salazar-Miranda, A., Heine, C., Santi, P. and Ratti, C. US nationwide travel mode detection using GPS data.

[10] He, M., **Liang, Y.***, Zheng, Y., Wang, Q., Zhuang, D., Wang, S., Tian, L. and Zhao, J. Generative AI for Urban Design: A Stepwise Approach Integrating Human Expertise with Multimodal Diffusion Models.

[11] Yang, B., **Liang, Y.***, Zhao, Z, Wang, S. and Zhao, J. Performing Transit-Oriented Development Using Deep Reinforcement Learning.

TEACHING EXPERIENCE

MIT-UF-NU Joint Summer Research Camp **Research Mentor** 06/2024 – 09/2025

- Designed research projects and supervised 3 master students in research and publication.

Hong Kong University **Teaching Assistant** 09/2021 – 12/2022

- Taught tutorial sessions of URBS1003 Theories and Global Trends in Urban Development

Tsinghua University **Teaching Assistant** 09/2018 – 12/2019

- Assisted in the course administration of "Architecture and National Dignity".

Tsinghua University **Academic Advisor** 09/2017 – 07/2020

- Provided academic and career guidance for undergraduate students in the School of Architecture.

DESIGN EXPERIENCE

THAD Architectural Design Institute **Design Intern** 09/2019 – 12/2019

- Assisted in designing Songzhuang Art Village, Beijing, including site analysis and art museum design.

Robert A.M. Stern Architects **Design Intern** 05/2018 – 08/2018

- Assisted in urban design for Atlanta International Airport, including site analysis and parking design.

THUPDI Planning and Design Institute **Design Intern** 09/2018 – 12/2018

- Assisted in the conceptual planning of three villages in Yunnan and Guizhou Provinces.

SELECTED HONORS

HKU Presidential PhD Scholarship 2020 – 2024
HKU Foundation Publication Award for Research Postgraduate Students 2023
Best Presentation Award, HK-Swiss Symposium for Future Cities 2022
First Prize, Chengyuan Cup - Planning Decision Support Model Design Contest 2020
Outstanding Graduate, Tsinghua University & Beijing Municipality 2019
Grand Prize, "Challenge Cup" Academic and Technological Competition, Tsinghua University 2019
Outstanding Student Leader, Tsinghua University 2019
Academic Excellence Scholarships, Tsinghua University 2015– 2018

SELECTED SERVICES

Reviewer for leading academic journals in transportation, urban planning and geography, including:

- Transportation Research Part E: Logistics and Transportation Review
- IEEE Transactions on Intelligent Transportation System
- Transportation Research Part C: Emerging Technologies
- Transportation Research Part D: Transport and Environment
- Journal of Transport Geography
- International Journal of Geographical Information Science
- Expert Systems with Applications
- Journal of Cleaner Production
- Scientific Reports (Nature)
- Cities
- Environment and Planning B: Urban Analytics and City Science

STUDENTS MENTORED

Students in MIT-UF-NU 2024 Joint Summer Research Camp:

- He Mingyi (MIT Master of Science in Transportation)
- Yang Bo (UCLA PhD in Civil Engineering)
- Zhong Lingyun (HKU PhD in Urban Planning and Design)