Wesley Rancher

Department of Geography
University of Oregon
Terrestrial Ecosystems Ecology and Landscapes Lab
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Summary

Environmental data scientist with expertise in remote sensing, GIS, and landscape ecology. Skilled in applying machine learning to large-scale spatial datasets to model ecosystem change, with a focus on carbon dynamics. Dedicated to applying data-driven insights to support sustainable infrastructure, guide environmental management, and strengthen resilience across natural and built systems.

Education

University of Oregon
M.S. in Geography
GPA: 3.9

Ohio Wesleyan University
B.A. in Environmental Studies and Geography
Minor in Philosophy
GPA: 3.5

Skills

- **GIS & Remote Sensing**: Advanced in ArcGIS, QGIS, Google Earth Engine
- **Programming**: Advanced in R and Python; proficient in Bash, Git, AWS CLI, and Docker
- **UAS**: FAA Certified Remote Pilot (#4802988); experience with DJI Pilot, Pix4D, Drone2Map, Agisoft; experience in LiDAR and Dual Red-Edge sensors calibration
- **Languages**: Working proficiency in Spanish

Research Experience

Graduate Research Assistant – University of Oregon September 2023 – Present
Advisor: Dr. Melissa Lucash

- Contributed to research on forest dynamics (succession, wildfire, hydrology) under climate change in temperate and boreal ecosystems
- Collaborated with the Bonanza Creek Long-Term Ecological Research (LTER) program to assess boreal ecosystem change using simulation modeling and remote sensing
- Developed Google Earth Engine scripts for atmospheric and topographic correction and cross-sensor calibration of Landsat imagery
- Processed satellite data and applied machine learning in R (terra, dplyr, tidymodels, randomForest, kknn) and Python (geopandas, rioxarray, scikit-learn) to model and map aboveground biomass
- Built and deployed Docker images to containerize the LANDIS-II forest landscape model, improving reproducibility and scalability
- Acquired, managed, and processed large climate datasets from CMIP5 and CMIP6 for integration into modeling workflows

Graduate Research Fellow – NASA DEVELOP June 2023 – August 2023
Advisor: Dr. Anthony Vorster

- Collaborated with Grand Staircase Escalante Partners to map invasive plant communities in the Paria River Watershed, Utah
- Integrated field observations of plant cover with vegetation indices and senescence observations from Landsat imagery and random forest algorithms
- Processed LiDAR datasets and Landsat imagery using ArcGIS and Google Earth Engine

Undergraduate Research Assistant – Ohio Wesleyan University December 2022 – May 2023
Advisor: Dr. Nathan Rowley

- Reproducibly estimated supraglacial lake depth development in Western Greenland using radiative transfer models
- Developed workflows to process Landsat imagery (raster sieving and feature detection)
- Calibrated dual-red-edge (Micasense) and LiDAR sensors with DJI drones
- Created study material for FAA Part 107 exam

Undergraduate Research Fellow – University of Central Oklahoma June 2022 – July 2022
Advisor: Dr. Victor Gonzalez

- Participant in undergraduate research program (REU) funded by the NSF, focused on analyzing climate stressors on heat tolerances of honeybees and sweat bees in Lesvos, Greece
- Created apparatuses for testing desiccation, conducted fieldwork, and contributed to research methodology for temperature acclimation, starvation, and thermal limit assays
- Discovered that bees remain heat tolerant following desiccation and starvation

