

Zhihang Liu

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Research Interests

Complex Systems Modeling, Big Geospatial Data, Urban Computing, Sustainable transportation, Computational Social Science

Work Experience

- Full -time Research Assistant / The Chinese University of Hong Kong** 2023.9-2024.3
- Institute of Space and Earth Information Science (<http://www.iseis.cuhk.edu.hk/en/>)
 - **Participation in Project:** “Vehicle Detection and Vehicle-kilometrage Estimation Based on Remote Sensing Technologies”, Smart Traffic Fund, The Government of Hong Kong SAR, No. PSRI/44/2208/PR, 2023 – 2025. (PI: Prof. Mei-Po Kwan) ([Link](#))
 - **Research Direction:** Deep Learning of Remote Sensing and Modeling of Complex Transportation Systems
 - **Supervisor:** [Prof. Mei-Po Kwan](#)
- Summer Intern / The JTL Urban Mobility Lab at MIT** 2023.6-2023.9
- **Research Direction:** Mobility AI with urban imagery, networks, and natural language
 - **Completed Project:** Holistic urban sensing based on remote sensing and street view images using Vision Transformers (<https://github.com/Liu-Zhihang/MIT-Summer-Research-Interns>)
- Full -time Research Assistant / Technical University of Munich** 2022.9-2023.9
- Department of Aerospace and Geodesy, Professorship for Big Geospatial Data Management (<https://www.bgd.ed.tum.de/en/>)
 - **Participation in Project:** “Towards a NAS Benchmark for Classification in Earth Observation”, Sponsored by: [TUM Data Science in Earth Observation](#) cooperating with the [German Aerospace Center \(DLR\)](#), 2022-2023 ([Link](#))
 - **Research Direction:** Complexity & Complex Networks, Auto ML
 - **Output papers:** *Efficiency and equity of the multimodal travel between public transit and bike-sharing accounting for multiscale, Spatio-temporal Analysis of Urban Economic Resilience during Covid-19 with Multilayer Complex Networks*
 - Supervisor: [Prof. Dr. Martin Werner](#)
- Part- time Research Assistant/IGSNRR, Chinese Academy of Sciences** 2020.9- present
- Institute of Geographic Sciences and Natural Resources Research (<http://english.igsnr.cas.cn/>)
 - **Participation in Project:** “Cooperative Observation, Transformation Mechanism and Scenario Simulation of Rural Areal System”, Major Program of the National Natural Science Foundation of China, No. 42293270, 2023 – 2027. (PI: Prof. Liu Yansui) ([Link](#))
 - **Research Direction:** Regional complex systems simulation & Multi-Agent Reinforcement Learning
 - **Output paper:** *Exploring Patterns of Rural Development through Collective Behavior-Based AI Simulation*
 - Supervisor: [Prof. Yurui Li](#)

Education

MSc in Urban Planning (Geography)/Peking University 2021.9-2024.6

- GPA: 3.7/4.0 (Excellent)
- Research Direction: Urban Computing
- Supervisor: Prof. Dr. Jiawen Yang

BA in Public Administration /Sun Yat-Sen University 2017.9-2021.7

- GPA: 4.1/5.0 (Excellent, Top 5%)
- Research Direction: Computational Social Science
- Graduation Thesis: How Marketisation Affects Village Development: An Empirical Study Based on Multiple Sets of Village-level Data

Study Abroad Experiences

- Guest Researcher, Department of Aerospace and Geodesy, Technical University of Munich, 2022-2023;
- UK Study Abroad Programme (Full Scholarship), LSE, Cambridge, Oxford, UoM, 2019;
- China Scholarship Council (CSC) Excellent Undergraduate International Exchange Program, The University of Seoul, 2019-2020;

