YIFAN YANG

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Education Background

2024-now Texas A&M University College Station, USA

Ph.D. Student, Geography (GIScience) GPA 3.80/4

Advisor: Dr. Lei Zou

2022-2024 University of Southern California Los Angeles, USA

Master of Science, Spatial Data Science GPA 3.96/4

Advisor: Dr. John P. Wilson and Dr. Siqin Wang

2018-2022 Hainan University Haikou, China

Bachelor of Engineering, Software Engineering Average score: 87.4/100

Advisors: Prof. Jieren Cheng, Prof. Qi Qi

Research Interests

- Geographic Information Science (GIScience)
- Geospatial Artificial Intelligence (GeoAI)
- Responsible GIScience
- Spatial Data Science
- Autonomous GeoAI
- Generative AI
- Multimodal AI
- Smart and Equal Resilience

Vision: To transcend the boundaries of screens and make the real world our playground of intelligence — where AI, space, and humanity coexist and co-create.

Current Projects

Sat2Street-DisasterGen — Satellite-to-Street View Synthesis for Post-Disaster Assessment

GitHub: https://github.com/rayford295/Sat2Street-DisasterGen

Developed a multimodal generative framework for satellite-to-street view synthesis under post-disaster scenarios. The system benchmarks cross-view image generation strategies, integrating diffusion models, ControlNet, and VLM-guided semantic conditioning to synthesize realistic street-view imagery from post-disaster satellite inputs.

- Designed a unified evaluation framework ensuring consistent satellite inputs, data splits, and protocols across generative methods
- Implemented multiple cross-view generation pipelines, including Pix2Pix (cGAN), SD1.5 + ControlNet, VLM-guided synthesis, and Disaster-MoE (Mixture-of-Experts)
- Built a multi-stage LoRA training pipeline for damage-severity-aware generation (Mild / Moderate / Severe)
- Evaluated outputs using pixel-level metrics (FID, SSIM, LPIPS), semantic consistency (ResNet-based classification), and VLM perceptual scoring

- Developed reproducible dataset structure, inference scripts, and evaluation modules for controlled benchmarking

GeoAgent4Disaster — Multi-Agent GeoAI Framework for Multimodal Disaster Assessment

GitHub: https://github.com/rayford295/GeoAgent4Disaster

Developed an autonomous multi-agent GeoAI framework for hyperlocal, interpretable, and near–real-time disaster damage assessment. The system orchestrates multiple specialized agents leveraging vision–language foundation models to perform cross-view perception, damage recognition, reasoning, and automated report generation without task-specific retraining.

- Designed a modular multi-agent architecture, including Disaster Perception, Image Restoration, Damage Recognition, and Disaster Reasoning agents
- Integrated multimodal inputs: satellite imagery, street-view imagery, textual cues, and temporal change signals
- Implemented agent-based orchestration for zero-/few-shot disaster analysis using VLMs (e.g., GPT, Gemini)
- Enabled cross-view semantic alignment and causal reasoning for damage assessment and recovery recommendation
- Built an interpretable evaluation and reporting pipeline for structured disaster intelligence outputs

DamageArbiter — CLIP-Enhanced Multimodal Framework for Hurricane Damage Assessment

GitHub: https://github.com/rayford295/DamageArbiter

Developed a CLIP-enhanced multimodal arbitration framework for hyperlocal hurricane damage assessment using bi-temporal street-view imagery. The system integrates vision-language models (CLIP) with deep vision backbones (e.g., ViT-B/16) to improve damage classification robustness under real-world post-disaster uncertainty.

- Designed a multimodal arbitration mechanism to reconcile conflicting visual and semantic signals
- Implemented image classification pipelines using ViT-B/16 and transformer-based architectures
- Evaluated performance on hurricane street-view datasets with precision, recall, F1, and cross-validation
- Built a reproducible codebase, including dataset structure, model training scripts, and figure generation

BiTemporal-StreetView-Damage — Hyperlocal Disaster Assessment via Bi-Temporal Street-View Imagery

GitHub: https://github.com/rayford295/Bi-Temporal-StreetView

Developed a bi-temporal street-view image analysis framework for hyperlocal disaster damage assessment using pre- and post-disaster imagery. The system employs dual-channel architectures with pre-trained vision backbones (Swin Transformer, ConvNeXt) to improve classification accuracy and interpretability of damage severity estimation.

