# Eric Gagliano

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## EDUCATION

**PhD in Civil Engineering**
***Data Science Option***
**University of Washington | December 2025**
GPA: 3.96/4.00
Dissertation: *From peak to planet: advancing multi-scale detection of snowmelt timing with satellite radar* [recording]
Advisor: Dr. David Shean

**BSc in Computational Engineering**
***Certificate in Humanitarian Engineering***
**The University of Texas at Austin | May 2020**
GPA: 3.82/4.00

## RESEARCH EXPERIENCE

**Postdoctoral Scholar** January 2026 – Present
***Terrain Analysis and Cryosphere Observation Lab, University of Washington***

- Exploring NISAR L-band SAR integration into existing Sentinel-1 C-band snowmelt workflows to improve wet snow detection and multi-band snowmelt phase delineation.
- Designing scalable cloud-based geospatial data processing and visualization pipelines built on emerging tools such as Icechunk and GitHub Actions, harnessing hundreds of concurrent parallel workers to produce automatically updating, versioned, analysis-ready datasets at global scale.

**Graduate Research Assistant** September 2020 – December 2025
***Terrain Analysis and Cryosphere Observation Lab, University of Washington***

- Developed the first global high-resolution dataset of snowmelt timing, processing ~3.9 million Sentinel-1 SAR satellite scenes to map snowmelt runoff onset across Earth's seasonal snow cover at 80-meter resolution for water years 2015-2024.
- Systematically analyzed ~150 mountain ranges to quantify elevation, aspect, and temperature controls on snowmelt patterns, with validation against 900+ weather stations demonstrating median accuracy of 9 days.
- Published open-source methodology and datasets with applications for water resource management affecting 1+ billion people dependent on mountain snowmelt.

**Undergraduate Research Assistant** September 2018 – May 2020
***Radar Interferometry Group, Center for Space Research, The University of Texas at Austin***

- Researched under Dr. Ann Chen to model seasonal glacial flow in Western Greenland using Interferometry on Synthetic Aperture Radar (SAR) data from Sentinel-1.

- Analyzed Digital Elevation Models (DEM) from ArcticDEM and validated the advertised sensor resolutions using statistical methods.

**Year Round Intern** September 2018 – September 2019
***Autonomy for Hypersonics Group, Sandia National Laboratories***
- Developed method for efficiently correlating SAR images to DEMs in real-time using Computer Vision techniques for use in navigation in GPS-Denied environments.
- Improved cross correlation code run times from 3 hours to 12 seconds using a combination of FFTs, down-sampling, parallelization, and GPU based computations.

**R&D Intern** May 2018 – August 2018
***Center for Analysis Systems and Applications, Sandia National Laboratories***
- Added complexity to an atmospheric cloud generation MATLAB model, focusing on clustering algorithms and global temperature profiles.
- Modernized a large satellite modeling and simulation codebase for better compatibility with current capabilities and input formats.

**Undergraduate Research Assistant** September 2018 – May 2020
***Center for Mechanics of Solids, Structures, and Materials, Aerospace Engineering & Mechanics, The University of Texas at Austin***
- Researched under Dr. Ravi-Chandar to investigate crack propagation and fracture patterns in specific alloys of aluminum (AL6061-O).
- Modeled fracture of AL6061-O in ABAQUS (Finite Element Analysis software), using the Johnson-Cook Damage Model and validated computational model of fracture with Digital Image Correlation in and a hydraulic material test station.

**Student Technician** June 2017 – January 2018
***Modeling and Simulation Group*, *Applied Research Laboratories, The University of Texas at Austin***
- Developed a prototype active sonar ontology to represent target properties during signal processing using TopBraid Composer.
- Performed trade studies and analysis on scenario generation and vehicle dynamics systems for the Army's Games for Training program.

## TEACHING EXPERIENCE

**Predoctoral instructor, Geospatial Data Analysis in Python** Winter 2024, Winter 2025
***Civil & Environmental Engineering, University of Washington***
- Instructor of record for CEE467/CEWA567: Geospatial Data Analysis in Python, a 10-week graduate course covering vector and raster data processing, spatial analysis, and remote sensing applications using Python and open-source geospatial libraries.
- Iteratively refined and updated course materials including Jupyter notebook-based labs, demonstrations, and real-world problem sets focused on snow hydrology, climate reanalysis, and civil/environmental engineering applications in the Western U.S.
- Course evaluations: Winter 2024, Winter 2025.