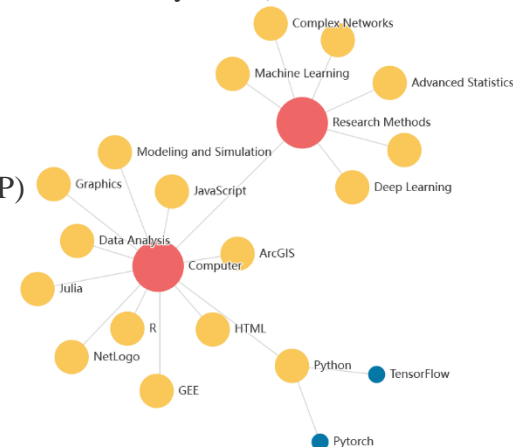
Skills

Computer

- Data Analysis, Graphics, Modelling and Simulation, Python (TensorFlow, PyTorch), R, JavaScript, HTML, Julia, ArcGIS, NetLogo, GEE

Research Methods

- Machine Learning (Interpretable ML, Graph ML)
- Deep learning (Multi-Agent Reinforcement Learning, CV, NLP)
- Complex networks (Topology, Dynamics, Multilayer)
- Spatial algorithms & Remote sensing
- Web spider & Geospatial web data visualization
- Advanced Statistics



Academic Experience

Publications

- **Liu, Z.**, Fang, C., Li, H., Wu, J., Zhou, L., & Werner, M. (2023). [Efficiency and equality of the multimodal travel between public transit and bike-sharing accounting for multiscale](#). *Sustainable Cities and Society*, 105096.
- Yao, Y., Lei, S., Guo, Z., Li, Y., Ren, S., **Liu, Z.**, ... & Luo, P. (2023). [Fast optimization for large scale logistics in complex urban systems using the hybrid sparrow search algorithm](#). *International Journal of Geographical Information Science*, 1-29.
- Ling, C., **Liu, Z.** (2023). [High-Density Cities and Compact Development: Sino-Foreign Comparisons and Implications](#). *Urban Planning International*, 1-13.

Working Papers

- [From positive support to negative reaction: The evolution of China's containment policy and its impact on public sentiment during the COVID-19 pandemic](#) (First Author, Submit to *Humanities and Social Sciences Communications*, Revision)

- [Spatio-temporal analysis of urban economic resilience during COVID-19 with multilayer complex networks](#) (First & Corresponding Author, accepted by The ISPRS Geospatial Week 2023 oral talk, Travel Grants by the ISPRS Foundation, Submissions in progress)[[PDF](#)]
- Exploring Patterns of Rural Development through Collective Behavior-Based AI Simulation(On going)
- Holistic urban sensing based on remote sensing and street view images using Vision Transformers (On going)
- How do the spatial mobility and economic model shape shop sign landscape? Based on street view images and deep learning (On going)
- Sensing Cities with large language model (On going)

Awards & Scholarship

Awards

- Travel Grants by the ISPRS Foundation for GSW'2023, 2-7 September 2023[[Link](#)]
- Global Perspectives - Peking University Graduate Student Scholarly Exchange Fund 2023
- Excellent Paper Award in First National Student Land Survey Competition of China Land Science Society 2021
- Second Prize of the 16th Challenge Cup Guangdong University Student's Extracurricular Academic Science and Technology Works Competition (Provincial). 2021
- Outstanding Talents Training Program for Law and Political Science(excellence) 2017-2020
- Tsinghua University First Young Computational Social Scientist Award 2020
- National Top 100 in All-China Youth Federation's "Youth in China" Eighth Summer Social Research and Practice Activities for College Students 2020

Scholarship

- Peking University Education Abroad Program Scholarship 2023
- Li Xuerou Foundation Scholarship of Sun Yat-sen University (top1%) 2021
- Professor Xia Shuzhang Scholarship of Sun Yat-sen University (top1%) 2021
- National Encouragement Scholarship (National) 2020
- Sun Yat-sen University Academic Innovation Scholarship (School) 2020
- China scholarship council Excellent Undergraduate International Exchange Scholarship (CSC) 2019
- Sun Yat-sen University UK Overseas Study Scholarship 2019
- National Encouragement Scholarship (National) 2019
- Sun Yat-sen University Academic Scholarship 2019
- Sun Yat-sen University First Class Scholarship 2018