# DAVID E. SHEAN

*Curriculum Vitæ*

Civil and Environmental Engineering
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## EDUCATIONAL HISTORY

University of Washington, Seattle, WA
Ph.D., Earth and Space Sciences
June 2016
*Quantifying ice-shelf basal melt and ice-stream dynamics using high-resolution DEM and GPS time series*

Brown University, Providence, RI
Sc.M., Geology
May 2006
*Debris-covered Glaciers on the Earth and Mars: Formation, Evolution and Implications for Recent Climate Change*

Brown University, Providence, RI
Sc.B. with Honors, Geology-Physics/Mathematics
May 2004
*The Origin and Evolution of a Cold-based Tropical Mountain Glacier on Mars: The Pavonis Mons Fan-shaped Deposit*

## EMPLOYMENT HISTORY

University of Washington
Seattle, WA, USA
Department of Civil and Environmental Engineering
Assistant Professor, 2018-present

University of Washington
Seattle, WA, USA
Applied Physics Laboratory, Polar Science Center
Research Associate, 2016-2017

University of Washington
Seattle, WA, USA
Applied Physics Laboratory, Department of Earth and Space Sciences
Research Assistant, 2011-2016

Malin Space Science Systems, Inc.
San Diego, CA, USA
Assistant Staff Scientist, 2007-2011

Boston University
Boston, MA, USA
Earth & Environment Department
Visiting Scholar, 2006-2007

Yellowstone National Park
Mammoth, WY, USA
Geothermal Resources Assistant, 2006

Brown University
Providence, RI, USA
Department of Earth, Environmental, and Planetary Sciences
Research Assistant, 2001-2006

## AWARDS AND HONORS

Grove Karl Gilbert Award for Excellence in Geomorphological Research, 2022, American Association of Geographers (team recognition for *Science* paper on Chamoli disaster)
Innovation Award, 2018, University of Washington
George Edward Goodspeed Geology Award, 2015, UW ESS
Inquisitive Graduate Student Award, 2015, UW ESS
United States Geospatial Intelligence Foundation Scholarship, 2014, USGIF
Outstanding Student Paper Award, 2014, AGU Fall Meeting
Outstanding Student Paper Award, 2012, AGU Fall Meeting
NASA Earth and Space Sciences Fellowship (NESSF), 2012, NASA
NASA Achievement Award: MRO CTX/MARCI science operations team, 2011
Jin Prize, 2004, Brown University
Undergraduate Research and Academics Excellence Award, 2004, Brown University DEEPS
Royce Fellowship, 2003, Brown University
Rhode Island Space Grant Scholarship, 2002, Brown University

## AFFILIATIONS AND OTHER APPOINTMENTS

Adjunct Assistant Professor, Aeronautics & Astronautics (*University of Washington*), 2019-present
Adjunct Assistant Professor, Earth & Space Sciences (*University of Washington*), 2023-present
Affiliate, eScience Institute (*University of Washington*), 2019-present

## PUBLICATIONS

**Refereed archival journal publications**

Google Scholar: https://scholar.google.com/citations?user=oQnXfL4AAAAJ

Citations (as of February 29, 2024): 4085
h-index: 30
i10-index: 43

[1]Ph.D. Student, Chair
[2]Ph.D. Student, Committee member or other significant advising relationship
[3]Postdoc advisee

In review/revision

- Bhushan, S.[1,3], **D. Shean**, Hu, J.[1], Guillet, G.[3], Rounce, D. (2024) Seasonal and annual surface mass balance for debris-covered glaciers in High-Mountain Asia from flow-corrected satellite stereo DEM time series, *Journal of Glaciology*, in revision.
- Brencher, G.[1], Henderson, S., and **Shean, D.** (2024), Removing Atmospheric Noise from InSAR Interferograms in Mountainous Regions with a Convolutional Neural Network, *Computers & Geosciences*, in review.
- Piermattei, L., et al. Observing glacier elevation changes from spaceborne optical and radar sensors–an inter-comparison experiment using ASTER and TanDEM-X data (2024). *The Cryosphere Discuss*, https://doi.org/10.5194/egusphere-2023-2309.

2024

1. Besso, H[2], **D. Shean**, and J. Lundquist (2024), Mountain snow depth retrievals from customized processing of ICESat-2 satellite laser altimetry, *Remote Sensing of Environment*, *300*, 113843, doi:10.1016/j.rse.2023.113843.

2023

2. **Shean, D.**, Swinski, J.P., Smith, B., Sutterley, T., Henderson, S., Ugarte, C., Lidwa, E., and T. Neumann (2023), SlideRule: Enabling rapid, scalable, open science for the NASA ICESat-2 mission and beyond. *Journal of Open Source Software*, 8(81), 4982, doi:10.21105.joss.04982.
3. Hu, J. M.[1], **Shean, D.**, and S. Bhushan[1] (2023), Six Consecutive Seasons of High-Resolution Mountain Snow Depth Maps From Satellite Stereo Imagery, *Geophysical Research Letters*, *50*(24), e2023GL104871, doi:10.1029/2023GL104871.
4. Knuth, F.[1], **D. Shean**, S. Bhushan[1], E. Schwat[2], O. Alexandrov, C. McNeil, A. Dehecq, C. Florentine, and S. O'Neel (2023), Historical Structure from Motion (HSfM): Automated processing of historical aerial photographs for long-term topographic change analysis, *Remote Sensing of Environment*, *285*, 113379, doi:10.1016/j.rse.2022.113379.
5. Gagliano, E.[1], **Shean, D.**, Henderson, S., Vanderwilt, S.[1] (2023) Capturing the Onset of Mountain Snowmelt Runoff Using Satellite Synthetic Aperture Radar, *Geophysical Research Letters*, *50*(21), e2023GL105303, doi:10.1029/2023GL105303.
6. Schwat, E.[2], E. Istanbulluoglu, A. Horner-Devine, S. Anderson, F. Knuth[1], and **D. Shean** (2023), Multi-decadal erosion rates from glacierized watersheds on Mount Baker, Washington, USA, reveal topographic, climatic, and lithologic controls on sediment yields, *Geomorphology*, *438*, 108805, doi:10.1016/j.geomorph.2023.108805.
7. Deschamps-Berger, C., S. Gascoin, **D. Shean**, H. Besso[2], A. Guiot, and J. I. López-Moreno (2023), Evaluation of snow depth retrievals from ICESat-2 using airborne laser-scanning data, *The Cryosphere*, *17*(7), 2779–2792, doi:10.5194/tc-17-2779-2023.
8. Yang, K. [3], John, A.[3], **Shean, D**., Lundquist, J., Sun, Z., Yao, F., Todoran, S. and N. Cristea (2023), High-resolution mapping of snow cover in montane meadows and forests using Planet imagery and machine learning, *Frontiers in Water*, 5:1128758, doi: 10.3389/frwa.2023.1128758.
9. Westoby, M. J., S. A. Dunning, J. L. Carrivick, T. J. Coulthard, K. Sain, A. Kumar, E. Berthier, U. K. Haritashya, **D. E. Shean**, Mohd. F. Azam, K. Upadhyay, M. Koppes, H. R. McCourt, and D. H. Shugar (2023), Rapid fluvial remobilization of sediments

deposited by the 2021 Chamoli disaster, Indian Himalaya, *Geology*, doi:10.1130/G51225.1.

10. Yin, T, Montesano, P.M., Cook, B.D., Chavanon, E., Neigh, C.S.R., **Shean, D.**, Peng, D., Lauret, N., Mkaouar, A., Morton, D.C., Regaieg, O., Zhen, Z., Gastellu-Etchegorry, J-P. (2023) Modeling forest canopy surface retrievals using very high-resolution spaceborne stereogrammetry: (I) methods and comparisons with actual data, *Remote Sensing of Environment*, *298*, 113825, doi:10.1016/j.rse.2023.113825.
11. Yin, T, Montesano, P.M., Cook, B.D., Chavanon, E., Neigh, C.S.R., **Shean, D.**, Peng, D., Lauret, N., Mkaouar, A., Regaieg, O., Zhen, Z., Qin, R., Gastellu-Etchegorry, J-P., Morton, D.C. (2023) Modeling forest canopy surface retrievals using very high-resolution spaceborne stereogrammetry: (II) optimizing acquisition configurations, *Remote Sensing of Environment*, *298*, 113824, doi:10.1016/j.rse.2023.113824.
12. Zheng, W., Bhushan, S.[1], Van Wyk De Vries, M., Kochtitzky, W., **Shean, D.**, Copland, L., Dow, C., Jones-Ivey, R., and F. Pérez (2023), GLAcier Feature Tracking testkit (GLAFT): A statistically- and physically-based framework for evaluating glacier velocity products derived from satellite image feature tracking, *The Cryosphere*, doi:10.5194/tc-2023-38.
13. Rogic, N., S. J. Charbonnier, F. Garin, G. W. Dayhoff II, E. Gagliano[1], M. Rodgers, C. B. Connor, S. Varma, and **D. Shean** (2023), Characterizing and Mapping Volcanic Flow Deposits on Mount St. Helens via Dual-Band SAR Imagery, *Remote Sensing*, *15*(11), 2791, doi:10.3390/rs15112791.

