TAO HUANG

taohuang@uw.edu| Seattle, WA

EDUCATION

Boise State University, Boise, ID May 2025
Ph.D. in Ecology, Evolution, and Behavior
• Dissertation: Assessing semi-arid vegetation cover, post-fire hydrology, and stream temperature using remote sensing and modeling

University of New Hampshire, Durham, NH December 2016
M.S. in Natural Resources and the Environment

National Taiwan University, Taipei, Taiwan June 2010
B.S. in Bioenvironmental Systems Engineering

WORK EXPERIENCE

University of Washington, Seattle, WA Oct 2025 – Present
Postdoctoral Researcher

- Quantified ecosystem services, hazard exposure, and adaptive capacity for forests across the U.S. West Coast.

Boise State University, Boise, ID May 2021 – May 2025
Graduate Research Assistant

- Developed and validated machine learning models that integrated ground surveys with multispectral UAS imagery to generate high-resolution fractional cover maps of semi-arid vegetation, achieving classification accuracies of 89% or higher.
- Applied the physics-based model to simulate overland flow and soil erosion during rainfall events.
- Built a data pipeline for hydrological data retrieval via the USGS Python API, implementing neural network models for stream temperature prediction.

Academia Sinica, Taipei, Taiwan January 2020 – July 2020
Research Assistant

- Developed urban traffic noise hazard exposure maps from a large dataset via geostatistical interpolation.

Cary Institute of Ecosystem Studies, Millbrook, NY December 2017 – November 2019
Data Manager

- Processed geospatial datasets to build machine learning models for identifying zoonotic disease reservoirs.

Water Systems Analysis Group, Durham, NH August 2014 – November 2017
Graduate Research Assistant

- Integrated diverse datasets, including USGS water quality measurements and NASA's MERRA climate reanalysis data, into the river network model.

National United University, Miaoli, Taiwan October 2013 – July 2014
Research Assistant

- Simulated different best management practices using a hydrologic model to reduce nitrogen export from agricultural fields.

National Taiwan University, Taipei, Taiwan September 2010 – June 2012
Research Assistant

- Applied the spatially explicit ecosystem model to quantify and map ecosystem services under projected climate and land use changes.

SELECTED PUBLICATIONS

- Villarreal, M. L., Bishop, T. B., Sankey, T. T., Smith, W. K., Burgess, M. A., …, **Huang, T.,** ... & Yao, E. H. (2025). Applications of unoccupied aerial systems (UAS) in landscape ecology: a review of recent research, challenges and emerging opportunities. *Landscape Ecology*, 40(2), 43.
- **Huang, T.,** Olsoy, P. J., Glenn, N. F., Cattau, M. E., Roser, A. V., Boehm, A., & Clark, P. E. (2024). Quantifying rangeland fractional cover in the Northern Great Basin sagebrush steppe communities using high-resolution unoccupied aerial systems (UAS) imagery. *Landscape Ecology*, 39(11), 1-18.
- **Huang, T.,** Wollheim, W. M., & Jones, S. H. (2022). Removal of fecal indicator bacteria by river networks. *Water*, 14(4), 617.
- Shuman, J. K., Balch, J. K., Barnes, R. T., Higuera, P. E., Roos, C. I., … , **Huang, T.,** ... & Zhang, X. (2022). Reimagine fire science for the anthropocene. *PNAS Nexus*, *1*(3).
- Majewska, A. A., **Huang, T.,** Han, B., & Drake, J. M. (2021). Predictors of zoonotic potential in helminths. *Philosophical Transactions of the Royal Society B*, 376(1837), 20200356.
- Kitzes, J., Blake, R., Bombaci, S., Chapman, M., Duran, S. M., **Huang, T.,** ... & Yule, K. (2021). Expanding NEON biodiversity surveys with new instrumentation and machine learning approaches. *Ecosphere*, 12(11), e03795.
- **Huang, T.,** Chan, T. C., Huang, Y. J., & Pan, W. C. (2020). The association between noise exposure and metabolic syndrome: a longitudinal cohort study in Taiwan. *International Journal of Environmental Research and Public Health*, 17(12), 4236.
- Fischhoff, I. R., **Huang, T.,** Hamilton, S. K., Han, B. A., LaDeau, S. L., Ostfeld, R. S., … & Solomon, C. T. (2020). Parasite and pathogen effects on ecosystem processes: A quantitative review. *Ecosphere*, 11(5), e03057.
- Schmidt, J. P., Maher, S., Drake, J. M., **Huang, T.,** Farrell, M. J., & Han, B. A. (2019). Ecological indicators of mammal exposure to Ebolavirus. *Philosophical Transactions of the Royal Society B*, 374(1782), 20180337.
- Samal, N.R., Wollheim, W.M., Zuidema, S., Stewart, R.J., Zhou, Z., Mineau, M.M., … , **Huang, T.** and Lutz, D.A. (2017). A coupled terrestrial and aquatic biogeophysical model of the Upper Merrimack River watershed, New Hampshire, to inform ecosystem services evaluation and management under climate and land-cover change. *Ecology and Society*, 22(4).
- Chiang, L. C., Chaubey, I., Maringanti, C., & **Huang, T.** (2014). Comparing the selection and placement of best management practices in improving water quality using a multiobjective optimization and targeting method. *International Journal of Environmental Research and Public Health*, *11*(3), 2992-3014.

