

Boyang Li

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EDUCATION

New York University

2025 – Present

Ph.D. in Human-Centered Technology, Innovation & Design

New York, NY

- Advisor: Takahiro Yabe
- Research Focus: Human-Centered AI, Causal Inference, Complex Systems, and Network Science

Peking University

2022 – 2025

M.Sc. in Geography, Smart Cities and Big Data

Shenzhen, China

- Advisor: Wenjia Zhang
- Research Focus: Urban Computing, Inverse Reinforcement Learning, Spatial AI

Wuhan University

2018 – 2022

B.Eng. in Remote Sensing Science and Technology

Wuhan, China

- Advisor: Zhipeng Gui
- Research Focus: Remote Sensing Change Detection, Visual SLAM, and UAV-based Geospatial Mapping

DISCIPLINARY FIELDS

- Urban Complex Systems
- Geospatial machine learning and AI
- Behavioral Decision Modeling
- Human–Environment Systems
- Computational Social Science

EXPERIENCE

RUN Lab, New York University

2025 – Present

Ph.D. Researcher - Human-Centered AI for Complex Systems

New York, USA

- Developing **LDP-DiffTraj**, diffusion-based generative models under local differential privacy for personalized human mobility trajectory synthesis.
- Proposing **nD-RoPE**, a generalized n -dimensional rotational positional encoding framework for Transformer architectures.
- Designing **EconAI**, an AI framework for modeling and simulating economic agents and strategic decision-making in complex systems.
- Developing **PDNets** (Predictive Dependency Networks) for modeling causal interactions and dynamic behavioral dependencies in complex urban systems.

BSAI Lab

2023 – 2025

Graduate Researcher - GeoAI & HumanEnvironment Systems

Shenzhen, China

- Proposed **MEDIRL-IC**, integrating individual heterogeneity into maximum-entropy inverse reinforcement learning for pedestrian route choice modeling.
- Developed cognitive map modeling frameworks (AVRIL) combining Bayesian IRL and topological data analysis to capture spatial decision-making structures.
- Designed **GeoRAG** and contributed to **AskNearby**, integrating geographic retrieval with LLMs for personalized neighborhood information and cognitive-map-aware recommendations.

- Developed large-scale trajectory prediction models using deep inverse reinforcement learning
- Built WebGIS-based visualization system for spatial mobility analysis

PUBLICATIONS

* Equal contribution; † Corresponding author

Li, Boyang, and Wenjia Zhang.

- Enhancing Pedestrian Route Choice Models Through Maximum-Entropy Deep Inverse Reinforcement Learning With Individual Covariates (MEDIRL-IC). *IEEE Transactions on Intelligent Transportation Systems*, 25(12), 20446–20463.

Li, Boyang, Yulin Wu, Sizhe Xu, Nuoxian Huang, Zhonghang Yuan, Shangyi Guo, Shu Yang, Takahiro Yabe

- *nD-RoPE: A Generalized RoPE for n-Dimensional Position Embedding*. Accepted at the International Conference on Machine Learning (ICML 2026).

Li, Boyang, Shangyi Guo, Kota Tsubouchi, Toru Shimizu, Zhonghang Yuan, Joseph Y. J. Chow, and Takahiro Yabe.

- LDP-DiffTraj: Diffusion Models under Local Differential Privacy for Personalized Human Mobility Trajectory Generation. Submitted to the ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (SIGSPATIAL 2026), under review.

Li, Boyang^{*}, Sizhe Xu^{*}, Donghak Lee, Shangyi Guo, Zhaonan Wang, and Takahiro Yabe.

- Behaviorally Grounding Large Language Models with Revealed Choices for Human Mobility Prediction. Submitted to the ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (SIGSPATIAL 2026), under review.

Sizhe Xu^{*}, **Boyang Li**^{*}, Jing Tang^{*}, Zhe Wang^{*}, Takahiro Yabe^{*†}, and Zhaonan Wang^{*†}.

- Towards the Convergence of Geospatial and Spatial Intelligence. In *Proceedings of the 34th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (SIGSPATIAL)*, Vision Track.

Luyao Niu, Zhicheng Deng, **Boyang Li**[†], Nuoxian Huang, Ruiqi Liu, and Wenjia Zhang.

- AskNearby: An LLM-Based Application for Neighborhood Information Retrieval and Personalized Cognitive-Map Recommendations. In *Proceedings of the 8th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery*, 22–32.

Wenjia Zhang, Daming Lu, Hongjin Liu, and **Boyang Li**.

- Varying Built Environment Contexts and Trip Chain Decisions: A Multinomial-Choice Gradient Boosting Decision Trees Analysis. *Travel Behaviour and Society*, 34, 100684.

He Zhu, Wenjia Zhang, Nuoxian Huang, **Boyang Li**, et al.

- PlanGPT: Enhancing Urban Planning with Tailored Language Model and Efficient Retrieval. *arXiv preprint arXiv:2402.19273*.

SELECTED CONFERENCE PRESENTATIONS

- **AskNearby: An LLM-Based Application for Neighborhood Information Retrieval and Personalized Cognitive-Map Recommendations**. Oral presentation, ACM SIGSPATIAL GeoAI 2025 Workshop, Minneapolis, MN, USA, 2025.
- **Cognitive Anchors of Urban Residents: A Method Combining Topological and Euclidean Spatial Analysis**. Oral presentation, China Behavioral Geography Annual Conference, Shanghai, China, 2023.
- **Deep Inverse Reinforcement Learning-Based Travel Decision Analysis for Urban Residents**. Oral presentation, China Behavioral Geography Annual Conference, Xian, China, 2022.

GRANTS & FELLOWSHIPS

- NYU Tandon School of Engineering (SoE) Ph.D. Fellowship, fully funded (2025-2026)
- Yi-Innovator College Student Social Innovation Grant, RMB 120,000 (2024)
- Baidu Wenxin Cup Research Scholarship, RMB 15,000 (2024)
- Peking University Long Yuan Chang Ze Scholarship, RMB 5,000 (2024)
- Peking University Shenzhen Graduate School Tie Han Scholarship, RMB 8,000 (2023)
- Wuhan University First-Class Scholarship, RMB 3,000 (2019, 2021)
- Wuhan University Hong Tu Chuang Zhan Scholarship, RMB 5,000 (2020)