2022

14. Hu, J.M.[1] and **Shean, D**. (2022) Improving Mountain Snow and Land Cover Mapping Using Very-High-Resolution (VHR) Optical Satellite Images and Random Forest Machine Learning Models. *Remote Sens.*, *14*, 4227, doi: 10.3390/rs14174227.
15. John, A.[2], A. F. Cannistra[2], K. Yang[3], A. Tan, **D. Shean**, J. Hille Ris Lambers, and N. Cristea (2022), High-Resolution Snow-Covered Area Mapping in Forested Mountain Ecosystems Using PlanetScope Imagery, *Remote Sensing*, 14(14), 3409, doi:10.3390/rs14143409.
16. Meyer, J.[2], J. S. Deems, K. J. Bormann, D. E. Shean, and S. M. Skiles (2022), Mapping snow depth and volume at the alpine watershed scale from aerial imagery using Structure from Motion, *Frontiers in Earth Science*, 10, doi: 10.3389/feart.2022.989792.
17. Van Wyk de Vries, M., S. Bhushan[1], M. Jacquemart, C. Deschamps-Berger, E. Berthier, S. Gascoin, **D. E. Shean**, D. H. Shugar, and A. Kääb (2022), Pre-collapse motion of the February 2021 Chamoli rock–ice avalanche, Indian Himalaya, *Natural Hazards and Earth System Sciences*, *22*(10), 3309–3327, doi:10.5194/nhess-22-3309-2022.

2021

18. Shugar, D. H., M. Jacquemart, **D. Shean**, S. Bhushan[1], and 49 others (2021), A massive rock and ice avalanche caused the 2021 disaster at Chamoli, Indian Himalaya, *Science*, 373(6552), 300–306, doi:10.1126/science.abh4455.
19. Bhushan, S.[1], **Shean, D.**, Alexandrov, O., & Henderson, S. (2021). Automated digital elevation model (DEM) generation from very-high-resolution Planet SkySat triplet stereo and video imagery. *ISPRS Journal of Photogrammetry and Remote Sensing*, 173, 151–165. https://doi.org/10.1016/j.isprsjprs.2020.12.012.
20. Cannistra, A. F.[2], **Shean, D. E.**, & Cristea, N. C. (2021). High-resolution CubeSat imagery and machine learning for detailed snow-covered area. *Remote Sensing of Environment*, 258, 112399. https://doi.org/10.1016/j.rse.2021.112399.

21. Rounce, D. R., Hock, R., McNabb, R. W., Millan, R., Sommer, C., Braun, M. H., Malz, P., Maussion, F., Mouginot, J., Seehaus, T.C. and **Shean, D.E.** (2021). Distributed global debris thickness estimates reveal debris significantly impacts glacier mass balance. *Geophysical Research Letters*, 48, e2020GL091311. https://doi.org/10.1029/2020GL091311.
22. Anderson, S. W., and **D. Shean** (2021), Spatial and temporal controls on proglacial erosion rates: a comparison of four basins on Mount Rainier, 1960 to 2017, *Earth Surface Processes and Landforms*, doi:10.1002/esp.5274.
23. Mohajerani, Y.[3], **D. Shean**, A. Arendt, and T. C. Sutterley (2021), Automated Dynamic Mascon Generation for GRACE and GRACE-FO Harmonic Processing, *Remote Sensing*, 13(16), 3134, doi:10.3390/rs13163134.
24. Mishra, S. K., S. Rupper, S. Kapnick, K. Casey, H. G. Chan, E. Ciraci, U. Haritashya, J. Hayse, J. S. Kargel, R. B. Kayastha, N. Y. Krakauer, S. V. Kumar, R. B. Lammers, V. Maggioni, S. A. Margulis, M. Olson, B. Osmanoglu, Y. Qian, S. McLarty, K. Rittger, D. R. Rounce, **D. Shean**, I. Velicogna, T. D. Veselka, and A. Arendt (2021), Grand Challenges of Hydrologic Modeling for Food-Energy-Water Nexus Security in High Mountain Asia, *Frontiers in Water*, *3*, 123, doi:10.3389/frwa.2021.728156.

2020

25. **Shean, D. E.**, S. Bhushan[1], P. Montesano, D. R. Rounce, A. Arendt, and B. Osmanoglu (2020), A Systematic, Regional Assessment of High Mountain Asia Glacier Mass Balance, *Front. Earth Sci.*, *7*, doi:10.3389/feart.2019.00363.
26. Joughin, I., **D. E. Shean**, B. E. Smith, and D. Floricioiu (2020), A decade of variability on Jakobshavn Isbræ: ocean temperatures pace speed through influence on mélange rigidity, *The Cryosphere*, *14*(1), 211–227, doi:10.5194/tc-14-211-2020.
27. Rounce, D. R., R. Hock, and **D. E. Shean** (2020), Glacier Mass Change in High Mountain Asia Through 2100 Using the Open-Source Python Glacier Evolution Model (PyGEM), *Front. Earth Sci.*, *7*, doi:10.3389/feart.2019.00331.
28. Rounce, D. R., T. Khurana, M. B. Short, R. Hock, **D. E. Shean**, and D. J. Brinkerhoff (2020), Quantifying parameter uncertainty in a large-scale glacier evolution model using Bayesian inference: application to High Mountain Asia, *J. Glaciol.*, 1–13, doi:10.1017/jog.2019.91.
29. Deschamps-Berger, C., S. Gascoin, E. Berthier, J. Deems, E. Gutmann, A. Dehecq, **D. Shean**, and M. Dumont (2020), Snow depth mapping from stereo satellite imagery in mountainous terrain: evaluation using airborne laser-scanning data. *The Cryosphere*, *14*(9), 2925–2940. https://doi.org/10.5194/tc-14-2925-2020
30. Dehecq, A., Gardner, A. S., Alexandrov, O., McMichael, S., Hugonnet, R., **Shean, D.**, and Marty, M. (2020). Automated Processing of Declassified KH-9 Hexagon Satellite Images for Global Elevation Change Analysis Since the 1970s. *Frontiers in Earth Science*, *8*. https://doi.org/10.3389/feart.2020.566802.
31. Brun, F., Treichler, D., **Shean, D.**, and Immerzeel, W. W. (2020). Limited Contribution of Glacier Mass Loss to the Recent Increase in Tibetan Plateau Lake Volume. *Frontiers in Earth Science*, *8*. https://doi.org/10.3389/feart.2020.582060.

2019

32. **Shean, D. E.**, I. R. Joughin, P. Dutrieux, B. E. Smith, and E. Berthier (2019), Ice shelf basal melt rates from a high-resolution digital elevation model (DEM) record for Pine Island Glacier, Antarctica, *The Cryosphere*, *13*(10), 2633–2656, doi:10.5194/tc-13-2633-2019.

33. McGrath, D., R. Webb, **D. Shean**, R. Bonnell, H.-P. Marshall, T. H. Painter, N. P. Molotch, K. Elder, C. Hiemstra, and L. Brucker (2019), Spatially extensive ground-penetrating radar snow depth observations during NASA's 2017 SnowEx Campaign: Comparison with in situ, airborne, and satellite observations, *Water Resour. Res.*, *55*, 10,026–10,036, doi:10.1029/2019WR024907.
34. Menounos, B., R. Hugonnet, **D. Shean**, A. Gardner, I. Howat, E. Berthier, B. Pelto, C. Tennant, J. Shea, M.-J. Noh, F. Brun, and A. Dehecq (2019), Heterogeneous Changes in Western North American Glaciers Linked to Decadal Variability in Zonal Wind Strength, *Geophys. Res. Lett.*, *46*(1), 200–209, doi:10.1029/2018GL080942.
35. Loomis, B. D., A. S. Richey, A. A. Arendt, R. Appana, Y.-J. C. Deweese, B. A. Forman, S. V. Kumar, T. J. Sabaka, and **D. E. Shean** (2019), Water Storage Trends in High Mountain Asia, *Front. Earth Sci.*, *7*, doi:10.3389/feart.2019.00235.
36. Kirschbaum, D., C. S. Watson, D. R. Rounce, D. H. Shugar, J. S. Kargel, U. K. Haritashya, P. Amatya, **D. Shean**, E. R. Anderson, and M. Jo (2019), The State of Remote Sensing Capabilities of Cascading Hazards Over High Mountain Asia, *Front. Earth Sci.*, *7*, doi:10.3389/feart.2019.00197.
37. Olson, M., S. Rupper, and **D. E. Shean** (2019), Terrain Induced Biases in Clear-Sky Shortwave Radiation Due to Digital Elevation Model Resolution for Glaciers in Complex Terrain, *Front. Earth Sci.*, *7*, doi:10.3389/feart.2019.00216.

