Zhicheng Deng

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RESEARCH INTEREST

My research investigates how people move through cities and how urban systems evolve, using data-driven and AI-based approaches to generate insights that can meaningfully inform urban planning and policy. I analyze patterns of human mobility and travel behavior, including their responses to shocks such as extreme weather, to reveal the underlying dynamics of urban life. I also develop advanced AI models that incorporate spatial and temporal structures to better understand and predict complex urban processes. By integrating multiple urban data sources, ranging from traffic flows to satellite imagery, I aim to uncover how different parts of a city function, how residents organize their daily activities, and how people interact with their environment. My goal is to produce research that strengthens data-informed decision-making for more resilient and sustainable cities.

EDUCATIONS

2023–26 **Master of Science** in *Territorial Spatial Planning (Smart Cities and Big Data),* **Peking University**
Dissertation: Urban Travel under Extreme Weather: A Cross-View of Travel Behavior Analysis and Activity Space Modeling
Supervisor: Asst. Prof. Zhaoya Gong and Prof. Pengjun Zhao
GPA: 3.94/4.0 (Ranked: 1st/50)
Coursework: Urban Space-Time Analytics and GeoComputation; Smart Cities: Theories and Methods

2019–23 **Bachelor of Science** in *Geographic Information Science,* **Nanjing Normal University**
Supervisor: Prof. Linwang Yuan and Prof. Zhaoyuan Yu
GA: 91.84/100 (Ranked: 1st/70)
Coursework: Principles of GIS; Geographic Modeling Methods; Spatial Data Mining; Python for Spatial Analysis

2021–22 **Exchange Program, Bachelor of Science** in *Land Surveying and Geo-Informatics*, **The Hong Kong Polytechnic University**
GPA: 3.94/4.3
Coursework: Urban Informatics and City Planning; Cartography and Geovisualization

PUBLICATIONS

(* denotes the corresponding author, and † denotes equal contributions)

Journal Articles:

[1] Zhaoya Gong, **Zhicheng Deng***, Junqing Tang, Hongbo Zhao, Zhengying Liu, and Pengjun Zhao. (2025). “Uncovering human behavioral heterogeneity in urban mobility under the impacts of disruptive weather events.” *International Journal of Geographical*

Information Science, 39(5), 951–974. https://doi.org/10.1080/13658816.2024.2372783

[2] Zhaoya Gong, Chenglong Wang, Bin Liu, Binbo Li, Wei Tu, Yuting Chen, **Zhicheng Deng**, and Pengjun Zhao. (2025). "Multi-spatial urban function modeling: A multi-modal deep network approach for transfer and multi-task learning." *International Journal of Applied Earth Observation and Geoinformation*, 136, 104397. https://doi.org/10.1016/j.jag.2025.104397

[3] **Zhicheng Deng**, Xiangting You, Zhaoyang Shi, Hong Gao, Xu Hu, Zhaoyuan Yu, and Linwang Yuan. (2022). "Identification of Urban Functional Zones Based on the Spatial Specificity of Online Car-Hailing Traffic Cycle." *ISPRS International Journal of Geo-Information*, 11(8), 435. https://doi.org/10.3390/ijgi11080435

Paper under review:

[1] **Zhicheng Deng**, Zhaoya Gong, Jean-Claude Thill, and Elizabeth C. Delmelle. "Delineating hierarchical activity space from high-resolution urban mobility flows." *Computer, Environment and Urban Systems*.

Papers in preparation:

[1] **Zhicheng Deng†**, Zhaoya Gong†, Ran Tao, Haoran Zhang, and Pengjun Zhao. "Discovering the scales of human mobility under natural hazards." *Nature Communications*.

[2] Luhan Li, **Zhicheng Deng**, and Guangdong Li. "Divergent effects of urbanization on human thermal comfort across world cities." *Nature Cities*.

