

Brenton A. Wilder

Warren Wilson College, Swannanoa, NC
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Education

Ph.D. in Geosciences, Boise State University, 2024
M.S. in Civil Engineering (Water Resources), San Diego State University, 2021
B.S. in Civil Engineering, Cal Poly Pomona, 2018

Professional Experience

2022 Scientists in Parks (SIP) Fellow, Cabrillo National Monument, National Park Service

Awards and Honors

2020 Master's Research Scholarship Award, San Diego State University

Research Interests

- Remote sensing of the natural environment
- Imaging spectroscopy and lidar remote sensing
- Cryosphere and climate change
- Radiative transfer
- Wildfire and disturbance hydrology
- Numerical optimization and statistical methods

Funding

2022-2025 FINESST Grant, NASA (21-EARTH21-0249), \$150,000 [16% acceptance; 3 years of support]

2019-2021 GRIN Award, JFSP (#19-1-01-55), \$24,958 [24% acceptance; 2 years of support]

Teaching Experience

Warren Wilson College

Adjunct Instructor

BIO 4721-300 Ecological Data for Conservation: Spring 2025

San Diego State University

Co-Instructor

CIVE 445 Applied Hydrology: Spring 2020

CIVE 444 Applied Hydraulics: Summer 2019, Fall 2019

Cal Poly Pomona

Supplemental Instructor (SI)

CE 304 Structural Analysis I: Fall 2017, Spring 2018

CE 305 Structural Analysis II: Winter 2018

Guest Lectures

2022 “Understanding and working with raster data” (October 2022). GEOG 360/560
Introduction to Geographic Information Systems, Boise State University, Boise, Idaho

Publications

In-review:

Bair, E. H., Roberts, D. A., Thompson, D. R., Brodrick, P. G., **Wilder, B. A.**, Bohn, N., ... & Dozier, J. (2024). Brief communication: Not as dirty as they look, flawed airborne and satellite snow spectra. *EGUsphere*, 2024, 1-8.

Peer-reviewed:

Wilder, B. A., Enterkine, J., Hoppinen, Z., Adebisi, N., Marshall, H. P., O'Neel, S., ... & Glenn, N. F. (2025). Modeling snow optical properties from single wavelength airborne lidar in steep forested terrain. *Frontiers in Earth Science*, 13, 1487776.

Wilder, B. A., Meyer, J., Enterkine, J., & Glenn, N. F. (2024). Improved snow property retrievals by solving for topography in the inversion of at-sensor radiance measurements. *The Cryosphere*, 18(11), 5015-5029.

Wilder, B. A., Lee, C. M., Chlus, A., Marshall, H. P., Brandt, J., Kinoshita, A. M., ... & Glenn, N. F. (2024). Computationally efficient retrieval of snow surface properties from spaceborne imaging spectroscopy measurements through dimensionality reduction using k-means spectral clustering. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*.

Wilder, B. A., & Kinoshita, A. M. (2022). Incorporating ECOSTRESS evapotranspiration in a paired catchment water balance analysis after the 2018 Holy Fire in California. *Catena*, 215, 106300.

Wilder, B. A., Lancaster, J. T., Cafferata, P. H., Coe, D. B., Swanson, B. J., Lindsay, D. N., ... & Kinoshita, A. M. (2021). An analytical solution for rapidly predicting post-fire peak streamflow for small watersheds in southern California. *Hydrological Processes*, 35(1), e13976.

Kohli, G., Lee, C. M., Fisher, J. B., Halverson, G., Variano, E., Jin, Y., Carney D., **Wilder, B. A.**, & Kinoshita, A. M. (2020). ECOSTRESS and CIMIS: A comparison of potential and reference evapotranspiration in riverside county, California. *Remote Sensing*, 12(24), 4126.

Conference Presentations

Oral Presentation, “Improved snow property retrievals by solving for topography in the inversion of at-sensor radiance measurements” American Geophysical Union in Washington D.C., December 13, 2024.

Poster Presentation, “Mapping SSA from helicopter-borne lidar reflectance” Western Snow Conference 2024, in Corvallis, OR, April 23-24, 2024.

Poster Presentation, “Global Optical Snow Properties via High-Speed Algorithm With K-Means Clustering (GOSHAWK)” IEEE IGARSS 2023, in LA, CA, July 17, 2023.

Poster Presentation, “Helicopter-Borne Lidar to Resolve Snowpack Variability in Southwest Idaho” AGU 2022, in Chicago, IL, December 2022.

Poster Presentation, “Snow Albedo Modeling with Imaging Spectroscopy aboard Earth Observing Satellites” Surface Biology and Geology (SBG) Community Meeting, in Washington D.C., October 12, 2022.

Oral Presentation, “Coastal Fog - A Lifeline for Native Plants in Southern California” ESA Annual Conference in Montreal, Canada, August 18, 2022.

