

Ashley M. Grinstead

Graduate Research Assistant

Storrs, Connecticut, United States

✉ ashley.grinstead@uconn.edu | 🆔 0000-0003-2623-4457 | 🌐 [ashleygrinstead](https://www.linkedin.com/in/ashleygrinstead)

🌐 [ashley-grinstead](https://www.linkedin.com/in/ashley-grinstead) | 📄 [ashleygrinstead](https://orcid.org/0000-0003-2623-4457)

Research Interests

My work bridges ecohydrology and remote sensing to quantify how disturbances shape ecosystem function and resilience across contrasting U.S. landscapes. I am broadly interested in developing scalable, physically grounded monitoring tools that can inform drought response, rangeland and forest management, and coastal restoration decision-making.

Education

University of Connecticut

August 2023 - Present

PhD in Natural Resources and the Environment

Storrs, CT, USA

Dissertation: *Water-Related Disturbances in United States Ecosystems: From Water Stress in the West to Marsh Composition in the East*

Advisor: Dr. Zhe Zhu

University of California, Santa Barbara

June 2022

Environmental Studies, B.S.

Santa Barbara, CA, USA

Physical Geography, B.S.

Peer-reviewed Publications

1. Song, K., Knighton, J., Qiu, S., Yang, X., Suh, J.W., Tavares, J.V., Liu, Y., Tai, X., Fahey, R., Neigh, C.S.R., Callahan, R., Hong, F., Li, T., **Grinstead, A.**, Ren, W., Witharana, C., Hedges, S.B., Yang, Z., Vieira Leite, R., Bittencourt, P.R.L., Zhu, Z. (2026). Physiological fidelity of a satellite-derived forest resilience indicator in the Amazon. *Nature Ecology & Evolution*, [accepted].
2. Li, T., Wang, Z., Kyba, C. C. M., Román, M. O., Seto, K. C., Yang, Y., Qiu, S., Kuester, T., Fragkias, M., Chen, X., Meyer, T. H., Rittenhouse, C. D., Tai, X., Cullerton, M., Hong, F., **Grinstead, A.**, Song, K., Suh, J. W., Yang, X., ... Zhu, Z. (2026). Satellite imagery reveals increasing volatility in human night-time activity. *Nature*, 652(8109), 379–386. <https://doi.org/10.1038/s41586-026-10260-w>
3. Qiu, S., Zhu, Z., Yang, X., Woodcock, C. E., Fahey, R. T., Stehman, S., Zhang, Y., Cullerton, M., **Grinstead, A.**, Hong, F., Song, K., Suh, J. W., Li, T., Ren, W., & Nemani, R. R. (2025). A shift from human-directed to undirected wild land disturbances in the USA. *Nature Geoscience*, 18(10), 989–996. <https://doi.org/10.1038/s41561-025-01792-3>
4. Zipper, S., Kastens, J., Foster, T., Wilson, B. B., Melton, F., **Grinstead, A.**, Deines, J. M., Butler, J. J., & Marston, L. T. (2024). Estimating irrigation water use from remotely sensed

evapotranspiration data: Accuracy and uncertainties at field, water right, and regional scales. Agricultural Water Management, 303, 109036. <https://doi.org/10.1016/j.agwat.2024.109036>

Research Experience

- **University of Connecticut, Storrs, CT**
Graduate Research Assistant | Dr. Zhe Zhu, GERS Lab | 2023 - Present
Project: Water use and land cover change detection using ECOSTRESS and OpenET
 - Adapted a widely used time series change detection algorithm to the normalized evapotranspiration fraction (f_{RET}) to detect abrupt and gradual vegetation water-use change at 30m resolution across the Western U.S. (1999–2024)
 - Generating annual f_{RET} change maps for the Western U.S. to quantify spatiotemporal patterns of vegetation water stress by land cover type and ecoregionProject: Advancing coastal wetland restoration outcomes: examining temporal trajectories and spatial variation of past management interventions across the Long Island Sound
 - Developing a spectral unmixing framework using DECODER time series coefficients and support vector regression to estimate fractional cover of key marsh vegetation composition at 30m resolution
 - Constructing a composition-based Marsh Resilience Index calibrated with field measurements of percent vegetation cover from reference marsh sites along the Long Island Sound
 - Quantifying how pulse disturbances and press stressors shape Marsh Resilience Index trajectories across the Long Island Sound
 - Evaluating whether different restoration intervention types produce distinct resistance and recovery signals in the Marsh Resilience Index using a regional restoration database
- **NASA OSTEM Internship Program, Remote**
Wildland Fire Science Research Intern | Dr. Erik Boren, Weyerhaeuser | 2023
Project: Can topography and multispectral data be combined to map riparian damage severity and predict riparian burn risk?
 - Collaborated with the remote sensing team at Weyerhaeuser
 - Mosaicked 10m public LiDAR data to create a normalized summation of the illumination geometries in the study area, evaluated the Total Wetness Index, and derived elevation
 - Extracted Sentinel-2 data to generate NBR and dNBR layers for burn severity analysis, and compared the results with effective shade data collected in the field
 - Conducted data analysis, script writing, and created linear regression models using Python libraries including numpy, pandas, scikitlearn, arcpy, scipy, and matplotlib
 - Provided valuable deliverables to both Weyerhaeuser and NASA
 - Presented my research findings to Weyerhaeuser stakeholders
- **NASA DEVELOP National Program, Greenbelt, MD**
Geospatial Research Intern | 2022
Project: Monitoring vegetation health and water availability in Bryce Canyon National Park for drought stress mitigation planning