- Designed dual-channel fusion architecture for comparative reasoning between pre- and post-disaster imagery
- Constructed a dataset of 2,249 labeled street-view image pairs with fine-grained severity annotations
- Achieved performance improvement from 66.14% (post-only) to 77.11% (bi-temporal) classification accuracy
- Applied Grad-CAM visualization to demonstrate enhanced spatial attention using pre-disaster inputs

- Evaluated multiple fusion strategies (cross-attention, weighted fusion, Siamese difference)
- Enabled fine-grained damage mapping for climate-resilient urban planning

Industry Engagement:
The research is currently being written up and promoted by **Mosaic – Geospatial Imaging Leaders (Prague, Czech Republic)**, highlighting its relevance for 360° street-level surveying, urban mapping, and disaster intelligence applications.

Professional Experience

Graduate Research Assistant, Texas A&M University Aug 2024 – Present, TX

- Conduct research on GeoAI, multimodal disaster assessment, and spatial intelligence using remote sensing and street-view imagery.
- Develop deep learning pipelines (CLIP, BLIP, ViT, ConvNeXt, Swin, LLM-based reasoning) for bi-temporal disaster perception and geospatial representation.
- Build geospatial databases, run spatial analysis (PostGIS, ArcGIS Pro), and implement Python ML workflows for classification, localization, and explainability (Grad-CAM, semantic probing).

Research Intern, Spatial Data Lab, Harvard University Mar 2025 – Aug 2025, Remote

- Conducted research on wildfire modeling and Autonomous GeoAI, focusing on Los Angeles wildfire dynamics using multimodal geospatial data (satellite imagery, fire perimeters, VIIRS/GOES data, and weather layers).
- Developed RL- and POMDP-based frameworks to simulate wildfire spread and evaluate autonomous decision-making strategies for response, resource allocation, and risk-aware planning.

Graduate Teaching Assistant, Texas A&M University Aug 2024 – Dec 2024, TX

- Assisted in teaching Cartography (GEOG/GEOS course), including weekly labs, visualization exercises, and map design principles.
- Guided students in applying GIScience concepts, cartographic design, spatial thinking, and geovisualization techniques using ArcGIS Pro and related tools.

Student Worker (Graduate Research), University of Southern California Sept 2023 – May 2024, CA

- Conducted research on urban tree shade modeling to evaluate microclimate impacts and heat mitigation benefits across Los Angeles neighborhoods.
- Built 3D urban environment models in ArcGIS Pro using building footprints, tree canopy data, LiDAR, and DSM/DEM layers.
- Performed sun–shade and solar radiation analysis to quantify shading patterns, assess thermal comfort variation, and support urban greening strategies.

Data Engineering and AI Model Fine-tuning, Vitally AI Feb 2023 – May 2023, Remote

- Fine-tuned Stable Diffusion models using DreamBooth for personalized pet-style image generation, including embedding extraction, class/instance image balancing, and training with LoRA and prior-preservation loss to capture unique style features.
- Prepared and curated training datasets, performed image preprocessing (cropping, normalization, augmentations), optimized model configurations (learning rate, steps, scheduler, batch size).
- Developed Python scripts and automated data pipelines for dataset preparation, model training, and inference deployment; integrated workflows using PyTorch, HuggingFace Diffusers, and custom training utilities to support AI product prototyping and internal model experimentation.

Publications

Google Scholar Page (Total Citations: 352, h-index: 5, i10-index: 4)

Publications as the First Author

Journal Articles

[1] Yang, Y., Zou, L., Zhou, B., Li, D., Lin, B., Abedin, J., & Yang, M. (2025). Hyperlocal disaster damage assessment using bi-temporal street-view imagery and pre-trained vision models. Computers, Environment and Urban Systems, 121, 102335.

[2] Yang, Y., Wang, S., Li, D., Sun, S., & Wu, Q. (2024). GeoLocator: A Location-Integrated Large Multimodal Model (LMM) for Inferring Geo-Privacy. Applied Sciences, 14(16), 7091.