**Teaching Assistant, Geospatial Data Analysis in Python** Winter 2022, Winter 2023

***Civil & Environmental Engineering, University of Washington***

- Graded weekly labs and final presentations of graduate and undergraduate students (~20-30 in each quarter).
- Assisted students in office hours with lab assignments, debugging code, and project help.

**Teaching and Field Assistant, Advanced Surveying and Geomatics** Autumn 2023, Autumn 2025
***Civil & Environmental Engineering, University of Washington***

- Graded weekly labs and final presentations, assisted with surveying equipment setup and familiarization.

**Undergraduate Teaching Assistant, Introduction to Computer Programming** Fall 2019
***Aerospace Engineering & Mechanics, The University of Texas at Austin***

- Hosted weekly interactive office hours for a class of 80 students to help them debug their C++ and MATLAB code and better understand concepts.

**First year interest group mentor** August 2016 – December 2019
***Aerospace Engineering & Mechanics, The University of Texas at Austin***

- Mentored 60 first year students (over the course of four years) in their academic careers, giving weekly lectures to students on requested topics such as future careers, time management, UT traditions, campus resources, and organized relevant speakers and events.

## FIELD EXPERIENCE

**CUAHSI-SINTER Snow Measurement Field School** January 2026
***Fraser Experimental Forest, Colorado***

- Participated in an intensive field course covering snow pit measurements (including stratigraphy, density, grain classification, liquid water content), distributed snow depth and SWE measurements, and relevant instrumentation.
- Designed and executed a group field campaign to address fine-scale spatial variability of snow depth and liquid water content in a forested area of Berthoud Pass, including field safety planning, data collection, analysis, and presentation.

**Easton Glacier UAV Structure from Motion Survey** September 2020, September 2021
***Mt. Baker, Washington***

- Assisted with my lab's yearly UAV SfM flight over Easton Glacier on Mt. Baker in order to build DEMs to conduct time series analysis on the retreat of Easton Glacier.

**International Summer School in Glaciology** June 2022
***McCarthy, Alaska***

- Participated in an intensive graduate program covering glacier physics, dynamics, remote sensing, and quantitative modeling through daily lectures, computational exercises, and field excursions in McCarthy, Alaska.

- Conducted collaborative research project applying Bayesian parameter estimation and probabilistic programming methods (PyMC3) to calibrate temperature index model parameters against energy balance model outputs using Greenland climate reanalysis data.

## PUBLICATIONS

**In prep**

- **Gagliano, E.,** Shean, D., & Henderson, S. (2026). Global patterns and controls on mountain snowmelt runoff onset from a decade of high-resolution observations, in prep.
- Mower, R., Pflug, J. M., **Gagliano, E.,** Gutmann, E., Cristea, N., & Lundquist, J. D. (2026). Identifying wet pixels for SAR-based SWE retrieval using model output and Sentinel-1 backscatter signals, in prep.

**In review/revision**

- Bennett, M., **Gagliano, E.** (2026) Breaker of images? Synthetic aperture radar and the rise of satellite iconoclasm, *Environment & Planning F*, in review.
- **Gagliano, E.,** Shean, D., & Henderson, S. (2026). A global high-resolution dataset of snowmelt runoff onset timing from Sentinel-1 SAR, 2015-2024, *Earth System Science Data*, in review. [preprint]
- Mirza, B., **Gagliano, E.,** Small, E., Raleigh, M. (2026). Remotely sensed melt fraction enhances streamflow modeling in snow-dominated ungauged Basins with long short-term memory networks, Hydrological Processes, in review.
- Brencher, G., Shean, D., Henderson, S., & **Gagliano, E.** (2026). Accurate snow depth predictions across the Western U.S. using a deep learning model trained on 7 years of airborne lidar snow depth measurements, in review. [preprint]

**2026**

- Kaur, P., Webb, R., Tarricone, J., Rittger, K., McGrath, D., **Gagliano, E.,** et al. (2026). Feasibility mapping of L-band InSAR for SWE retrievals across the Western United States. Geophysical Research Letters, 53, e2025GL120162.
- Rickenbaugh, L., Sproles, E., **Gagliano, E.,** Covino, T., Tuholske, C., & Carroll, R. W. H. (2026). When and Where does Water Originate? Leveraging Stable Water Isotopes and Synthetic Aperture Radar to Assess the Hydrology of a Snow-Dominated Watershed in Southwestern Montana, Remote Sensing Applications: Society and Environment, 101887, 2352-9385.