2018

38. Lilien, D., Joughin, I., Smith B., and **D. Shean** (2018), Changes in flow of Crosson and Dotson ice shelves, West Antarctica, in response to elevated melt, *The Cryosphere*, 12, 1415-1431, 10.5194/tc-12-1415-2018.
39. Rounce, D.R., King, O., McCarthy, M., **Shean, D.E.,** Salerno, F. (2018), Quantifying Debris Thickness of Debris-Covered Glaciers in the Everest Region of Nepal Through Inversion of a Subdebris Melt Model, *J. Geophys. Res. Earth Surf.*, 2017JF004395, doi:10.1029/2017JF004395.
40. Haritashya, U., Kargel, J., Shugar, D., Leonard, G., Strattman, K., Watson, C.S., **Shean, D.**, Harrison, S., Mandli, K., Regmi, D. (2018) Evolution and controls of large glacial lakes in the Nepal Himalaya, *Remote Sensing*, *10*(5), 798, doi:10.3390/rs10050798.

2017

41. **Shean, D. E.,** K. Christianson, K. M. Larson, S. R. M. Ligtenberg, I. R. Joughin, B. E. Smith, C. M. Stevens, M. Bushuk, and D. M. Holland (2017), GPS-derived estimates of surface mass balance and ocean-induced basal melt for Pine Island Glacier ice shelf, Antarctica, *The Cryosphere*, 11(6), 2655–2674, doi:10.5194/tc-11-2655-2017.
42. Kehrl, L. M., I. Joughin, **D. E. Shean**, D. Floricioiu, and L. Krieger (2017), Seasonal and interannual variabilities in terminus position, glacier velocity, and surface elevation at Helheim and Kangerlussuaq Glaciers from 2008 to 2016: Helheim and Kangerlussuaq Glaciers, *J. Geophys. Res. Earth Surf.*, 122(9), 1635–1652, doi:10.1002/2016JF004133.
43. Bingham, R. G., D. G. Vaughan, E. C. King, D. Davies, S. L. Cornford, A. M. Smith, R. J. Arthern, A. M. Brisbourne, J. Rydt, A. G. C. Graham, M. Spagnolo, O. J. Marsh, and **D. E. Shean** (2017), Diverse landscapes beneath Pine Island Glacier influence ice flow, *Nature Communications*, 8(1), 1618, doi:10.1038/s41467-017-01597-y.

2016

44. **Shean, D. E.**, O. Alexandrov, Z. Moratto, B. E. Smith, I. R. Joughin, C. C. Porter, Morin, P. J. (2016), An automated, open-source pipeline for mass production of digital elevation models (DEMs) from very high-resolution commercial stereo satellite imagery, *ISPRS J. Photogramm. Remote Sens*, *116*, 101–117, doi:10.1016/j.isprsjprs.2016.03.012.

45. Joughin, I., **D. E. Shean**, B. E. Smith, and P. Dutrieux (2016), Grounding line variability and subglacial lake drainage on Pine Island Glacier, Antarctica, *Geophys. Res. Lett.*, *43*(17), 9093–9102, doi:10.1002/2016GL070259.
46. Christianson, K., Bushuk, M., Dutrieux, P., Parizek, B.R., Joughin, I.R., Alley, R.B., **Shean, D.E.**, Abrahamsen, E.P., Anandakrishnan, S., Heywood, K.J., Kim, T., Lee, S.H., Nicholls, K., Stanton, T., Truffer, M., Webber, B.G.M., Jenkings, A., Jacobs, S., Bindschadler, R., Holland, D.M. (2016), Sensitivity of Pine Island Glacier to observed ocean forcing: PIG response to ocean forcing, *Geophys. Res. Lett*., 43(20), 10,817-10,825, doi:10.1002/2016GL070500.
47. Pope, A., Scambos, T.A., Moussavi, M., Tedesco, M., Willis, M., **Shean, D.E.**, Grigsby, S. (2016), Estimating supraglacial lake depth in West Greenland using Landsat 8 and comparison with other multispectral methods, *The Cryosphere*, 10, 15-27, doi:10.5194/tc-10-15-2016.

2015

48. Allstadt, K.E., **Shean, D.E.**, Campbell, A., Fahnestock, M., Malone, S.D. (2015), Observations of seasonal and diurnal glacier velocities at Mount Rainier, Washington using terrestrial radar interferometry, *The Cryosphere*, 9, 2219-2015, doi:10.5194/tc-9-2219-2015.
49. Stevens, L.A., Behn, M.D., McGuire, J.J., Das, S.B., Joughin, I., Herring, T., **Shean, D.E.**, M. A. King (2015), Greenland supraglacial lake drainages triggered by hydrologically induced basal slip, *Nature*, 522, 7554, 73-76, doi:10.1038/nature14480.

2014

50. Joughin, I., Smith, B.E., **Shean, D.E.**, Floricioiu, D. (2014), Brief Communication: Further summer speedup of Jakobshavn Isbrae, *The Cryosphere*, 8, 209-214, doi:10.5194/tc-8-209-2014.

2010

51. **Shean, D.E.** and D.R. Marchant (2010), Seismic and GPR surveys of Mullins Glacier, McMurdo Dry Valleys, Antarctica: ice thickness, internal structure and implications for surface ridge formation, *Journal of Glaciology*, 56(195), 48-64, doi:10.3189/002214310791190901.
52. **Shean, D.E.** (2010), Candidate ice-rich fill material within equatorial craters on Mars, *Geophysical Research Letters*, 37, L24202, doi:10.1029/2010GL045181.
53. **Harrison, T.N.,** M.C. Malin, K.S. Edgett, **D.E. Shean**, M.R. Kennedy, L.J. Lipkaman, B.A. Cantor, and L.V. Posiolova (2010), Impact-Induced Overland Fluid Flow and Channelized Erosion at Lyot Crater, Mars. *Geophysical Research Letters*, 37, L21201, doi:10.1029/2010GL045074.

2009

54. Byrne, S., C. M. Dundas, M. R. Kennedy, M. T. Mellon, A. S. McEwen, S. C. Cull, I. J. Daubar, **D. E. Shean**, K. D. Seelos, S. L. Murchie, B A. Cantor, R. E. Arvidson, K. S. Edgett, A. Reufer, N. Thomas, T. N. Harrison, L. V. Posiolova, and F. P. Seelos (2009), Distribution of Mid-Latitude Ground Ice on Mars from New Impact Craters, *Science* 325, 1674–1676, doi:10.1126/science.1175307.

2007

55. **Shean, D.E.**, J.W. Head, and D.R. Marchant (2007), Shallow seismic surveys and ice thickness estimates of the Mullins Valley debris-covered glacier, McMurdo Dry Valleys, Antarctica, *Antarctic Science*, 19(4), 485-496, doi:10.1017/S0954102007000624.

56. **Shean, D.E.**, J.W. Head, J. Fastook, and D.R. Marchant (2007), Recent glaciation at high elevations on Arsia Mons, Mars: Implications for the formation and evolution of large tropical mountain glaciers, *Journal of Geophysical Research*, 112(E03004), doi:10.1029/2006JE002761.

2006

57. **Shean, D.** (2006), Norris geyser basin's dynamic hydrothermal features: Using historical aerial photographs to detect change, *Yellowstone Science*, 14(4), 24-28.
58. Forsberg, A., Prabhat, G. Haley, A. Bragdon, J. Levy, C.I. Fassett, **D. Shean**, J.W. Head III, S. Milkovich, M.A. Duchaineau (2006), Adviser: Immersive field work for planetary geoscientists, *IEEE Computer Graphics and Applications*, *26(4)*, 46-54, doi:10.1109/MCG.2006.73.

