

KAIZHEN TAN

✉ kt3275@nyu.edu

🏠 Personal Website

🎓 Google Scholar

🌐 LinkedIn

🐙 Github

RESEARCH INTERESTS

Focus: Urban Science, Spatial Intelligence, Embodied AI for Urban Environments

Paradigms: Robotic Urbanization, Agentic Urban Digital Twins, Human-centered Urban Governance

Methodologies: Multimodal Learning, Geospatial Data Analysis, Computational Social Science

Technologies: LLMs, VLMs, AI Agents, World Models

EDUCATION

New York University

Ph.D. student in Urban Science

New York/Shanghai

2026 — 2031 (expected)

- Advisor: Prof. Chenghe Guan; Co-supervised by Prof. Zhan Guo

Carnegie Mellon University

M.S. in Artificial Intelligence

Pittsburgh

2025 — 2026

- GPA: 4.0/4.0; Courses: AI Model Development, LLM Systems, Agentic Technologies, AI Cloud and DevOps

Tongji University

B.Mgt. in Information Systems

Shanghai

2021 — 2025

- GPA: 3.94/4.0; Courses: System Design, Database Application, Deep Learning, Python/C++/Java

PUBLICATIONS

Journal Papers

- [1] Huan, W., **Tan, K.**, Liu, X., Jia, S., Lu, S., Zhang, J., & Huang, W. (2025). A spatiotemporal adaptive local search method for tracking congestion propagation in dynamic networks. *GIScience & Remote Sensing*, 62(1), 2602215. DOI: 10.1080/15481603.2025.2602215

Conference Papers

- [1] **Tan, K.** (2026). GeoFidelity-Bench: Evaluating Segment-Level Geographic Fidelity in Text-to-Image Street-View Generation. *Under Review at The Fortieth Annual Conference on Neural Information Processing Systems (NeurIPS 2026)*. arXiv: 2606.23669
- [2] **Tan, K.**, Feng, Y., & Du, H. (2026). CREG: Compass Relational Evidence Graph for Characterizing Directional Structure in VLM Spatial-Reasoning Attribution. *9th Chinese Conference on Pattern Recognition and Computer Vision (PRCV 2026)*. arXiv: 2603.20475
- [3] **Tan, K.**, & Zhang, F. (2026). UrbanVGGT: Scalable Sidewalk Width Estimation from Street View Images. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (XXV ISPRS Congress 2026)*, *XLIX-B2-2026*, 559–567. DOI: 10.5194/isprs-archives-XLIX-B2-2026-559-2026
- [4] **Tan, K.**, Gu, R., & Li, M. (2026). CacheWeaver: Cache-Aware Evidence Ordering for Efficient Grounded RAG Inference. *EMNLP 2026 Workshop on Grounding Language Models*. arXiv: 2606.19667
- [5] **Tan, K.**, Wu, Y., Liu, Y., & Zeng, H. (2025). Decoding Tourist Perception in Historic Urban Quarters with Multimodal Social Media Data: An AI-Based Framework and Evidence from Shanghai. *Global Smart Cities Summit cum The 4th International Conference on Urban Informatics*. arXiv: 2509.03830
- [6] **Tan, K.** (2025). Multimodal deep learning for ATCO command lifecycle modeling and workload prediction. *7th Asia Conference on Machine Learning and Computing*. DOI: 10.1145/3772673.3772702

Working Papers

- [1] **Tan, K.**, Xu, X., Tao, S., Li, Y., Hong, H., Feng, Y., & Du, H. (2026). What Can Latent World Models Know? Physical Parameter Identifiability in Multimodal Predictive Representations. *Under Review at ICLR 2027*.

