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Aohua (Eren) Tian

Education	**University of Michigan** (Ann Arbor, MI) *M.S. in Geospatial Data Science, School for Environment and Sustainability (SEAS)* Sep 2024 – Jun 2026 (Expected) GPA: 4.0/4.0 **Relevant Courses:** Principle of GIS, Machine Learning, Advanced Topics in Computer Vision, Advanced Geovisualization, Remote Sensing, Web Design, Master's Thesis. **Chongqing University of Posts and Telecommunications** (Chongqing, China) *B.E. in Software Engineering (Joint Program with University at Albany, SUNY)* Sep 2020 – Jun 2024 GPA: 3.5/4.0 (Rank 15/108) Selected Courses: Algorithmic Analysis and Data Structure, Programming at Hardware-Software Interface, Principle of Programming Language, Differential Equation
Professional Experience	**Chongqing Tobacco Bureau, Chongqing, China** *Data Analysis Intern, Chongqing Tobacco Terminal Layout Project* Aug 2022 – Dec 2022 • Conducted spatial and statistical analysis for the Chongqing Tobacco Terminal Layout Project. • Applied clustering and spatial clustering algorithms to identify user distribution patterns across districts. • Provided data-driven recommendations for optimizing tobacco retail terminal layout and service coverage. **China Mobile Co., Ltd., Taizhou Branch, China** *Backend Development Intern* Jun 2023 – Oct 2023 • Participated in backend development for the Taizhou Municipal Approval Bureau information system. • Optimized existing framework components and conducted API interface testing. • Developed and debugged backend modules using Java and Node.js, improving system stability and efficiency.
Research Experience	**University of Michigan – School for Environment and Sustainability (SEAS), Ann Arbor, MI**

Researcher with Prof. Mark Lindquist and PhD Student Xiaohao Yang
Nov 2024 – Present

- **Project 1: Investigating the Impact of Urban Soundscapes and Street View Imagery on Perceived Emotions in Cities**
  Explored how auditory and visual urban environments affect human affective perception. Developed a multimodal analysis framework combining machine learning and keyword-based emotion annotation to quantify emotional responses across city streets.
- **Project 2: Identifying and Mapping Urban Blight in Detroit Using Vision-Language Models**
  Keywords: *Urban blight, residential housing condition, vision-language models, street view images, ensemble learning*
  Highlights:
  - Demonstrated that multiple street views enhance prediction accuracy.
  - Analyzed varying inference strengths of VLMs in detecting residential damage.
  - Showed that ensemble learners outperform individual models.
  - Proposed a low-cost, scalable method to monitor housing conditions beyond on-site surveys.
- **Project 3: Integrating Multimodal Large Language Models and Deep Learning for Urban Spatial Semantic Analysis — A Comparative Study of Zibo and Ann Arbor**
  Introduced a hybrid framework that combines deep visual learning and language-based interpretation to analyze the semantic and perceptual dimensions of urban environments. Emphasized how multimodal LLMs can bridge spatial analysis and human-centered urban perception for interpretable urban analytics.

University of Michigan – Department of Electrical Engineering and Computer Science (EECS), Ann Arbor, MI
Research with PhD Student Zhiwen Wan
Jan 2025 – Apr 2025

- Extracted battery charge–discharge characteristics and applied machine learning to predict battery State of Health (SOH).
- Developed feature engineering pipelines from voltage, current, and temperature data.
- Debugged and optimized transformer-based models to improve prediction reliability and accuracy.

Chongqing Intelligent Information Technology and Services Innovation Laboratory, Chongqing, China
Research Assistant to Professor Tingting Xu
Mar 2022 – Jan 2023
Project: *Prediction of Multi-Scale Socioeconomic Parameters from Long-Term Nighttime Lights Satellite Data Using Decision Tree Regression: A Case Study of Chongqing, China*

- Developed a novel data processing framework integrating machine learning methods for nighttime-light calibration with an accuracy exceeding 95%.
- Supported model design, data cleaning, and validation for socioeconomic indicator prediction across spatial scales.

Chongqing Intelligent Information Technology and Services Innovation Laboratory, Chongqing, China
Research Assistant to Professors Tingting Xu and Jay Gao
May 2022 – Mar 2023
Project: *Multi-Scale Spatiotemporal Wetland Loss and Its Critical Influencing Factors in China Using Grid-Based GWR*

- Built a predictive model for wetland loss using the Grid-GWR-CUDA method with updated land cover datasets.
- Achieved model performance with adjusted R^2 values ranging between 0.5 and 0.9, demonstrating spatial heterogeneity across regions.

Chongqing Intelligent Information Technology and Services Innovation Laboratory, Chongqing, China
Research Assistant to Professor Tingting Xu
May 2023 – Sep 2023
Project: *Analysis of Factors Affecting Degraded Glaciers in China Using Clustering Methods and SHAP-XGBoost*

- Combined clustering techniques with SHAP-XGBoost to identify key environmental and climatic drivers of glacier degradation.
- Engineered data pipelines and fine-tuned models to ensure optimal operation and reproducible results.