2005

59. **Shean, D.E.**, J.W. Head, and D.R. Marchant (2005), Origin and evolution of a cold-based tropical mountain glacier on Mars: The Pavonis Mons Fan-shaped Deposit, *Journal of Geophysical Research*, 110(E05001), doi:10.1029/2004JGRE002360.

**Conference proceedings and other non-journal articles (selected)**

- ***Refereed by abstract only***
  - B. Osmanoglu, T. H. Painter, **D. Shean**, A. Arendt, J. Kargel and S. A. Margulis, Remote sensing of the cryosphere in high mountain Asia, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Fort Worth, TX, 2017, pp. 2813-2816, doi:10.1109/IGARSS.2017.8127583.
  - **Shean, D.E**., Joughin, I., Floriciouiu, D., Smith, B., Moratto, Z., Alexandrov, O., Morin, P., and Porter, C. (2014). A 2008-2013 Time Series of TanDEM-X and WorldView-1/2 Stereo DEMs for Jakobshavn Isbrae, Greenland, *IGARRS* 2014, TH4.01.5.
  - **Shean, D.E.**, J. Fahle, M.C. Malin, L.J. Edwards, L. Posiolova (2011), MRO CTX stereo image processing and preliminary DEM quality assessment, *Abstracts submitted to the 42nd Lunar and Planetary Science Conf.*, #2646.
  - **Shean, D.E.** (2010), Evidence for widespread removal of martian mid-latitude "fill" material, *Abstracts submitted to the 41st Lunar and Planetary Science Conf.*, #1509.
  - Marchant, D.R., W.M. Phillips, J.M. Schaefer, J.L. Fastook, **D.E. Shean**, J.W. Head, D.E. Kowalewski, and A.R. Lewis (2007), Establishing a chronology for the world's oldest glacier ice, *Antarctica: A Keystone in a Changing World – Online Proceedings of the 10th ISAES X*, edited by A.K. Cooper and C.R. Raymond et al., USGS Open-File Report 2007-1047, Extended Abstract #054.
  - **Shean, D.E.**, J.W. Head, M. Kreslavsky, G. Neukum, and the HRSC Co-Investigator Team (2006), When were glaciers present in Tharsis? Constraining age estimates for the Tharsis Montes fan-shaped deposits, *Abstracts submitted to the 37th Lunar and Planetary Science Conf.*, #2092.

**Non-refereed papers, technical reports**

1. Zokaei Ashtiani, M.; Muench, S.; Shean, D. (2020), Remote Sensing Application in Surveying Statewide Asphalt Pavement Aggregate Stockpile Inventory, Preprints 2020, doi:10.20944/preprints202012.0330.v1.

## Other significant research dissemination

### Open Datasets

1. Hu, J. M. and D. Shean. (2024). SnowEx Colorado 3M Snow Depth Time Series and DEMs from High-Resolution Satellite Image Pairs, Version 1 [Data Set] https://doi.org/10.5067/7QCNCHVQMCI8.
2. Hu, J. M. and **D. Shean.** (2023). Land Cover Classification, Snow Cover, and Fractional Snow-Covered Area Maps from Maxar WorldView Satellite Images, Version 1 [Data Set]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/USXB6X9CD4Q2.
3. Knuth. F. and **D. Shean.** (2022). Historical digital elevation models (DEMs) and orthoimage mosaics for North American Glacier Aerial Photography (NAGAP) program, version 1.0 [Data set]. In Remote Sensing of Environment: Vol. Volume 285 (1.0). Zenodo. https://doi.org/10.5281/zenodo.7297154
4. **Shean, D.**, Bhushan, S., Berthier, E., Deschamps-Berger, C., Gascoin, S., Knuth, F., 2021, Chamoli Disaster Post-event 2-m DEM Composite (February 10-11, 2021) and Difference Map, http://doi.org/10.5281/zenodo.4558692
5. Bhushan, S., **Shean, D.**, 2021, Chamoli Disaster Pre-event 2-m DEM Composite: September 2015, http://doi.org/10.5281/zenodo.4554647
6. McNeil, C. J., Florentine, C. E., Bright, V. A. L., Fahey, M. J., McCann, E., Larsen, C. F., Thoms, E. E., **Shean, D. E.**, McKeon, L. A., March, R. S., Keller, W., Whorton, E. N., O'Neel, S.,and Baker, E. H., 2019, Geodetic data for USGS benchmark glaciers: orthophotos, digital elevation models, and glacier boundaries (ver 1.0, September 2019): U.S. Geological Survey data release, doi:10.5066/P9R8BP3K.
7. **Shean, D.** 2017. High Mountain Asia 8-meter DEM Mosaics Derived from Optical Imagery, Version 1. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi:10.5067/KXOVQ9L172S2.
8. **Shean, D.** 2017. High Mountain Asia 8-meter DEMs Derived from Along-track Optical Imagery, Version 1. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi: 10.5067/GSACB044M4PK.
9. **Shean, D.** 2017. High Mountain Asia 8-meter DEMs Derived from Cross-track Optical Imagery, Version 1. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. doi:10.5067/0MCWJJH5ABYO.

### Software

1. JP Swinski, Eric Lidwa, Tyler Sutterley, Scott Henderson, David Shean, Carlos E. Ugarte, James (Jake) Gearon, Alexey Shiklomanov, Joseph H Kennedy, Pangeo Bot, & Romain Hugonnet. (2024). ICESat2-SlideRule/sliderule: v4.2.3 (v4.2.3). Zenodo. https://doi.org/10.5281/zenodo.10534564
2. David Shean, Shashank Bhushan, David Lilien, Friedrich Knuth, Eli Schwat, Joachim Meyer, Meghan Sharp, & Michelle Hu. (2023). dshean/demcoreg: v1.1.1 Compatibility and doc improvements (v1.1.1). Zenodo. https://doi.org/10.5281/zenodo.7730376
3. David Shean, David Lilien, Daniel Otto, & Chris McNeil. (2023). dshean/pygeotools: v1.1.0 Compatibility updates (v1.1.0). Zenodo. https://doi.org/10.5281/zenodo.7730282
4. Shashank Bhushan, David Shean, Oleg Alexandrov, & Scott Henderson, skysat_stereo. (2021, January 7). uw-cryo/skysat_stereo: Zenodo doi revision updates (Version 0.2). Zenodo. http://doi.org/10.5281/zenodo.4422248
5. Anthony Arendt, Jessica Scheick, **David Shean**, Ellen Buckley, Shane Grigsby, Charley Haley, Lindsey Heagy, Yara Mohajerani, Tom Neumann, Johan Nilsson, Thorsten Markus, Fernando Paolo, Fernando Perez, Alek Petty, Axel Schweiger, Ben Smith, Amy

Steiker, Sebastian Alvis, Scott Henderson, Nick Holschuh, Zheng Liu, Tyler Sutterley. (2020). ICESAT-2HackWeek/2020_ICESat-2_Hackweek_Tutorials (Version 1.0). Zenodo. http://doi.org/10.5281/zenodo.3966463

6. Arendt, A., Smith, B., Shean, D., Steiker, A., Petty, A., Perez, F., Henderson, S., Paolo, F., Nilsson, J., Becker, M., Adusumilli, S., Shapero, D., Wallin, B., Schweiger, A., Dickinson, S., Hoschuh, N., Siegfried, M., Neumann, T. (2019), ICESAT-2HackWeek/ICESat2_hackweek_tutorials (Version 1.0), https://github.com/ICESAT-2HackWeek/ICESat2_hackweek_tutorials, doi:10.5281/zenodo.3360994.
7. David Shean, & Shashank Bhushan. (2023). dshean/vmap: v1.1.0 Compatibility updates (v1.1.0). Zenodo. https://doi.org/10.5281/zenodo.7730146
8. David Shean, & Shashank Bhushan. (2020). dshean/hma_mb_paper: Release for accepted article (v1.0). Zenodo. https://doi.org/10.5281/zenodo.3600624
9. David Shean, & Shashank Bhushan. (2019). dshean/gmbtools: Frontiers submission (1.1.0). Zenodo. https://doi.org/10.5281/zenodo.3451308
10. David Shean. (2019). dshean/tandemx: Update for Zenodo DOI tracking (v1.1). Zenodo. https://doi.org/10.5281/zenodo.3451468