Book Chapters

[1] Yang, Y., & Borrelli, D. (2025). *Object detection and segmentation of trees using Text SAM in ArcGIS Online.* In D. M. Ruddell & D. Ter-Ghazaryan (Eds.), *Security First: Geospatial Workflows for a Safe and Equitable World* (pp. 113–122). Redlands, CA: Esri Press.

Conference Proceedings

[1] Yang, Y., & Zou, L. (2025). Perceiving Multidimensional Disaster Damages from Street-View Images Using Visual-Language Models. Abstracts of the ICA, 10, 310. **Best Student Paper Award**

Preprint

[1] Yang, Y., Zou, L., Gong, W., Fu, K., Li, Z., Wang, S., ... & Tian, H. (2026). DamageArbiter: A CLIP-Enhanced Multimodal Arbitration Framework for Hurricane Damage Assessment from Street-View Imagery. arXiv preprint arXiv:2603.14837.

Publications as a Co-Author

Journal Articles

[1] Ye, X., Gong, W., **Yang, Y.,** Zou, L., Tu, Z., Huang, X., ... & Wu, L. (2026). Towards Agentic Urban Digital Twins (AUDiTs): advancing new urban science through Human-AI co-learning agents. Urban Informatics, 5(1), 9.

[2] Wang, Y., Yin, H., **Yang, Y**., Zhao, C., & Wang, S. (2025). Navigating spatial inequities in freight truck crash severity via counterfactual inference in Los Angeles. Journal of Transport Geography, 128, 104387.

[3] Gong, W., Ye, X., Wu, K., Jamonnak, S., Zhang, W., **Yang, Y**., & Huang, X. (2025). Integrating spatiotemporal vision transformer into digital twins for high-resolution heat stress forecasting in campus environments. Journal of Planning Education and Research, 1–15. https://doi.org/10.1177/0739456X251391121

[4] Zhang, Y., Chen, J., Liu, B., **Yang, Y**., Li, H., Zheng, X., Chen, X., Ren, T., & Xiong, N. (2020). *COVID-19 public opinion and emotion monitoring system based on time series thermal new word mining*. Computers, Materials & Continua, 64(3), 1415-1434. https://doi.org/10.32604/cmc.2020.011316

[5] Shi, C., Mou, G., Wang, H., Liu, T., **Yang, Y**., & Li, Z. (2020). Different Loss Functions Used in the Low-rank Approximation. *International Core Journal of Engineering*, *6*(11), 360-368.

Conference Proceedings

[1] Zou, L., Mandal, D., Zhou, B., **Yang, Y.**, & Yang, M. (2025). Resilience in 4D: AI-Driven Geospatial Digital Twins for Urban Flood Simulation and Management. AGU25.

[2] Yan, B., Wang, J., Cheng, J., Zhou, Y., Zhang, Y., **Yang, Y**., ... & Liu, B. (2021, June). Experiments of federated learning for COVID-19 chest X-ray images. In *International Conference on Artificial Intelligence and Security* (pp. 41-53). Cham: Springer International Publishing.

Preprint

[1] Lin, B., Zou, L., Tian, H., Cai, H., **Yang, Y.**, & Zhou, B. (2026). Predicting Healthcare System Visitation Flow by Integrating Hospital Attributes and Population Socioeconomics with Human Mobility Data. *arXiv preprint arXiv:2601.15977*.

[2] Li, Z., Li, H., **Yang, Y.**, Wang, S., & Zhu, Y. (2025). Integrating earth observation data into the tri-environmental evaluation of the economic cost of natural disasters: a case study of 2025 LA wildfire. *arXiv preprint arXiv:2505.01721*.

[3] Wu, Q., Xu, Y., Xiao, T., Xiao, Y., Li, Y., Wang, T., ... & **Yang, Y.** (2024). Surveying attitudinal alignment between large language models vs. humans towards 17 sustainable development goals. arXiv preprint arXiv:2404.13885.

Presentations (Presenting Author)

[1] 2026 DamageArbiter: A Disagreement-driven Arbitration Framework for Hurricane Damage Assessment from Street-View Imagery. AAG GISS Specialty Group Honors Competition for Student Papers 2, AAG 2026 Annual Meeting, San Francisco, California.