Conference Papers:

[1] **Zhicheng Deng**, and Zhaoya Gong. (2025). "Simple Yet Effective: Supervised Fine-Tuning of Large Language Models for Multi-City Human Mobility Prediction." *SIGSPATIAL'25: Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems*, 1-4. https://doi.org/10.1145/3748636.3771320

[2] Luyao Niu[†], **Zhicheng Deng[†]**, Boyang Li, Nuoxian Huang, and Wenjia Zhang. (2025). "AskNearby: An LLM-Based Application for Neighborhood Information Retrieval and Personalized Cognitive-Map Recommendations." *GEOAI'25: Proceedings of the 8th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery*, 1-11. https://doi.org/10.1145/3764912.3770813

[3] **Zhicheng Deng**, Zhaoya Gong, and Pengjun Zhao. (2023). "Uncovering Spatiotemporal Patterns of Travel Flows Under Extreme Weather Events by Tensor Decomposition." *12th International Conference on Geographic Information Science (GIScience 2023)* (Vol. 277, p. 27:1-27:6). Schloss Dagstuhl – Leibniz-Zentrum für Informatik. https://doi.org/10.4230/LIPIcs.GIScience.2023.27

[4] Chenglong Wang†*, and **Zhicheng Deng†***. (2023). "Multi-perspective Spatiotemporal Context-aware Neural Networks for Human Mobility Prediction." *HuMob'23: Proceedings of the 1st ACM SIGSPATIAL International Workshop on Human Mobility Prediction Challenge*, 32-36. https://doi.org/10.1145/3615894.3628502

[5] Ziyue Guo, Teng Fei, Yonggai Zhuang, **Zhicheng Deng**, and Yi Fu. (2025). "Beyond Schelling's Threshold: Quantifying Emotional Impetus of Human Residential Distribution Formation through Geo-tagged Facial Analysis." *13th International*

Conference on Geographic Information Science (GIScience 2025).
https://doi.org/10.5281/zenodo.16939299

RESEARCH PROJECTS

2025–28 **Research Assistant, Space of human travel flows in urban agglomerations: cross-level interactions and simulation, funded by National Natural Science Foundation of China**

◦ Contributed to proposal drafting; conducted spatiotemporal measurement and mechanistic analysis of cross-hierarchical mobility patterns in urban agglomerations

2024–25 **Principal Investigator, *AskNearby*: Bridging Small Neighborhoods with Large Language Model,** funded by Shenzhen Nanshan Charity Federation (¥120,000)

◦ Developed and launched an app integrating a large language model with spatial cognition and a spatiotemporal social platform, gaining over 2,000 users

SELECTED HONORS AND AWARDS

2024 Merit Student, Peking University (Top 10%)

2024 Gold Award, The 7th College Students' Social Innovation Project Competition of Nanshan (Top 1/200+)

2024 Finalist, Baidu Ernie Cup Innovation Challenge 2024 (Top 1%)

2024 Tiehan Scholarship, Peking University Shenzhen Graduate School (Top 1/50)

2023 Outstanding Graduate, Nanjing Normal University (Top 1/70)

2022 Third Prize, Python Programming in University Group A, The 13th National Software and Information Technology Professionals Competition National Finals (Top 5%)

2021 National Third Prize, SuperMap Cup University GIS Contest (Top 5/100+)

SERVICES AND RESEARCH SKILLS

Reviewer International Journal of Geographical Information Science, Journal of Transport Geography, Travel Behaviour and Society, Sustainable Cities and Society, Cities, TRB Annual Meeting, Geo-spatial Information Science

Teaching Urban Space-Time Analytics and GeoComputation: Lab demonstrator

Mentorship Xinshu Li & Wei Shi (Master's student, Peking University)

Programming Python (proficient), SQL, R, C/C++ (working knowledge)

Software ArcGIS, QGIS, Microsoft Office, Photoshop, SPSS, Stata, LaTex, Git

Language TOEFL: 101 (Reading:27, Listening:26, Speaking:22, Writing:26)