**Selected Press**

**1.** Large glacier near Seattle has ‘completely disappeared,’ says researcher who has tracked it for years, *CNN*, https://www.cnn.com/2023/02/01/us/washington-hinman-glacier-disappear-climate/index.html, February 1, 2023
2. A mountain of learning: students practice drone surveying techniques at Mount Baker, UW CEE Bridge, https://www.ce.washington.edu/news/article/2022-05-16/mountain-learning, May 2022.
3. Washington's benchmark glacier is shrinking, *KING5*, https://www.king5.com/article/tech/science/environment/washingtons-glaciers-melting/281-b69f0fee-5e4d-4a37-b59a-b7fdbffc6e03, February 2022.
4. In North Cascades, researchers, climbers watch Washington’s snowpack quickly melt, exposing glaciers’ retreat, *Seattle Times*, https://www.seattletimes.com/seattle-news/washingtons-fast-shrinking-glaciers-under-watchful-eyes-of-researchers-climbers/, September 2021.
5. How is the ‘snowiest place on Earth’ faring in this record-hot summer? It’s a little rocky on Rainier, *Geekwire*, https://www.geekwire.com/2021/snowiest-place-earth-faring-record-hot-summer-gotten-little-rocky/, August 2021.
6. Cause, scope determined for deadly winter debris flow in Uttarakhand, India, *UW News*, https://www.washington.edu/news/2021/06/10/cause-scope-determined-for-deadly-winter-debris-flow-in-uttarakhand-india/, June 2021.
7. Peering into snow, November 2020, *UW Aeronautics & Astronautics*, https://www.aa.washington.edu/news/article/2020-11-23/peering-snow
8. Can trees clean up jet pollution? *UW DEOHS*, 2020 https://deohs.washington.edu/edge/blog/can-trees-clean-jet-pollution
9. Stirring the imagination, August 2020, *UW-IT Innovators Archive*, https://www.washington.edu/trends/jupyter-notebooks-electrify-geospatial-data-analysis-class/
10. Asia's vital rivers, *National Geographic*, July 2020, https://www.nationalgeographic.com/magazine/2020/07/asias-vital-rivers-perpetual-feature/
11. Glaciers Across Time, *UW IT: A Year in Partnerships*, https://www.washington.edu/uwit/partnerships-2019/cloud-computing-climate-change/

12. One of the snowiest places on Earth is losing its glaciers, *National Geographic*, May 2019, https://www.nationalgeographic.com/magazine/2019/05/map-of-mt-rainier-shows-glacier-loss-climate-change/
13. Decade of heavy storms has helped Northwest glaciers, but don't expect that to last, studies show, *Seattle Times*, 2019 (paragraph one of front page, https://www.seattletimes.com/seattle-news/environment/decade-of-heavy-storms-has-helped-northwest-glaciers-but-dont-expect-trend-to-last-studies-show/), similar coverage in *The Guardian*, *KNKX*
14. Mountain glaciers shrinking across the West, *UW News*, http://www.washington.edu/news/2017/10/20/mountain-glaciers-shrinking-across-the-west/
15. TV/Radio Interviews on Pacific Northwest glaciers with *KING5*, *KPLU*, *KNKX*, 2015-2016

**Patents submitted and/or awarded**

1. Christopher Rudasill-Neigh, Mark Carroll, David Shean, Matthew Macander, Alexei Lyapustin, Oleg Alexandrov, Dan Slayback, Paul Montesano, Margaret Wooten, Roger Gill (2020), *Application Programming Interface (API) for Producing High-resolution Commercial Validation Products*, Application Serial No. 17/027,823.

## MISCELLANEOUS

**Outside Professional Work for Compensation (1460s)**

| Name of Organization | Start Date | End Date | Number of Days | Description of Activity |
|---|---|---|---|---|
| AECOM | April 2016 | November 2016 | ~60 | Consulting to prepare satellite and airborne remote sensing datasets for remote sites in Alaska |

## OTHER SCHOLARLY ACTIVITY

**Invited lectures and seminars**

1. UW CS4Env Seminar, February 2024
2. Keynote, NSF EarthCube Advancing the Analysis of High-Resolution Topography (HRT) Workshop, May 2023
3. Mt. Rainier Glacier Workshop, March 2023
4. Planet Town Hall, Fall AGU Meeting, December 2022
5. UW CEE Seminar, November 2022
6. NASA Headquarters ICESat-2 Mission Extension review, February 2022
7. UW SPARC Panel: Space Design for Social Good, October 2021
8. Planet Explore 2021, Planet SkySat Stereo: 4D surveys of Planet Earth, October 2021 (with PhD student Shashank Bhushan)

9. NASA ICESat-2 Science Team Meeting, September 2021
10. UW TechConnect Conference, August 2020
11. NASA JPL, Sea Level Rise Seminar, July 2018
12. American Meteorological Society Webinar, April 2018
13. DigitalGlobe, Inc. Seminar, August 2017
14. University of Oregon, Dept of Earth Sciences, June 2017
15. University of Washington, Civil and Environmental Engineering, March 2017
16. USGS Washington Water Science Center, 2017
17. University of Texas Institute for Geophysics, February 2017
18. Ph.D. Defense, Seattle, Washington, June 2016
19. Mt. Rainier National Park Superintendent Briefing, Ashford, WA, December 2015
20. NSF Headquarters, Office of Polar Programs, March 2014
21. U.S. Civil Applications Committee (CAC), March 2014
22. UW CSE Graphics and Imaging Lab (GRAIL) Seminar, May 2014
23. USGS Cascades Volcano Observatory Seminar, May 2013

**Presentations given at conferences**

1. Shean, D.E. et al., invited oral and submitted oral presentation, *AGU fall meeting*, San Francisco, CA, Dec. 2023
2. Shean, D.E. et al., panel, *NASA Surface Topography and Vegetation (STV) Community Workshop*, Pasadena, CA November 2023
3. Shean, D.E. et al., oral presentation, *NASA Surface Topography and Vegetation (STV) Workshop*, Lake Tahoe, CA, June 2023
4. Shean, D.E. et al., oral presentation, NASA Goddard, *CSDAP BlackSky Evaluation Team Meeting*, January 2023
5. Shean, D.E. et al., poster presentation, *AGU fall meeting*, Chicago, IL, Dec. 2022
6. Shean, D.E. et al., oral presentation, *AGU fall meeting*, New Orleans, LA, Dec. 2021
7. Shean, D.E. et al., poster presentation, *AGU fall meeting*, San Francisco, CA, Dec. 2020
8. Shean, D.E. et al., oral presentation, *Northwest Glaciologists Meeting*, Oct. 2020
9. Shean, D.E. et al., oral presentation, *AGU fall meeting*, San Francisco, CA, Dec. 2019
10. Shean, D.E. et al., oral presentation, *Northwest Glaciologists Meeting*, Corvallis, OR, Oct. 2019
11. Shean, D.E. et al., oral presentation, *NASA SnowEx meeting*, Baltimore, MD, Sept. 2019
12. Shean, D.E. et al., invited oral presentation, *NASA Commercial Data Program*, Rockville, MD, May 2019
13. Shean, D.E. et al., oral presentation, *NASA HiMAT meeting*, University of Maryland, March 2019
14. Shean, D.E. et al., invited oral presentation, *Pacific Lutheran University Mt. Rainier Workshop*, 2019
15. Shean, D.E. et al., oral presentation, *NASA/CAS HiMAT meeting*, Chengdu, China, May 2018
16. Shean, D.E. et al., oral presentation, *NASA HiMAT meeting*, Seattle, WA, 2018
17. Shean, D.E. et al., oral presentation, *AGU Fall meeting*, San Francisco, CA, Dec. 2017
18. Shean, D.E. et al., invited oral presentation, *GSA annual meeting*, Seattle, WA, Oct 2017
19. Shean, D.E. et al., oral presentation, *West Antarctic Ice Sheet Meeting*, 2017
20. Shean, D.E. et al., oral presentation, *NASA SnowEx Meeting*, Longmont, CO, Aug 2017
21. Shean, D.E. et al., oral presentations, *NASA/CAS HiMAT meeting*, Juneau, AK, May 2017
22. Shean, D.E. et al., invited oral presentation, *Pacific Lutheran University Mt. Rainier Workshop*, 2017
23. Shean, D.E. et al., invited oral and submitted oral presentations, *AGU Fall meeting*, San Francisco, CA, Dec. 2016