Teaching Experience

Graduate Teaching Assistant – University of Oregon September 2023 – Present

- **Geography 485/585: Remote Sensing I** Winter 2025, Fall 2024
  - Developed lab exercises, taught GIS and remote sensing software (ArcGIS, QGIS, R), and provided hands-on demonstrations to undergraduates and graduates to apply remote sensing and spatial analysis concepts
- **Geography 199: Global Wildfire** Spring 2024
  - Supported curriculum development, provided supplemental instruction for different wildfire topics, and assisted with student questions on concepts and theory
  - ***Guest lecture:*** *"Changing Wildfire in Brazil"* – Discussed landscape drivers of a changing fire regime in Brazil
  - ***Guest lecture:*** *"Bees and Wildfire"* – Introduced the interplay between post-wildfire effects, vegetation, and pollinators
- **Geography 181: Our Digital Earth** Winter 2024, Fall 2023
  - Facilitated labs focused on digital mapping and spatial data; helped students with ArcGIS Online basics and digital geography concepts

Awards and Honors

Rippey Research Grant ($1000, UO) 2024
NASA Develop Scholarship ($1500, SSAI) 2023
Dean's List (OWU) Fall '22, Spring '20, '22, '23
Robert E. Shanklin Distinguished Scholar (Geography, OWU) 2023

Phi Sigma Tau (Philosophy, OWU) 2023
Our New Gold Digital Storytelling winner (Spanish, OWU) 2022

Publications

- Rancher, W., Matsumoto, H., Lamping, J., & Lucash, M. (2025). *Estimating aboveground carbon using machine learning and process-based models*. *(In preparation)*.
- Lucash, M., Lamping, J., Nowell, B., Scheller, R., Banerjee, T., Buettner, C., Fawcett, J., Hurteau, M., Parks, S., Rancher, W., Robbins, Z., St. Denis, L., Stasiewicz, A., Urza, A., & Weiss, S. (2025). *Roadmap for the future of extreme wildfire events*. *(Submitted)*.
- Weiss, S., Rancher, W., Hayes, K., Buma, B., & Lucash, M. (2024). *Wildfire dynamics under climate change in interior Alaska*. *(In preparation)*.
- Gonzalez, V., Rancher, W., Vigil, R., Garino-Heisey, I., Oyen, K., Tscheulin, T., Petanidou, T., Hranitz, J., & Barthell, J. (2024). *Bees remain heat tolerant after acute exposure to desiccation and starvation*. *Journal of Experimental Biology*.
- Rowley, N., Rancher, W., & Karmosky, C. (2024). *Comparison of multiple methods for supraglacial melt-lake volume estimation in western Greenland during the 2021 summer melt season*. *Glacies*.

Presentations

- Rancher, W. (2025). *Estimating species-level aboveground carbon in interior Alaska using machine learning and process-based models*. University of Oregon, Eugene, OR. *(Master's thesis presentation)*.
- Rancher, W., Matsumoto, H., Lamping, J., & Lucash, M. (2025). *Estimating recent shifts in aboveground carbon and species composition in interior Alaska using Landsat imagery and random forests*. *Northwest Scientific Association*, Eugene, OR. *(Poster)*.
- Rancher, W., Matsumoto, H., Lamping, J., & Lucash, M. (2024). *Assessing vegetation shifts in boreal Alaska by integrating Landsat imagery with spatial modeling*. *American Geophysical Union*, Washington, DC. *(Poster)*.
- Rancher, W., VanArnam, M., Kowalski, A., Anarella, T., & Vorster, A. (2023). *Mapping Russian olive and tamarisk to inform invasive species management along the Paria River, Utah*. *NASA DEVELOP Day*, Washington, DC. *(Virtual talk)*.
- Rancher, W., Rowley, N. (2023). *Estimating supraglacial melt lake volume changes in west-central Greenland using multiple remote sensing methods*. *Ohio Wesleyan Spring Symposium*, Delaware, OH. *(Poster)*.
- Rancher, W., Vigil, R., Garino-Heisey, I., & Gonzalez, V. (2022). *Effects of desiccation on bees' heat tolerance*. *Ohio Wesleyan Connection Conference*, Delaware, OH. *(Poster)*.
- Rancher, W., & Gonzalez, V. (2022). *Effects of desiccation on bees' heat tolerance*. *IUSSI Sección Andina y del Caribe*, Panama City, Panama. *(Talk)*.