[2] 2025 Texas A&M University GIS Day Student Paper Competition, Seeing Disagreements: An Explainable Multimodal Framework for Disaster Assessment and Spatial Mapping, Texas A&M University, College Station, USA (Oral).

[3] 2025 Yang, Y., Gong, W., Zhang, K. DisasterVLP: Perceiving Multidimensional Disaster Damages from Street-View Images Using Visual-Language Models. Summer School on Cyberinfrastructure and Disaster Resilience, August 15, 2025, Texas A&M University, College Station, USA (Oral).

[4] 2025 Perceiving Multidimensional Disaster Damages from Street-View Images Using Visual-Language Models. Student Paper Session, *International Cartographic Conference (ICC)*, Vancouver, Canada.

[5] 2025 DisasterVLP: A Vision-Language Pretrained Framework for Multidimensional Disaster Damage Assessment Using Street-View Images. *GeoAnalytics for Sustainable and Livable Cities Symposium*, International Cartographic Conference (ICC), Vancouver, Canada.

[6] 2025 Hyperlocal Disaster Damage Assessment Using Bi-Temporal Street-View Imagery and Pre-Trained Image Processing Models. GISS Specialty Group Paper Competition II, AAG 2025 Annual Meeting, Detroit, Michigan.

[7] 2024 GeoLocator: A Location-Integrated Large Multimodal Model for Inferring Geo-Privacy. Symposium on GeoAI and Deep Learning for Geospatial Research: Human-Centered Geospatial Data Science III, AAG 2024 Annual Meeting, Honolulu, Hawai‘i.

[8] 2024 GeoLocator: A Location-Integrated Large Multimodal Model (LMM) for Inferring Geo-Privacy. Spatial Data Science Symposium — Thematic Session *“Geoprivacy Challenges and Solutions in the Digital Society.”* Online Symposium.

[9] 2024 GeoLocator: A Novel GeoAI Tool Making World Travel without Barriers & Urban Tree Shade Model. 2024 Los Angeles Geospatial Summit, February 23, 2024, Los Angeles, California.

[10] 2024 GeoLocator: A Location-Integrated Large Multimodal Model for Inferring Geo-Privacy. AGI Leap Summit — Multimodality Session, SuperAGI, February 29, 2024 (Virtual).

Session Organizer & Chair

[1] GeoAI and Data Science for Disaster Resilience, 33rd International Conference on Geoinformatics (GeoInformatics 2026), Singapore. Co-organized with Lei Zou, Yi Qiang, Yingjie Hu, Qunying Huang, Xiao Huang, and Bing Zhou. https://blog.nus.edu.sg/cpgis2026/programme/sessions/

[2] GeoAI and Deep Learning Symposium: GeoAI for Disaster Resilience, AAG 2026 Annual Meeting, San Francisco, California. Co-organized with Lei Zou, Yingjie Hu, Qunying Huang, Yi Qiang, Marcela Suarez, and Morteza Karimzadeh.

[3] Panel and Symposium Organization, GISER Symposium: Past, Present, and Future of GIScience, AAG Annual Meeting, San Francisco, USA, 2026, Organizer.

[4] AAG Remote Sensing Specialty Group Student Illustrated Paper Competition, AAG 2026 Annual Meeting, San Francisco, California. Co-organized with Ying Lu.

[5] Symposium on Human Dynamics Research: Urban Environmental Intelligence and Human–Climate Interactions (Sessions 1–2), AAG 2025 Annual Meeting, Detroit, Michigan. Co-organized with Wenjing Gong, Sisi Wang, Xinyue Ye, and Xiao Huang.