24. Shean, D.E. et al., invited oral presentation, *NASA High Mountain Asia Workshop*, 2016
25. Shean, D.E. et al., oral presentation, *NASA High Mountain Asia Team Meeting*, NASA GSFC, 2016
26. Shean, D.E. et al., oral presentation, *International Glaciological Society (IGS) Ice/Ocean Symposium*, La Jolla, CA, July 2016
27. Shean, D.E. et al., invited oral and submitted oral presentations, *AGU Fall meeting*, San Francisco, CA, Dec. 2015
28. Shean, D.E. et al., oral presentation, *AGU Fall meeting*, San Francisco, CA, Dec. 2014
29. Shean, D.E. et al., oral presentation, *Northwest Glaciologists Meeting*, Portland, OR, 2014
30. Shean, D.E. et al., invited oral presentation, *NSF/NASA Polar Glacial/Geophys. Instrumentation Workshop*, Maryland, 2014
31. Shean, D.E. et al., oral presentation, *Free & Open Source Software For Geo (FOSS4G) Conf.*, Portland, OR, 2014
32. Shean, D.E. et al., oral presentation, *W.M. Keck Workshop:* Gazing at the Solar System, CalTech, 2014
33. Shean, D.E. et al., invited oral presentation, *IEEE Int'l Geoscience and Remote Sensing Symp*. (IGARRS), Quebec City, QB, 2014
34. Shean, D.E. et al., oral presentation, *ASPRS Annual Conference*, 2013
35. Shean, D.E. et al., oral presentation, *AGU Fall meeting*, San Francisco, CA, Dec. 2013
36. Shean, D.E. et al., oral presentation, *Northwest Glaciologists Meeting*, Vancouver, BC, 2013
37. Shean, D.E. et al., poster presentation, *AGU Fall meeting*, San Francisco, CA, Dec. 2012
38. Shean, D.E. et al., oral presentation, *Northwest Glaciologists Meeting*, Seattle, WA, 2012
39. Shean, D.E. et al., oral presentation, *Northwest Glaciologists Meeting*, Portland, OR, 2011
40. Shean, D.E. et al., oral presentation, *AGU Fall meeting*, San Francisco, CA, Dec. 2010
41. Shean, D.E. et al., oral presentation, *Lunar and Planetary Science Conference (LPSC*), Houston, TX, 2006
42. Shean, D.E. et al., poster presentation, *Lunar and Planetary Science Conference (LPSC*), Houston, TX, 2005
43. Shean, D.E. et al., poster presentation, 6$^{th}$ International Mars Conference, Pasadena, CA, 2004
44. Shean, D.E. et al., poster presentation, *Lunar and Planetary Science Conference (LPSC*), Houston, TX, 2004
45. Shean, D.E. et al., oral presentation, *Lunar and Planetary Science Conference (LPSC*), Houston, TX, 2003

**Professional society memberships**

1. Member, American Geophysical Union, 2010-present
2. Member, American Society for Photogrammetry and Remote Sensing, 2014-present
3. Member, International Glaciological Society, 2011-2014
4. Sigma Xi (Scientific Research Honor Society), 2005-present

**Other**

**Reviewer**

- *The Cryosphere*, 2024, 2020, 2017, 2016
- *Geophysical Research Letters*, 2023
- *Journal of Glaciology*, 2020, 2018, 2012
- *Water Resources Research*, 2019
- *Transactions on Geoscience and Remote Sensing*, 2017
- *Oceanography*, 2016

- *Icarus*, 2016, 2014
- *Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 2014
- *Progress in Physical Geography*, 2013

**Extended Field Campaigns**

1. Utqiagvik, Alaska, 2022
2. South Cascade Glacier, WA, 2017
3. South Cascade Glacier, WA, 2016
4. Greenland Ice Sheet, 2013
5. Greenland Ice Sheet, 2012
6. McMurdo Dry Valleys, Antarctica, 2006
7. Yellowstone National Park, 2006
8. McMurdo Dry Valleys, Antarctica, 2004

**Certifications**

- FAA Part 107 Remote Pilot Certificate, 2018-present
- FAA Part 61 Private Pilot Certificate (ASEL, VFR), 2003

## GRADUATE STUDENTS

**Chaired Doctoral Degrees**

- Shashank Bhushan, Chair, *Using high-resolution satellite constellations to understand glacier mass balance and dynamics in High-Mountain Asia*, Spring 2023, now UW postdoc
- Michelle Hu, Chair, *Quantifying seasonal snow with very-high-resolution stereo optical satellite images*, Autumn 2023, now U Utah postdoc

**Current Doctoral Students**

- Friedrich, Knuth, Chair, *Historical photogrammetry for glacier mass balance*, achieved candidacy June 2022, expected graduation Spring 2024
- Eric Gagliano, Chair, passed qualifying exam May 2022, expected graduation Spring 2025
- George (Quinn) Brencher, Chair, passed qualifying exam June 2023, expected graduation Spring 2026

**Chaired Masters Degrees**

- Seth Vanderwilt, Chair, Project: *Using Deep Learning for satellite stereo DEM refinement*, Spring 2023.

**Other significant supervision**

**Research Engineer/Scientist**

- Ben Purinton, supervisor, 2023-present

**Postdoctoral Scholars**

- Karthik Venkataramani, supervisor, 2024-present
- Shashank Bhushan, supervisor, 2023-present
- Romain Hugonnet, supervisor, 2022-present
- Gregoire Guillet, supervisor, 2022-2023, UAF/U Oslo
- Aji John, co-supervisor, 2022-2023, UW SEFS

- Yara Mohajerani, supervisor, 2020-2021, CEO of EnvAI

**Doctoral Committee**
- Amanda Manaster, CEE PhD Committee Member, Spring 2024 (expected)
- Zach Aemmer, CEE PhD Committee Member, Spring 2024 (expected)
- Steven Pestana, CEE PhD Committee Member, Spring 2023
- Justin Pflug, CEE PhD Committee Member, Spring 2021

**Masters Committee**
- Hannah Besso, MS Committee Member, Thesis: *Mountain snow depth retrievals from customized processing of ICESat-2 satellite laser altimetry*, Fall 2022
- Annie Zaccarin, MS Committee Member, Thesis: *Investigating Repeatable Snow Distributions and Meteorological Conditions over Four Years at Finse, Norway*, Autumn 2020
- Dylan Reynolds, MS Committee Member, Thesis: *Evaluating Wind Fields for Use in Distributed Snowpack Models*, Autumn 2019
- Steven Pestana, MS Committee Member, Thesis: *Remote Sensing Surface Temperatures of Forests and Melting Snow at Different Spatial Scales*, Spring 2019

**Qualifying Exam Committee**
- Ross Mower, April 2023
- Hannah Besso, April 2023
- Cassie Lumbrazo, 2021
- Christine Baker, May 2020
- Steven Pestana, October 2019
- Justin Pflug, 2019
- Amanda Manaster, November 2018

**Graduate School Representative**
- Chris Hayner, AA PhD Committee, GSR, 2026 (expected)
- An Li, ESS PhD Committee, GSR, 2026 (expected)
- Anthony Stewart, SEFS PhD Committee, GSR, 2026 (expected)
- Caden Chamberlain, SEFS PhD Committee, GSR, 2024 (expected)
- Evan Lahr, OCN PhD Committee, GSR, 2024 (expected)
- Kimber Hinson, AA PhD Committee, GSR, 2024 (expected)
- Jonathan Bachelor, SEFS PhD Committee, GSR, Autumn 2023 (expected)
- Daniel Broyles, AA PhD Committee, GSR, Autumn 2023
- Hamid Izadinia, CSE PhD Committee GSR, July 2020

**Undergraduate**
- Chris Hayner, undergraduate in Applied Physics (BS 2021), A&A Autonomous Flight Systems Lab, Project: *UAV platform development and mission planning for ground-penetrating radar and air quality sensors*
- Alan Viola, CEE undergraduate

**Advisor for independent research projects**
- Athil George (AA BS), 2020-2021, Project: *Integrating survey-grade GNSS with UAV GPR system*
- Trevor Hillebrand (ESS PhD, 2019), Project: *Terrestrial SfM of Blue Glacier*

- Jonathan Beyeler (ESS MS 2017), Project: *Terrestrial LiDAR and GPS surveys of river valleys at Mt. Rainier*
- Shashank Bhushan, (UW APL summer intern, Indian Institute of Technology, Dhanbad, MS 2017), Project: *Geodetic glacier mass balance in Nepal*
- Tait Russell (ESS MS, 2016), Project: *UAV SfM surveys, A High-Resolution DEM Time series for Measuring Seasonal and Interannual Glacier Mass Balance on Mount Baker, WA*, presented at 2014 Geological Society of America (GSA) meeting.
- Devin Bedard (ESS MS, 2016), Project: *Terrestrial LiDAR surveys of landslides, cliff erosion on Whidbey Island*