Chongqing Intelligent Information Technology and Services Innovation Laboratory, Chongqing, China
Research Assistant to Professor Tingting Xu
Apr 2023 – Sep 2023
Project: *Impact of Spatio-Temporal Resolution on the Performance of Deep Learning Models for Urban Sprawl*

- Implemented a CNN-LSTM framework to improve predictive accuracy of urban sprawl simulations compared with traditional models.
- Conducted comprehensive comparisons among Markov-FLUS models across multiple temporal and spatial resolutions.

Teaching Experience

Chongqing University of Posts and Telecommunications, Chongqing, China
Peer Teaching Assistant / Class Mentor
Sep 2022 – Jun 2024

- Served as class mentor for the incoming undergraduate cohort in the Software Engineering program, achieving 100% positive student evaluations.
- Organized regular review sessions for midterm and final exams, and coordinated English proficiency (CET-4/6) practice workshops.
- Provided one-on-one academic guidance and peer support to improve students' study strategies and performance.

Publications | Peer-Reviewed:

1. **Tian, A.**, Xu, T., Gao, J., Liu, C., & Han, L. (2023). *Multi-scale spatiotemporal wetland loss and its critical influencing factors in China determined using innovative grid-based GWR*. **Ecological Indicators**, 149, 110144. (Cited by 24)

2. Xu, T., **Tian, A.**, Gao, J., Yan, H., & Liu, C. (2024). *Analysis of the spatial heterogeneity of glacier melting in Tibet Autonomous Region and its influential factors using the K-means and XGBoost-SHAP algorithms.* **Environmental Modelling & Software**, 182, 106194. (Cited by 16)

3. Xu, T., Zong, Y., Su, H., **Tian, A.**, Gao, J., Wang, Y., & Su, R. (2023). *Prediction of multi-scale socioeconomic parameters from long-term nighttime lights satellite data using decision tree regression: A case study of Chongqing, China.* **Land**, 12(1), 249. (Cited by 4)

4. Su, H., Xu, T., Xion, X., & **Tian, A.** (2024). *Enhancement of land subsidence prediction capabilities using machine learning and SHAP value analysis with Sentinel-1 InSAR data.* **[Research Square (Preprint)]**, 3 citations.

5. Xu, T., Su, H., He, B., **Tian, A.**, & Guo, J. (2024). *Influence of multiple spatiotemporal resolutions on the performance of urban growth simulation models.* **iScience**, 27(1). (Cited by 2)

6. Liu, C., Xu, T., Han, L., Du, S., & **Tian, A.** (2024). *A Geographically Weighted Regression–Compute Unified Device Architecture (CUDA) approach to explore the spatial agglomeration and heterogeneity in arable land consumption in Southwest China.* **Agriculture**, 14(10), 1675.

Under Review:

1. **Yang, X.**, Van Berkel, D., **Tian, A.**, Xu, Q., & Lindquist, M. (2025). *Identifying and Mapping Urban Blight in Detroit Using Vision-Language Models.* Under review at **Computers, Environment and Urban Systems**.

Grants | **Conference Grant, School for Environment and Sustainability, University of Michigan, 2025**

Provided financial support to present research work at AAG conference in Detroit, MI.
Travel Grant, Rackham Graduate School, University of Michigan, 2025
Awarded to support travel expenses for attending and presenting at CPGIS conference in Henan, China.

Awards & Fellowships	**Chongqing University of Posts and Telecommunications, Chongqing, China**
	• Academic Innovation Scholarship (First Prize) — 2022 & 2023
	  Awarded for outstanding performance in research and innovation; received a grant of ¥4,000 each year.
	• Second-Class Academic Excellence Scholarship — 2023 & 2024
	  Granted for excellent academic achievement in the undergraduate program; received a grant of ¥2,000 each year.

Conference Presentations	**Xu, T., & Tian, A.** (2025). *Urban Vitality from the Perspective of Information Space: Measurement and Prediction Model Based on Multi-Source Data.* Paper submitted to the **32nd International Conference on Geoinformatics (Geoinformatics 2025)**. **Yang, X., Tian, A., & Lindquist, M.** (2025). *Mapping Perceived Safety Around Bus Stops in Detroit Using Crowdsourced Street Views.* Poster accepted at the **GIScience 2025 Conference**.
Language & Computer Skills	**Languages:** • **Chinese (Mandarin):** Native proficiency • **English:** Professional working proficiency • **Japanese:** Basic proficiency **Computer Skills:** • **Programming Languages:** Python, Java, C/C++, R, SQL, Kotlin, HTML, CSS, Linux • **Frameworks & Libraries:** PyTorch, TensorFlow, NumPy, Pandas • **Software & Tools:** ArcGIS Pro, Android Studio, Git, Node.js, Spring Boot • **Other Skills:** Big data processing, spatial analysis, machine learning model development, and web-based GIS visualization