Partial Honors, Awards, and sponsorships

2026 AAG-GISSG Student Honors Paper Competition — 2nd Place.

2026 AAG-IGIF Scholarship Award, AAG International Geographic Information Funds (IGIF), $1200.

2025 Environment and Sustainability Graduate Fellow Award, Texas A&M University, $2500.

2025 Texas A&M University GIS Day Student Paper Competition, Finalist.

2025 Travel Grant, Summer School on Cyberinfrastructure and Disaster Resilience, TAMU (funded by NSF), $200.
2025 Texas A&M Institute of Data Science (TAMIDS) Student Ambassador Scholarship, Domain Data Science Track, TAMU, $2,000.
2025 CaGIS International Travel Grant - 2025 ICC, Vancouver, Canada, $2,100.
2025 International Cartographic Conference (ICC), Vancouver, Canada - Best Student Paper Award
2025 AAG-GISSG Student Honors Paper Competition - Honorable Mention, $200. (Top 5)
2025 AAG Applied Geography Specialty Group - Student Travel Award, $196.
2024–2025 Travel Grant, Department of Geography, Texas A&M University, total amount: $2,100.
2024 Travel Grant (Visiting), Department of Geography, University of South Carolina, $400.
2024 Lifetime Membership - Nu Theta Chapter, Gamma Theta Upsilon (International Geographic Honor Society)
2024 Los Angeles Geospatial Summit - ArcGIS StoryMaps Competition: Most Suitably Applied Analysis Methodology
2020 National First Prize - Computer Design Competition for Chinese College Students (Big Data Practice)
2020 Third Prize - 10th MathorCup College Mathematical Modeling Challenge
2020 Second Prize - 13th "Certification Cup" Mathematics China Mathematical Modeling Network Challenge (Inner Mongolia Region)
2020 Third Prize - China–US Youth Creators Competition (Haikou Region)
2020 Second Prize - 3rd China Youth Cup National University Student Mathematical Modeling Competition
2020 Third Prize - 6th National Mobile Internet Innovation Competition (South China Region)
2020 Third Prize - Innovation Group of the 2020 China University Computer Competition (Artificial Intelligence Track)
2020 Third Prize - Finalist, Hainan Selection Competition of the 4th China Creative Wings Innovation Competition
2020 Honorable Mention - 2020 Hainan Free Trade Port Entrepreneurship Competition
2020 Silver Award - Hainan Creative Group, 6th China International "Internet+" Student Innovation and Entrepreneurship Competition
2020 Bronze Prize - Hainan Region, Challenge Cup Student Entrepreneurship Plan Competition
2020 Second Prize - 14th iCAN International Innovation and Entrepreneurship Competition (South China Region)
2020-2021 First-Class Comprehensive Scholarship - Hainan University ¥2500

2020-2021 Recognized as "College Student with the Most Innovative Spirit and Practical Ability" - Hainan University

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Professional Activities and Service

2025-2026 Data Science Student Ambassador, Texas A&M Institute of Data Science (TAMIDS)
2025-2026 Executive Committee Member, Aggie Geographers Graduate Society (AGGS)
2025-2027 Student Co-Director of Remote Sensing Specialty Group, American Association of Geographers
2025-2027 Student Co-Director of Hazards, Risks, and Disasters, American Association of Geographers
2024-2025 Board Member, GISphere (responsible for the GISalon Roundtable Series)
2021-2022 Vice President, Association of Robotics and Artificial Intelligence, Hainan University

Reviewer for leading journals including:

ACM Transactions on Autonomous and Adaptive Systems
Computational Urban Science
International Journal of Applied Earth Observation and Geoinformation
International Journal of Geographical Information Science
International Journal of ITS Research
Scientific Reports
Transactions in GIS
Tourism Geographies
Journal of Transport Geography

Technical Skills

***Applications*:** PyTorch, TensorFlow, Scikit-learn, HuggingFace Transformers, Stable Diffusion, Visual Studio Code, Git/GitHub, Jupyter Notebook, Anaconda, Linux/Unix, Docker, Esri ArcGIS Pro, MS SQL Server, SQL Server Management Studio, PgAdmin, PostgreSQL & PostGIS

***Programming*:** C, C++, Java, Python, SQL, R, ArcGIS API (JavaScript, Python), JavaScript, HTML

Open-Source Leadership

Founder, AutonomousGeoAI4Science (AutoGeoAI4Sci)

GitHub Organization: https://github.com/AutoGeoAI4Sci

Founded and led an open research community advancing autonomous and multimodal GeoAI for scientific discovery. The initiative integrates tutorials, open-source research code, cross-view modeling projects, and agent-based spatial intelligence systems.

- Curate and maintain 20+ repositories on cross-view GeoAI, disaster intelligence, and autonomous spatial reasoning
- Develop open-source tutorials and research frameworks for multimodal geospatial AI
- Build a collaborative platform connecting AI, GIScience, and Earth observation communities
- Promote reproducible research in autonomous geospatial intelligence