

Zhanpei Fang

Email: fangzha@oregonstate.edu
+1(425)749-1949

EDUCATION

Oregon State University, *PhD Artificial Intelligence & Geography*. 9/2022 – 6/2027 (anticipated)
Co-advisors: Jamon Van Den Hoek (Conflict Ecology lab), Fuxin Li (Deep Machine Vision group).
Stanford University, *MS Applied & Engineering Physics*. 4/2019 – 6/2020
Stanford University, *BS Physics* (Astrophysics concentration), *BA Art Practice*. 9/2015 – 6/2019

SKILLS

- **Machine learning & computer vision:** PyTorch / TorchVision, scikit-learn, OpenCV, Detectron2; semantic/panoptic/instance/universal segmentation, object detection, and other DL architectures adapted for multispectral/multi-temporal imagery. Graduate coursework in advanced computer vision, convex optimization, topological data analysis, and differential information geometry.
- **Geospatial & remote sensing:** Google Earth Engine, GDAL, GeoPandas, **rasterio**, **xarray**, QGIS, **ipyleaflet**; experience across multispectral (segmentation, classification, regression), hyperspectral (sub-pixel target detection, anomaly detection, matched filtering, PCA/covariance-based noise/dimensionality reduction) & passive microwave modalities. Radiative transfer modeling (ISOFIT, Py6S), sensor calibration & atmospheric correction pipelines.
- **Data analysis:** NumPy, Pandas, SciPy for scientific image & signal processing; collecting, cleaning, & analyzing messy real-world sensor data. Data viz with Matplotlib, Seaborn, TensorBoard, interactive geospatial tools.
- **Programming:** Python, Git, Linux/Unix, shell scripting, HPC computing (slurm), Jupyter notebooks, L^AT_EX.

EXPERIENCE

- **Oregon State University** (Conflict Ecology & Deep Machine Vision labs), *Graduate Research Assistant*. 9/2022 –
 - **Smallholder plot delineation:** Developing transformer methods for panoptic segmentation of agricultural fields in multispectral VHR satellite imagery (Maxar, Planet) for NASA-funded LCLUC research in East Africa. Adapted Detectron2 for multi-spectral/multi-temporal analysis, developed methods to address cloud contamination and data gaps. Paper in preparation.
- **Orbital Sidekick**, *Junior Machine Learning Scientist (full-time)*, San Francisco, CA. 1/2022 – 9/2022
 - **Methane plume detection:** Developed automated detection pipeline for methane plumes in airborne and spaceborne hyperspectral imagery using matched filtering, anomaly detection, and radiative transfer modeling; implemented PCA and covariance-based methods for noise filtering and dimensionality reduction.
 - **Tree speciation:** Designed and led ground truth collection campaign for tree species classification from hyperspectral signatures; organized terrestrial spectrometry of tree foliage & participated in aerial data acquisition flights; developed classification models for wildfire risk assessment & above-ground carbon estimation.
- **Descartes Labs**, *Applied Science Intern*, Santa Fe, NM. 6/2019 – 8/2019
 - **Tree canopy mapping:** Used random-forest regression, trained on Sentinel-2 multispectral imagery, to predict changes in percent tree canopy cover at 20m resolution across the entire continental US. Engineered features from vegetation indices and DEM; processed petabyte-scale satellite archives.
- **Carnegie Institution Dept of Global Ecology**, *Research Assistant*, Stanford, CA. 7/2016 – 10/2016
 - **Sea-ice climate hazards:** Analyzed passive-microwave satellite data to quantify sea-ice-cover impacts on coastal vulnerability of an indigenous Alaskan village, first-author publication in *Arctic Science* [2].

CURRENT PROJECTS

- **Uganda refugee smallholder agriculture:** NASA grant #80NSSC23K0528, “Multi-sensor Mapping of Refugee Agricultural LCLUC Hotspots in Uganda” (2023-26, PI: Jamon Van Den Hoek).
- **Fields of the World:** Contributor to project for plot-level segmentation of global agricultural fields, led by Taylor Geospatial Engine and supported by Microsoft AI for Good Lab.
- **Debris mapping:** Currently funded on NASA grant for ML hurricane debris detection in VHR & aerial imagery.

CONFERENCES

- “Global Field Boundary Delineation Model Zoo and Tooling,” *Next-Gen GeoAI: Scalable and Research-Driven Machine Learning Applications for Environmental Impact*, American Geophysical Union (AGU), 17 Dec 2025. (oral)
- “Deep-learning transformers for panoptic delineation and monitoring of smallholder agricultural fields across Uganda’s refugee settlements,” *GC43R: Satellite Solutions: Agricultural Monitoring Through Remote Sensing*, AGU, 18 Dec 2025. (poster)

- “Transformer methods for universal segmentation of agricultural fields in high-resolution satellite images,” *Computer Vision for Science (CV4Science) Workshop*, Conference on Computer Vision and Pattern Recognition (CVPR), 11-15 Jun 2025. (poster)

PUBLICATIONS

1. S. Adhikari, M. Fishbach, D.E. Holz, R.H. Wechsler, and Z. Fang, ”The binary-host connection: Astrophysics of gravitational wave binaries from their host galaxy properties,” *The Astrophysical Journal*, 2020, vol. 905, no. 1, doi:10.3847/1538-4357/abfb7.
2. Z. Fang, P.T. Freeman, C.B. Field, and K.J. Mach, ”Reduced sea ice protection period increases storm exposure in Kivalina, Alaska,” *Arctic Science*, vol. 4, no. 4, pp. 525–537, 2018, doi:10.1139/as-2017-0024.

HONORS AND AWARDS

- Dr. Mary L. Brugo Graduate Geography Scholarship 2025
- Gordon Matzke Scholarship 2024
- Warren W. Denner Memorial Graduate Fellowship 2024
- Evans Family Graduate Fellowship in Humanitarian Engineering 2023 – 20224
- Arthur Parenzin Memorial Graduate Research Fellowship 2023, 2025
- Oregon State University Provost’s Distinguished Graduate Fellowship 2022 – 2023

TEACHING

- GEOG e580, Remote Sensing I: Principles & Applications. 1–3/2025
- GEOG 451/551, Planning Principles & Practices for Resilient Communities. 9–12/2024
- GEOG 464/564, Geospatial Perspectives on Intelligence, Security & Ethics. 4–6/2024, 2025
- GEOG 481/581, Satellite Image Analysis. 1–3/2024

PROFESSIONAL ACTIVITIES

- Program Committee for AAAI-AISI (AI for Social Impact Track). 2025 – 2026