Zhihao Wang

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Education

University of Maryland **Sep. 2020 – May. 2025 (Expected)**
Ph.D., Geographical Information Science; GPA: 3.84 *College Park, MD*

The Ohio State University **Sep. 2018 – Aug. 2020**
M.A., Geographical Information Science and Spatial Analysis; GPA: 4.00 *Columbus, OH*

University of Waterloo **Sep. 2016 – May. 2018**
B.E.S., Honors Geomatics; Minor in Computer Science; GPA: 3.91 (Excellent Standing) *Waterloo, Canada*

Wuhan University **Sep. 2014 – May. 2018**
B.E., Remote Sensing Science and Technology; GPA: 3.82 *Wuhan, China*

Relevant Coursework

- Machine Learning
- Neural Networks
- Computer Vision
- Photogrammetry
- Spatial Database
- Spatial Data Mining
- GIS Algorithm
- Multivariate Analysis

Research Projects

Deep Learning Research for Spatial-Temporal Data | *Python* **Sep. 2019 – Present**

- Developed a **physics-guided** deep learning method to improve **prediction fairness** in data-driven methods with the simulation data and real observations using **TensorFlow** (under the 2^{nd} review of AAAI'24).
- Published several novel deep learning methods for (1) **long-term time series** data modeling, (2) building detection from **LiDAR point clouds**, and (3) land cover satellite **image classification** via **TensorFlow** and **PyTorch**.
- Implemented many deep learning frameworks for NSF/NASA projects (e.g. urban change detection, forest degradation mapping, and cloud masking) using leading methods including **meta-learning**, **domain adaptation**, **Fourier neural operator** and **self-supervised learning**.

Image Analysis on Cloud Platform | *Google Earth Engine and Cloud Console, JavaScript* **Jan. 2019 – Dec. 2022**

- Designed a cloud-based framework to find spatially and temporally interested satellite images for generating global deep learning training data.
- Implemented an **parallel** algorithm to efficiently extract satellite meta footprints using **JavaScript** in Google Earth Engine and processed over 100k+ historical global images.
- Queried and Computed spatial and temporal intersections among image datasets using **SQL** in **Apache Sedona**, a distributed spatial database system.
- Designed a Google Earth Engine algorithm using **JavaScript** for improving time-series classification consistency using machine learning and Markov Random Field methods.

NOAA Operational Data Generation | *Python, C++* **May 2021 - Jun. 2022**

- Developed an automatic framework for generating global albedo climatology dataset for NOAA operational use.
- Parallelly processed over 3.5 TB of satellite data using **wget** and **multiprocessing** in **a linux computing cluster**.
- Contributed to satellite operational algorithm test using **C++ GDB**.
- Implemented an algorithm for saving memory in large dataset, which relies on incremental mean and variance to preserve information, for both **Python** and **C++**.

Selected Publications

- **Zhihao Wang**, Yiqun Xie, Xiaowei Jia, Lei Ma and George Hurtt. High-Fidelity Deep Approximation of Ecosystem Simulation over Long-Term at Large Scale. ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL'23; **Oral, Acceptance Rate: 20.1%**). Hamburg, Germany. 2023.
- Weiye Chen*, **Zhihao Wang***, Zhili Li*, Yiqun Xie, Xiaowei Jia, Anlin Li. Deep Semantic Segmentation for Building Detection Using Knowledge-Informed Features from LiDAR Point Clouds. ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL'22, **Top-3 Solution**). Seattle. 2022.

Technical Skills

Languages: Advanced: Python, MATLAB, R, JavaScript; Intermediate: C++/C, SQL
Tools/Libraries: PyTorch, TensorFlow, Google Earth Engine and Cloud Platform, Apache Sedona, Linux, Git, ArcGIS

Honors and Awards

- Dean's Fellowship, University of Maryland 2020
- Dean's Honor List, Entrance Scholarship, University of Waterloo 2016 – 2018
- Wuhan University Scholarship, 5050 Scholarship, Wuhan University 2016