**2025**

- Detre, A., McGrath, D., **Gagliano, E.,** Bonnell, R., Webb, R., Marshall, H. P., & Shean, D. (2025). Sentinel-1 SAR Estimates of Snowmelt Onset Coincide With SNOTEL Soil Moisture Pulses Across the Western United States. Hydrological Processes, 39(12), e70341.

**2024**

- Hoppinen, Z., Palomaki, R. T., Brencher, G., Dunmire, D., **Gagliano, E.,** Marziliano, A., ... & Marshall, H. P. (2024). Evaluating snow depth retrievals from Sentinel-1 volume scattering over NASA SnowEx sites. The Cryosphere, 18(11), 5407-5430.

**2023**

- **Gagliano, E.,** Shean, D., Henderson, S., & Vanderwilt, S. (2023). Capturing the onset of mountain snowmelt runoff using satellite synthetic aperture radar. Geophysical Research Letters, 50(21), e2023GL105303.
- Rogic, N., Charbonnier, S. J., Garin, F., Dayhoff II, G. W., **Gagliano, E.,** Rodgers, M., ... & Shean, D. (2023). Characterizing and mapping volcanic flow deposits on Mount St. Helens via dual-band SAR imagery. Remote Sensing, 15(11), 2791.

## REVIEWER

- Li, S., Huang, L., Bernhard, P., and Hajnsek, I.: Mapping seasonal snow melting in Karakoram using SAR and topographic data, The Cryosphere, 19, 1621–1639, https://doi.org/10.5194/tc-19-1621-2025
- Ad hoc grant reviewer, National Science Foundation Office of Polar Programs (2026)

## SOFTWARE

- **Gagliano, E.** (2025). easysnowdata (v0.0.22). Zenodo. https://doi.org/10.5281/zenodo.16544705
- Shean, D., **Gagliano, E.,** Brencher, G., Henderson, S., Knuth, F., Binjolkar, M. (2025) GDA_Wi25_jupyterbook: UW Geospatial Data Analysis course https://gda-wi25-jupyterbook.readthedocs.io/en/latest/intro.html
- **Gagliano, E.** (2024). snotel_ccss_stations (Version v1.0) [Computer software]. https://github.com/egagli/snotel_ccss_stations
- **Gagliano, E.** (2024). MODIS_seasonal_snow_mask (Version v1.0) [Computer software]. https://github.com/egagli/MODIS_seasonal_snow_mask
- Hoppinen, Z., Palomaki, R.T., Brencher, G., Dunmire, D., **Gagliano, E.,** Marziliano, A., Tarricone, J. and Marshall, H.P. (2023). spicy-snow: Use Sentinel-1 volumetric scattering at C-band to retrieve snow depths. https://github.com/SnowEx/spicy-snow
- **Gagliano, E.** (2023). generate_sentinel1_local_incidence_angle_maps (Version v1.0) [Computer software]. https://github.com/egagli/generate_sentinel1_local_incidence_angle_maps
- **Gagliano, E.** (2022). SAR Snowmelt Timing Toolbox (Version 1.0.0) [Computer software]. https://doi.org/10.5281/zenodo.7964286

## PRESENTATIONS

- **Global snowmelt timing insights from over 100 TB of satellite imagery and best practices for large-scale geospatial cloud workflows,** invited talk, *Spring 2026 UW Data Science Seminar* [abstract]
- **A global analysis of annual snowmelt runoff onset for the past decade**, oral presentation, *American Geophysical Union Fall 2025 Meeting*
- **A decade of global snowmelt runoff onset from Sentinel-1 SAR**, oral presentation, *Western Snow Conference 2025*
- **Geospatial data analysis at scale**, guest lecture, *Winter quarter 2025 offering of Advanced Remote Sensing and Earth Observation*
- **A decade of global snowmelt variability: insights from a SAR-derived dataset**, poster presentation, *American Geophysical Union Fall 2024 Meeting*