- [2] **Tan, K.**, Feng, Y., Du, H., Hong, H., Tao, S., & Xu, X. (2026). When Does Visual Token Pruning Improve Calibration? The Role of Evidence Coverage in MLLMs. *Under Review at AAAI 2027*. arXiv: 2604.12035
- [3] **Tan, K.**, Du, H., & Feng, Y. (2026). How Many Bits Can an Adapter Write? Measuring the Capacity and Memorization of Parameter-Efficient Fine-Tuning. *Under Review at AAAI 2027*. arXiv: 2607.21351
- [4] **Tan, K.**, Wu, G., & Guan, C. (2026). Robotic Urbanization and the Transformation of Ground Transportation Systems: Impacts, Challenges, and Opportunities. *Manuscript in preparation*.
- [5] **Tan, K.**, Wu, G., & Guan, C. (2026). RoboROW: Simulating and Governing Right-of-Way for Urban Service Robots in Shared Urban Spaces. *Manuscript in preparation*.
- [6] **Tan, K.** (2026). What We Lose, What We Gain: Spatio-temporal Patterns of Lost-and-Found Items in Qingdao Metro. *Manuscript in preparation*.

RESEARCH EXPERIENCE

Shanghai Key Laboratory of Urban Design and Urban Science (LOUD) 05/2026 — Present

- Advisor: Prof. Chenghe Guan, Prof. Zhaonan Wang
- Design embodied intelligence-friendly urban spaces and advance collaborative governance through digital twins and urban agents that model complex city dynamics.

Peking University, Spatio-Temporal Social Sensing Lab (S3-Lab) 10/2025 — 03/2026

- Advisor: Prof. Yu Liu, Prof. Fan Zhang
- Automated urban element measurement from street view using VGGT and semantic segmentation.
- Recovered metric scale via ground plane fitting and camera height calibration for large-scale data generation.

A*STAR, Institute for Infocomm Research, Singapore 09/2024 — 05/2025

- Advisor: Dr. Yicheng Zhang, Dr. Sheng Zhang
- Modeled air traffic controller communication tasks to predict workload using radiotelephony and trajectory data.
- Integrated multi-source air traffic data and evaluated scenarios with a CNN-Transformer model.

Tongji University, College of Architecture and Urban Planning 04/2024 — 04/2025

- Advisor: Prof. Yujia Zhai
- Built a multimodal pipeline with social media reviews and photos to analyze tourist perception of historic quarters.
- Fine-tuned segmentation models and applied sentiment analysis to produce multi-dimension satisfaction scores.

Tongji University, College of Surveying and Geo-Informatics 04/2024 — 12/2024

- Advisor: Prof. Wei Huang
- Modeled traffic congestion propagation with spatiotemporal graphs and multi-scale community search.
- Linked propagation patterns with built environment factors using causal analysis and POI-based features.

ACADEMIC PROJECTS

Urban Vision-Language Guide Agent for Visually Impaired People 10/2025 — 12/2025

- Design a real-time egocentric navigation assistant that provides spoken guidance to blind users while walking.
- Build a lightweight perception and event engine to segment key urban classes, estimate depth, and convert detections into concise voice prompts (e.g., “enter tactile paving,” “obstacle left/right,” “traffic light walk/stop”).

Pavement Disease Recognition for Smart Road Maintenance 09/2023 — 11/2023

- Enhanced YOLOv8 for small-target recognition and applied Wise-IoU, improving F1 by 26.3%.
- Applied AI to urban infrastructure monitoring, winning Second Prize at the national AI competition (top 5%).

Agent-based Modeling and Simulation for Public Facility Optimization 06/2023 — 08/2023

- Collected behavioral data on library seat usage and applied clustering & FAHP analysis.
- Built an AnyLogic-based simulation system for crowd behavior modeling, achieving 0.87 grey correlation.

INDUSTRY EXPERIENCE

Shanghai Artificial Intelligence Lab, AI Product Manager Intern

01/2025 — 04/2025

- Conducted end-to-end market research and competitive analysis for AI products (e.g., Migo, Auto-Research), benchmarking against 50+ vertical tools and delivered 5+ analytical reports to guide product positioning.
- Built operational data dashboard tracking KPIs, enabling granular analysis of user retention and behavior funnels.
- Established evaluation frameworks for Migo's InternLM model, enabling data-driven iteration cycles.

SKILLS

Languages: IELTS 7.5 (L:9, R:8.5, W:6.5, S:6), GRE 331 (V:161, Q:170, AW:3)

Programming & Tools: Python, C++, C#, Java, HTML, SQL, Git, Docker, Tableau, ArcGIS, Stata