## RESEARCH ACTIVITIES

**Funded Research**

**Total Amount: $13.6M**
**My Total Amount: $4.0M**

| **Funding Agency** | ***Title*** | **Your role with other PI's and co-PI's** | **Total Amount** | **Your Amount** | **Dates (start - finish)** |
|---|---|---|---|---|---|
| NASA Cryo | *ICESat-2 SlideRule Mission Extension: Enabling scalable, on-demand fusion of altimetry and raster data in the cloud* | Inst. PI (Co-PI Swinski, GSFC) | $638K | $422K | 2023-2025 |
| NASA CSDAP | *Evaluation of Capella X-band SAR data to capture high resolution cryosphere dynamics* | Co-I (PI Henderson, UW ESS/eScience) | $100K | $73K | 2023-2024 |
| NASA ESTO | *Advanced information systems to fill STV gaps: stereo+lidar fusion, stereo processing, and stereo sensor technology* | PI | $1.5M | $650K | 2022-2025 |
| NASA | *Data Fusion for mass-change measurements over complex ice surfaces* | Co-I (PI: Smith, UW APL) | $500K | $90K | 2022-2025 |
| NASA OSTFL | *Improving and Sustaining the Ames Stereo Pipeline* | Co-I (PI: Beyer, NASA Ames) | $400K | $63K | 2023-2025 |
| NASA THP | *Satellite stereo and altimetry fusion for improved snow depth mapping* | PI | $452K | $350K | 2022-2025 |
| NASA CSDAP | *CSDAP BlackSky Evaluation: Stereo vegetation/ecosystem* | Co-I (PI: Neigh, GSFC) | $100K | $25K | 2022-2023 |
| NASA CSDAP | *CSDAP BlackSky Evaluation: Snow Machine Learning* | Co-I (PI: Cristea, UW) | $100K | $12K | 2022-2023 |
| USBoR | *Assessing the Utility of New Satellites to Advance State of* | Inst. PI | $450K | $180K | 2021-2025 |

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|---|---|---|---|---|---|
| | *the Art Snow Forecasting Capabilities* | (PI Llewellyn, USBR; Webb, UWy) | | | |
| USGS | *Developing and applying modern photogrammetric methods to understand historical and present-day North American glacier mass balance* | PI | $60K | $60K | 2020-2022 |
| NASA CSDAP | *Evaluation of high-resolution snow covered area mapping in mountain ecosystems from PlanetScope imagery* | Co-I (PI: Cristea, UW) | $132K | $20K | 2021-2023 |
| WA DNR | *DNR Road Monitor* | Senior Personnel (PI: Istanbullouglu, UW) | | $50K | 2021-2023 |
| NASA IDS | *Combining Modeling and Retrievals of Both Falling and Fallen Snow in Complex Terrain to Improve Snow Representation Throughout its Lifecycle* | Co-I (PI: Lundquist, UW) | $1.17M | $40K | 2020-2023 |
| UW EarthLab | *Does vegetation help mitigate roadway and aircraft-related air pollution in Seattle? A community-engaged study using drones for 3D air quality measurements* | Co-I (PI: Seto, UW EOHS) | $75K | $30K | 2020-2022 |
| NASA Cryo | *ICESat-2 Science Applications for Just-In-Time Scalable Data Processing with SlideRule* | Inst. PI (PI: Swinski, GSFC) | $1.3M | $250K | 2020-2022 |
| NSF | *Cyberinfrastructure for Intelligent High-Resolution Snow Cover Inference from Cubesat Imagery* | Co-PI (PI: Cristea, UW) | $553K | $40K | 2020-2023 |
| NASA THP | *Peak water in High Mountain Asia: Quantifying future cryosphere change to understand downstream human impacts* | Institutional PI (PI: Rounce, CMU) | $1.0M | $330K | 2020-2023 |
| NASA FINESST | *Using high-resolution satellite observations to understand glacier mass balance and dynamics in High-Mountain Asia* | PI/Mentor (FINESST PI: Bhushan) | $135K | $135K | 2019-2022 |
| NASA THP | *Stereo2SWE: Regional Snow Depth and SWE from Sub-* | PI | $478K | $350K | 2018-2021 |

| | | | | | |
|---|---|---|---|---|---|
| | *meter Optical Satellite Stereo DEMs* | | | | |
| NASA CSDAP | *NASA Commercial Data Pilot Evaluation of Planet Imagery* | PI | $100K | $72K | 2019 |
| UW | *Building a digital glacier time machine: Reconstructing past landscapes to help understand the future of water in the western U.S.* | PI (Co-PIs Christianson and Koutnik, UW ESS) | $300K | $167K | 2018-2021 |
| NASA AIST | *Automated protocols for generating very high-resolution commercial validation products with NASA HEC resources* | Institutional PI (PI: Neigh, NASA GSFC) | $1.2M | $100K | 2017-2019 |
| NASA Cryo | *Validating a Glacier Melt Toolbox for High Mountain Asia using a remote-sensing-driven data integration framework* | Co-I (PI: Arendt, UW APL) | $1.1M | $300K | 2016-2019 |
| WA DNR | *Road surface microtopography and surface sediment monitoring* | Co-I (PI: Istanbullouglu, UW) | $196K | $40K | 2018-2020 |
| NSF | *Integrated modeling of hydro-geomorphic hazards: Floods, landslides and sediments* | Postdoc (PI: Istanbullouglu, UW) | $1.7M | $72K | 2017-2021 |
| NPS | *Using Satellite Data to Detect Glacier Change in the Washington Cascades* | PI/Postdoc (PI: Joughin, UW APL) | $55K | $55K | 2016-2018 |
| USGS | *Acquisition, processing, and integration of satellite imagery of Pacific Northwest glaciers to generate time series of Digital Elevation Models for geodetic glacier mass balance* | PI/Postdoc (PI: Joughin, UW APL) | $20K | $20K | 2016-2018 |
| NASA FINESST | *Quantifying ice-sheet dynamics and variability with meter-scale DEM and velocity data* | PI NESSF fellowship (PI/Mentor: Joughin, UW APL) | $90K | $90K | 2012-2015 |
| NSF | *Supplement to NSF award "Age, origin, and climate significance of buried ice in the western Dry Valleys region"* | Co-I (PI: Marchant, BU) | | $32K | 2006 |

**Pending Proposals**

| **Funding Agency** | ***Title*** | **Your role with other PI's and co-PI's** | **Total Amount** | **Your Amount** | **Dates (start - finish)** |
|---|---|---|---|---|---|
| NASA HiMAT | *Understanding the dynamics and impacts of surging glaciers in High Mountain Asia* | PI | $167K | 1$67K | 2023-2025 |
| NASA ESE | *Earth Dynamics Geodetic Explorer (EDGE) mission* | Co-I (PI: Fricker, UCSD/Scripps) | | | 2024- |
| NASA Cryo | *Enhancing understanding of sea ice preconditioning through remote sensing of sea ice topography, age, and melt ponds* | Co-I, Inst. PI (PI: Clemens-Sewall, UCAR) | $627K | $139K | 2024-2027 |
| NASA CSDAP | *Next-generation cryosphere research with the Umbra X-band SAR constellation* | Co-I (PI: Henderson, UW) | $111K | $80K | 2024-2025 |