SELECTED PRESENTATIONS

- Applying machine learning models to assess vegetation cover and stream temperature in Idaho. HydroML 2025, Lake Arrowhead, CA. May 27–29, 2025.
- Effect of vegetation cover data spatial resolution on post-fire rangeland hillslope erosion modeling. American Geophysical Union Fall Meeting. Washington, D.C. December 9–13, 2024.
- Using multispectral drone imagery and machine learning to characterize rangeland cover at the hillslope scale. American Geophysical Union Fall Meeting. San Francisco, CA. December 11–15, 2023.
- Impacts of vegetation cover resolution on modeling hillslope soil erosion in a semiarid landscape. Research Insights in Semiarid Ecosystems. Tucson, AZ. December 5, 2022.
- The combined effects of climate and wildfires on streamflow. 11th Northwest Climate Conference. Online. April 6-8, 2021.
- Identifying spatial and temporal drivers of waterborne pathogen Cryptosporidium dynamics. Ecological Forecasting Initiative 2019 Conference. Washington D.C. May 13–15, 2019.

- Environmental control of fecal indicator bacteria from land to the ocean: the importance of river networks. Plum Island LTER All Scientists Meeting. Woods Hole, MA. March 6–8, 2017.
- Fecal coliform removal by river networks. American Geophysical Union Fall Meeting. San Francisco, CA. December 14–18, 2015.

SELECTED GRANTS & AWARDS

2025 **Joint Fire Science Program** Graduate Research Innovation Grant
2024 **National Institutes of Water Resources Conference** Travel Award
2023 **NCAR-NEON Community Workshop** Travel Award
2022 **Geo for Good Summit** Invited Participation
2021 **Boise State Hazard and Climate Resilience Institute** Research Grant

RELEVANT TRAINING

2025 **PyCon:** Processing Large Geospatial Datasets with Dask & Xarray
2024 **NEON:** Intro to Working with Hyperspectral Remote Sensing Data
2024 **Open Geospatial Solutions:** Segment Geospatial
2023 **NASA Earthdata Tutorial:** Intro to EMIT Mission and Data
2021 **NASA ARSET:** Overview of Hyperspectral Data

COMMUNITY INVOLVEMENT

Idaho American Water Resource Association, Boise, ID August 2023 – July 2024
Liaison

- Co-organized the annual meeting and participated in Idaho water quality workshops, building connections with researchers, government agencies (e.g., NRCS), consulting firms (e.g., HDR), and watershed managers.

FIELDWORK EXPERIENCE

- 2024 Collected tree structural and age data by measuring juniper height with a laser hypsometer, recording diameter at breast height, and sampling tree rings for age estimation.
- 2023 Measured snow albedo using an ASD FieldSpec4.
- 2023 Sampled vegetation species composition using the point frame method and Real-Time Kinematic (RTK) positioning.
- 2022 Utilized terrestrial laser scanning to measure tree structures, providing detailed 3D data for a biomass estimation project.
- 2021 Geo-referenced target vegetation species using RTK.

TEACHING & MENTORING EXPERIENCE

- Teaching Assistant, General Biology. Boise State University Fall 2020 and Spring 2021
- REU Mentor, Disease Ecology Lab. Cary Institute of Ecosystem Studies Summer 2019
- R Instructor of the REU program. Cary Institute of Ecosystem Studies Summers 2018 and 2019
- Teaching Assistant, Aquatic Ecosystems. University of New Hampshire Fall 2015

SKILLS

Geospatial & Hyperspectral Tools

- Python: rasterio, rioxarray, geopandas, pyproj, earthaccess, h5py, xarray, Zarr, netCDF4, laspy
- R: rhdf5, raster, terra, sf, neonutilities, neonhs
- Software: ArcGIS, QGIS, Google Earth Engine, ENVI

Machine Learning & Statistics

- Python: Scikit-learn, PyTorch, TensorFlow, xgboost, shap, statsmodels, PyMC
- R: gbm, caret, randomForest, pdp, dplyr, lidR

Cloud & High-Performance Computing

- Google Colab, BSU Research Computing Cluster

Version Control

- Git, GitHub

Ecohydrological Modeling

Soil & Water Assessment Tool (SWAT), Rangeland Hydrology and Erosion Model (RHEM)