Poster Presentation, “Improving snow distribution estimates to increase drought resiliance in the Boise Mountains” Western Snow Conference, April 19, 2022.

Poster Presentation, “Application of ECOSTRESS evapotranspiration in a paired catchment analysis following the 2018 Holy Fire in California” International Association of Landscape Ecology, April 11, 2022.

Poster Presentation, “Post-fire Vegetation and Hydrologic Recovery in a Mediterranean Climate” American Geophysical Union (virtual), December 10, 2020.

Poster Presentation, “ECOSTRESS Wildfire Applications” Geo For Good Summit 2020 (virtual), October 20, 2020. Primary authors were Paa Sey from Howard University and Christine Lee from NASA-JPL.

Poster Presentation, “Flood after fire in southern California - Incorporating machine learning to identify important parameters for process-based hydrologic models” Student Research Symposium, in San Diego, California, February 28, 2020.

Poster Presentation, “Flood after fire in southern California - Incorporating machine learning to identify important parameters for process-based hydrologic models” International Erosion Control Association Annual Conference in Raleigh, North Carolina, February 25, 2020.

Oral Presentation, “Post-wildfire peak streamflow for small watersheds in southern California” American Geophysical Union in San Francisco, California, December 12, 2019.

Oral Presentation, “Predicting post-wildfire peak streamflow for small watersheds in southern California” Floodplain Management Association Annual Conference, in San Diego, California, September 5, 2019.

Poster Presentation, “Seismic Energy and Friction Dampers” Kellogg Honors College Convocation, in Pomona, California April 30, 2018.

Poster Presentation, “Seismic Energy and Friction Dampers” Southern California Undergraduate Research Symposium, in Pomona, California, November 18, 2017.

Service to the Community

<i>Journal reviewer:</i>	<i>(# of papers)</i>
Atmospheric Pollution Research	(1)
Earth System Science Data	(1)

Volunteering in the community:

- Volunteered/led groups (300+ hours) with the San Diego River Park Foundation in 2019.
- Volunteered at several events at Cal Poly Pomona through Kellogg Honors College including Matt's Run and Showcase of Excellence from 2015-2018.

Science Outreach

Talks and presentations:

“Coastal Fog - A Lifeline for Native Plants” Naturally Speaking Series, Cabrillo National Monument, July 15, 2022. https://www.youtube.com/watch?v=5v_9mPYNf_w .

Blog posts:

“Research Highlight: Modeling Snow Albedo from Space”, November 13, 2023.

<https://www.boisestate.edu/rcs/2023/11/13/research-highlight-modeling-snow-albedo-from-space/> .

“June Gloom Captured in Unprecedented Detail by Fog Fellows”, July 13, 2022.

<https://storymaps.arcgis.com/stories/52659af58fb046e89bef043b74ce7e1b> .

Open-Source Code and Data Products

Code repositories:

goshawk

Numerical optimization and k-means clustering algorithm for estimating snow properties from top of atmosphere radiance imaging spectroscopy data. Code is built to use Message Passing Interface (MPI) and multiprocessing to scale effectively on Boise State (and similar SLURM-based) Linux clusters. <https://github.com/cryogars/goshawk> .

ice-road-copters

Designed to post-process lidar data and enable differencing to resolve change in repeat collections for snow depth mapping. We also have developed an additional method to this code that serves as an example of estimating surface reflectance and optical snow properties from the lidar intensity. <https://github.com/cryogars/ice-road-copters> .

hyperquest

A Python package for hyperspectral quality estimation and computing image-wide noise in hyperspectral imaging (imaging spectroscopy).
<https://github.com/brentwilder/HyperQuest> .

Published community resources:

“AVIRIS-NG Surface Reflectance”, Jupyter Notebook for NASA SnowEx Hackweek, Aug 19, 2024. <https://snowex-2024.hackweek.io/tutorials/albedo/aviris-ng-data.html>.

Published data products:

Wilder, Brenton A.; Enterkine, Josh; Marshall, Hans-Peter; Van der Weide, Thomas; and Glenn, Nancy F.. (2023). *Dataset for ASD FieldSpec4 Snow and Conifer Measurements in Idaho and Colorado (2022-2023)* [Data set]. Retrieved from https://doi.org/10.18122/bcal_data.7.boisestate

Professional Memberships

2019-present American Geophysical Union (AGU)

Certifications

Remote Pilot, via FAA for Small Unmanned Aircraft System (#4411570, expired 07/24)

CPR/AED for Professional Rescuers with First Aid, via American Red Cross (#0159LMD, expires 03/25)

Wilderness First Aid (WFA), via National Outdoor Leadership School (expires 03/25)

References

Nancy Glenn, VP of Research (Professor of Geosciences) Boise State University
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Linh Anh Cat, Division Lead, Natural Resource Management National Park Service
linhanh_cat@nps.gov

Josh Enterkine, BCAL Lab Manager Boise State University
joshenterkine@boisestate.edu