## DOCUMENTATION OF TEACHING EFFECTIVENESS

**Courses Taught & Student Evaluations**

| **Course** | **Title** | **Quarter** | **Credit Hrs** | **Enrollment** | **Evaluations? Response** | **Item 1** | **Item 3** | **Item 4** | **Overall Adj. Median** |
|---|---|---|---|---|---|---|---|---|---|
| ENGR106 | Experience Engineering | Spring 2024 | 1-3 | | | | | | |
| CEE467 CEWA567 | Geospatial Data Analysis | Winter 2024 | 5 | 27 | | | | | |
| CEE437 CEWA537 | Advanced Surveying & Geomatics | Fall 2023 | 5 | 15 | 9 | 4.5 | 4.7 | 4.5 | 4.6 |
| ENGR202 | Exploring Engineering: Lidar Drone Surveying | Spring 2023 | 1 | 30 | N/A | N/A | N/A | N/A | N/A |
| CEE467 CEWA567 | Geospatial Data Analysis | Winter 2023 | 5 | 20 | 17 | 4.7 | 4.9 | 4.8 | 4.8 |
| ENGR202 | Exploring Engineering: Lidar Drone Surveying | Fall 2022 | 1 | 8 | N/A | N/A | N/A | N/A | N/A |
| ENGR202 | Exploring Engineering: Lidar Drone Surveying | Spring 2022 | 1 | 4 | N/A | N/A | N/A | N/A | N/A |
| CEE498 CEWA599 | Geospatial Data Analysis | Winter 2022 | 5 | 26 | 23 | 4.7 | 5.0 | 4.9 | 4.9 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CEE498 CEWA599 | Advanced Surveying | Fall 2021 | 5 | 18 | 15 | 4.7 | 4.9 | 4.8 | 4.8 |
| CEE317 | Geomatics/ GeoSurveying | Spring 2021* | 5 | 11 | 6 | 3.5 | 3.6 | 3.7 | 3.7 |
| CEE498 CEWA599 | Geospatial Data Analysis | Winter 2021 | 5 | 22 | 22 | 4.6 | 4.8 | 4.7 | 4.7 |
| CEE498 CEWA599 | Geospatial Data Analysis | Winter 2020 | 5 | 14 | 14 | 4.5 | 4.7 | 4.6 | 4.6 |
| CEE498 CEWA599 | Advanced Surveying | Spring 2019 | 5 | 12 | 12 | 4.7 | 4.7 | 4.5 | 4.6 |
| CEE498 CEWA599 | Geospatial Data Analysis | Winter 2019 | 4 | 13 | 12 | 4.6 | 4.8 | 4.6 | 4.7 |
| CEE498 CEWA599 | Advanced Surveying | Spring 2018 | 4 | 13 | 11 | 4.9 | 4.9 | 4.9 | 4.9 |

* Remote offering required redesign of all in-person labs due to COVID

**Peer Teaching Evaluations**

| Course | Quarter | Reviewer |
|---|---|---|
| ENGR202: Exploring Engineering | Spring 2023 | Dan Ratner |
| CEE498/CEWA599: Advanced Surveying | Fall 2021 | Joe Wartman |
| CEE317: Geomatics (Geosurveying) | Spring 2021 | Steve Muench |
| CEE498/CEWA599: Geospatial Data Analysis | Winter 2020 | Bart Njissen<br>Janice Fournier* |
| CEE498/CEWA599: Advanced Surveying | Spring 2019 | Jessica Lundquist |

*UW-IT Research Scientist, Academic Experience Design and Delivery, 6-page report: https://itconnect.uw.edu/wp-content/uploads/2020/07/Jupyter-Notebook-Pilot-Report-Winter-2020-1.pdf

**Supervision of independent study (design projects and research)**

**Independent Study**

| Course | Title or Student Name | Quarter | # of Students (Total Credit Hrs) |
|---|---|---|---|
| AA800 | Brian Katona | Spring 2019 | 1 (2 credits) |
| AA499 | Athil George | Winter 2021 | 1 (2 credits) |
| AA499 | Athil George | Spring 2021 | 1 (2 credits) |

**Guest lectures**

- Satellite Remote Sensing for Water Resources (CEWA566), F. Hossain, 2019
- Advanced Remote Sensing and Earth Observation (CEWA532), D. Butman, 2017

**List of other teaching contributions**

- Co-organizer, tutorial lead and data scientist for annual UW eScience Hackweeks – weeklong education and project-based events with 50-70 students, postdocs, faculty, researchers and industry partners:
    - NASA ICESat-2 HackWeek, August 2023
    - NASA SnowEx HackWeek, July 2021 (virtual)
    - NASA ICESat-2 HackWeek, June 2020 (virtual)
    - GeoHackWeek, September 2019
    - NASA ICESat-2 HackWeek, June 2019
    - GeoHackWeek, September 2018
    - GeoHackWeek, September 2017
    - GeoHackWeek, November 2016
- Teaching Assistant, Glaciers and Global Climate (ESS203), University of Washington, 2015
- Curricular Advising Program (CAP) Fellow and Teaching Assistant for introductory planetary geology course "Mars, Moon and The Earth", Brown University, 2003
- Organized or co-organized local field trips for community building, training graduate and undergraduate students:
    - Snoqualmie Pass, WA, 2022 (UAV LiDAR)
    - Easton Glacier, Mt. Baker, WA, 2023, 2022, 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014 (UAV SfM, UAV LiDAR, TLS)
    - Artist Point, Mt. Baker, WA, 2020 (UAV GPR)
    - Blue Glacier, Mt. Olympus, WA, 2018
    - Mount Rainier, WA 2017, 2015, 2012
    - Mt. St. Helen's, WA 2013

**Teaching Awards, Nominations for Teaching Awards**

- College of Engineering, Faculty Award: Teaching, nominated 2022
- UW Distinguished Teaching Award for Innovation with Technology, nominated 2021

## SERVICE

**Departmental service**

- Committee membership:
    - CEE undergraduate education committee, 2023/2024
    - CEE undergraduate education committee, 2022/2023
    - CEE undergraduate education committee, 2021/2022
    - CEE diversity, equity, and inclusion committee, 2020/2021
    - CEE graduate education committee, 2019/2020
    - CEE graduate education committee, 2018/2019
    - CEE faculty affairs committee, 2018
- Significant Contributions
    - Developed, proposed, and managed CEE PhD Degree Data Science Option (DSO) for CEE PhD program, 2019-present
    - Developed CEE workshop module for freshman ENGR course *Experiencing Engineering*; coordinated/advised CEE faculty to lead workshops, 2022-present
    - Search Committee, Research Assistant Professor, 2024
    - Worked with COE IT and UW IT to pilot virtual desktop interface (VDI) and Azure Lab Services as alternatives to traditional computer lab, 2022
    - Reviewer for BSCE undergraduate admission, 2020-present

- Reviewed undergraduate scholarship applications, 2019-present
- Co-hosted Burgess Visiting Professor Matthew Sturm (UAF, Nov. 2019)

**Diversity, Equity, and Inclusion Service**

- Developed and integrated material highlighting historical and present-day contributions from underrepresented groups in computing and surveying
- Organized research group discussions focused on DEI topics and actions
- Implemented new research group practices and developed rubrics for hiring, 2022
- Led efforts to define and analyze metrics for admissions, exit surveys, town halls, 2021
- Initiated CEE website revision; drafted improved DEI website, 2020
- Initiated organization to screen *Picture a Scientist* documentary for COE, 2020

**College service**

- A&A Autonomous Flight Systems Lab – supervised students, provided funding, equipment, and guidance for UAS prototype development
- UW Space Policy and Research Center (SPARC) Symposium panel, 2021

**University service**

- Faculty lead for UW-IT JupyterHub Pilot, 2020
- Co-hosted Visiting Scholars Al Handwerger (NASA JPL, May 2022), Yara Mohajerani (UC-Irvine, Feb. 2020), Sarah Cooley (Brown, Feb. 2020)
- Co-organized eScience Remote Sensing Special Interest Group, 2020-2022
- Co-organized weekly Synthetic Aperture Radar (SAR) meetings with students and researchers across campus (eScience, ESS, SEFS), 2022-2023
- Managed and maintained UW Student Technology Fee (STF) surveying equipment, 2014-present
- Coordinated shared purchasing and maintenance of site license agreements for LiDAR and Structure from Motion software packages (Agisoft, Pix4D)
- Prepared report on history of UW NASA graduate student fellowships, 2019

**Professional society and other service**

- Co-lead of Stereo and LiDAR technology working group, NASA Terrestrial Hydrology Program, 2020-2021
- Member of UAV SfM technology working group, NASA Terrestrial Hydrology Program, 2021-2023
- Coordinated satellite tasking plans for Western U.S. cryosphere on behalf of NASA, USGS, NPS, BoR, 2013-present
- Session chair, Fall AGU meeting, 2018

**Community service**

- Earthlab Air Quality UAV sampling project, results presented at Beacon Hill Air and Noise Pollution Community Meeting, El Centro de la Raza, 2022
- Led interactive K-12 educational activities for annual 3-day Polar Science Weekend outreach event at Seattle Pacific Science Center, 2012-2019
- Outreach presentations at local OSGeo Chapter: Cascadia Users of Geospatial Open Source (CUGOS) meetings, 2012-2018

**International, national or governmental service**

- NASA proposal review panel, February 2023

- NSF proposal review, 2016
- International Association of Cryospheric Sciences (IACS) Working group on Regional Assessments of Glacier Mass Change (RAGMAC), 2020-present
- NASA High-mountain Asia Team, international cooperation with Chinese Academy of Sciences, 2016-2019