- **A decade of global snowmelt runoff onset from Sentinel-1 SAR**, oral presentation, *Western Snow Conference 2024*
- **Eight years of global snowmelt runoff onset from Sentinel-1 SAR**, oral presentation, *American Geophysical Union Fall 2023 Meeting*
- **Insights from a SAR-derived snowmelt runoff onset record for the Western U.S. from 2015-present**, oral presentation, *Western Snow Conference 2023*
- **Capturing the evolution of mountain snowmelt across the Western US using Synthetic Aperture Radar**, poster presentation, *American Geophysical Union Fall 2022 Meeting*
- **Capturing the evolution of mountain snowmelt across the Western U.S. using Synthetic Aperture Radar**, poster presentation, *NISAR Workshop 2022*
- **Capturing the evolution of mountain snow in the Western U.S. using Synthetic Aperture Radar**, poster presentation, *American Geophysical Union Fall 2021 Meeting*

## SERVICE & LEADERSHIP

**Civil & Environmental Engineering Union Steward**, *UAW Local 4121* 2024–2025
- Represented academic student employees in contract negotiation and enforcement.

**Volunteer counselor, Unit leader, Historical data intern**, *Camp Kesem* 2017–2025
- Supported children affected by a parent's cancer as a counselor at week-long summer camps with both UT and UW chapters; served as unit leader responsible for campers and counselors; personally fundraised over $7,000 for camp; contributed to national organization data infrastructure as a data intern. Emceed the May 2025 "Make the Magic" fundraiser, raising over $33,000, and returned as guest speaker for the 2026 fundraiser.

**Husky Discovery Days volunteer**, *University of Washington* 2024, 2026
- Staffed interactive booths such as "Creating 3D Models Using Drones and Smartphones" and "Measuring Snow in the Mountains", demonstrating how engineers use satellites, drones, and infrared cameras to understand our changing planet.

**(Informal) Social Media Manager** *Terrain Analysis and Cryosphere Observation Lab* 2020–2024
- Launched and managed the lab's Twitter account (@uwTACOlab), growing our reach to 700+ followers by sharing publication updates, lab member highlights, and science communication content.

**Graduate Student Advisory Board member**, *Civil & Environmental Engineering* 2022–2023
- Served on the Undergraduate Education Committee, providing graduate student perspective on undergraduate curriculum and recruitment.

## HACKWEEKS & WORKSHOPS

**Organizer & Project lead, NASA ICESat-2/SnowEx/GeoSMART HackWeek 2024**
- Led snowmelt-timing project developing methods to detect snowmelt onset using Sentinel-1 SAR. [github]

**Project co-lead, GeoSMART HackWeek 2023**
- Co-led crunchy-snow project exploring machine learning approaches for snow property retrieval. [github]

**Project co-lead, SnowEx HackWeek 2022**
- Co-led snowmelt-timing project developing SAR-based snowmelt detection workflows. [github, presentation]

**Participant, IceSat-2 HackWeek 2022**

- Contributed to a project integrating ICESat-2 altimetry and SAR for iceberg detection and maritime risk assessment. [github, presentation]

**Participant, SnowEx HackWeek 2021**

- Participated in project building open-source tools to process airborne UAVSAR data for snow depth estimation. [github, presentation]

## HONORS & AWARDS

**Outstanding Student Presentation Award**, *AGU Fall 2023 Meeting* 2023
**Graduate Student Conference Presentation Award**, *University of Washington* 2023
**Selected for eScience Data Science Incubator**, *eScience Institute* 2023

## GRANTS & FELLOWSHIPS

**UW Data Science Postdoctoral Fellow** 2026
**National Science Foundation Graduate Research Fellowship** 2020

## ADDITIONAL INTERESTS & ACTIVITIES

**Choir:** Member of various choral ensembles at UT and UW, including UT Concert Chorale, UT Collegium Musicum, UW Gospel Choir, UW Chorale. Some notable projects include *Considering Matthew Shepard*, *Mahler's Symphony No. 2*, and performing as a choir backup vocalist for Andrea Bocelli's May 14th, 2023 concert at Climate Pledge Arena in Seattle.
**Intramural sports:** Organized and coached various intramural sports teams for student organizations at UT and the CEE department at UW, Fall 2019 intramural dodgeball champion at UT, and Spring 2023 intramural ultimate frisbee champion at UW.
**Other interests:** Volunteering, reviewing soft serve ice cream, playing gaga ball, participating as a clinical research volunteer for a Type 1 diabetes study, spending time with friends.

For additional information, please email me or check out my undergraduate CV.