- Applied NDVI/NDWI on remotely-sensed Earth observation data (Landsat 8, PlanetScope) to monitor vegetation health and water availability and used machine learning techniques to identify seeps and springs
- Submitted deliverables (technical paper, PowerPoint presentation, poster) that informed decision-makers in a timely matter
- Completed software carpentry lessons for Google Earth Engine, the Unix shell, and RStudio
- Collaborated with an interdisciplinary team, external partner, science advisors and non-scientific communities
- **Kansas Geological Survey**, Lawrence, KS
Hydrologic Data Science Intern | Dr. Sam Zipper | 2022
Project: Evaluating uncertainty in remotely-sensed irrigation estimates for the SD-6 LEMA in Western Kansas
 - Worked with a PI to develop my own research project funded by the NSF
 - Used Python to analyze the OpenET dataset to identify uncertainties and the effectiveness of different agricultural conservation strategies
 - Gained experience in hydrological field work including sampling irrigation wells, purging and baling wells, downloading well log data, and collected stream samples to measure gas exchange between the stream and atmosphere
 - Co-authored paper published in Agricultural Water Management on September 2, 2024
- **Earth Research Institute**, University of California, Santa Barbara, CA
Undergraduate Research Assistant | Dr. Kelly Caylor | 2022
Project: Identifying vegetation patterns along global dryland rivers to uncover the ecological footprint of the hydrologic regime
 - Assisted director of the Earth Research Institute (ERI) Dr. Kelly Caylor and PhD candidate Bryn Morgan with identifying vegetation patterns along global dryland rivers to uncover the ecological footprint of the hydrologic regime
 - Used the Unix shell to navigate through hydrologic datasets stored on the ERI's server and wrangled them in Python
- **Central Coast Data Science Fellowship**, Santa Barbara, CA
Fellow | Dr. Kelly Caylor, Earth Research Institute | 2022
Project: Combining computer vision and satellite imagery to detect center pivot irrigation
 - Received training with machine learning and data science techniques
 - Collaborated with a team of 4 on a capstone project with an external sponsor for two quarters
 - Assisted in developing an open-source data pipeline for identifying center pivots based on a U-Net model
 - Presented my capstone project to a class of 70 students and to a joint open poster session with Cal Poly San Luis Obispo

Presentations & Posters

1. **Grinstead, A.** (2024). Water Use Change Detection in the Western United States: Enhanced Change Detection Using Evapotranspiration Data [Poster]. American Geophysical Union (AGU), Washington, D.C.
2. **Grinstead, A.** (2023). Predicting and Mapping Burn Severity in Northwestern Timberland Riparian Management Zones [Oral presentation]. Weyerhaeuser & NASA OSTEM, Remote.
3. Carr, A., Frost, M., **Grinstead, A.**, Stark, A. (2022). Monitoring Vegetation Health and Water Availability in Bryce Canyon National Park for Drought Stress Mitigation Planning [Oral presentation]. Bryce Canyon National Park & NASA DEVELOP, Greenbelt, MD.
4. Bui, E., Chen, T., **Grinstead, A.**, Hsu, T. (2022). Combining Computer Vision and Satellite Imagery to Detect Center Pivot Irrigation [Poster]. Central Coast Data Science Fellowship Capstone Symposium, Santa Barbara, CA.
5. **Grinstead, A.**, Huitema, J., Norman, M., Vega, H., Villaseñor, V., & Rickard, A. (2022). Aquatic Invertebrate Monitoring at Devereux Slough [Poster]. UC Santa Barbara: Cheadle Center for Biodiversity and Ecological Restoration Symposium.

Honors and Awards

- **Environmental Data Science Summit Travel Award** 2023
National Center for Ecological Analysis & Synthesis, Santa Barbara, CA
 - A summit to build community and foster collaboration within the Environmental Data Science community
- **Central Coast Data Science Fellowship** 2021-2022
University of California, Santa Barbara, CA
 - A capstone program to promote the application of data science to real-life projects

Skills

Programming Languages: Python, MATLAB, R, Javascript, bash

Packages: geopandas, rasterio, xarray, shapely, fiona, pyproj, folium, leafmap, gdal/ogr, scikitlearn

Geographic Information Systems (GIS): ArcGIS Pro, QGIS, Google Earth Engine (GEE)

High Performance Computing & Cloud: Linux, HPC clusters (SLURM), Google Cloud

Artificial Intelligence (AI): ChatGPT, Claude, Google Gemini

Machine Learning (ML): random forest, support vector regression, U-NET

Satellite Data: Landsat, Sentinel, Planet, MODIS, ECOSTRESS

Version Control: GitHub, git

Affiliations

- Department of Natural Resources and the Environment (UConn)
- American Geophysical Union (AGU)
- Central Coast Data Science Partnership (UCSB)
- Earth Research Institute (UCSB)