BENJAMIN H. HILLS

University of Washington
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EDUCATION

2017-present **University of Washington** | Seattle, WA
Ph.D. Earth and Space Science (emphasis: Geophysics/Glaciology) – GPA: 3.90
Advisors: Dr. Knut Christianson and Dr. Dale P. Winebrenner

2015-2017 **University of Montana** | Missoula, MT
M.S. Geosciences (emphasis: Glaciology) – GPA: 3.95
Advisor: Dr. Joel T. Harper

2010-2014 **Montana State University** | Bozeman, MT
B.S. Earth Sciences (emphasis: Snow Mechanics) – GPA: 3.94 (Highest Honors)

RESEARCH APPOINTMENTS

Sept. 2017 – present **Graduate Research Assistant** | Earth and Space Sciences Department | UW
Working under Dr. Knut Christianson, collecting, processing, and analyzing geophysical datasets from ice-sheet and alpine-glacier environments.

Sept. 2017 – present **Graduate Research Assistant** | Applied Physics Laboratory | UW
Worked under Dr. Dale Winebrenner on numerical implementation of the cylindrical Stefan problem. Model will aid design of a glacier melt probe.

May 2017 – Sept. 2017 **Post-MS Research Assistant |** Fluid Dynamics & Solid Mechanics | LANL
Worked under Dr. Matthew Hoffman to develop and run the land-ice component (MALI) of a coupled climate model (MPAS).

May 2015 – May 2017 **Graduate Research Assistant** | Geosciences Department | UofM
Worked within a collaboration between Geosciences and Computer Science Departments. Focused on ice-temperature measurements from Greenland.

TEACHING APPOINTMENTS

June. 2018 – Aug. 2022 **Graduate Teaching Assistant** | Earth and Space Sciences Department | UW
Summer Undergraduate Research Coordinator
ESS 431 – Principles of Glaciology (shared TA appointment)
ESS 102 – Introduction to Geology and Societal Impacts (including field trip)

Sept. 2015 – May 2016 **Graduate Teaching Assistant** | Geosciences Department | UofM
GEO 101 – Introduction to Physical Geology (including field trip)

Summer 2013 **Tutor** | Montana State University
Personal tutoring for engineering courses

Supplemental Teaching:

Fall 2018-present **Undergraduate Advisior** | University of Washington
Jonathan Ortiz-Candelaria; Informatics
Raphael Sauvage; Chemistry
Joshua Driscol; Atmospheric Sciences (now at University of New Mexico)

Fall 2018; 2019-21 **Lecture, Recitation, and Field Trip** | ESS 431 – Principles of Glaciology

FIELD/WORKSHOP EXPERIENCE

2022-23	Glacier Geophysics Lead | ~2-Month | **Hercules Dome, Antarctica**
2022	Glacier Geophysics Lead | 1 Week | **Mt. Waddington, British Columbia**
2022	ICECReW Workshop | 2-Week | **US Ice Drilling Program**
2020	IceSAT-2 Hackweek | 2-Week | **eScience Institute, UW**
2018-20	Glacier Geophysics | ~2-Month Trips | **S. Pole and Herc. Dome, Antarctica**
2018-20	Interferometry | ~3-Day Trips | **Coleman Glacier, Mt. Baker**
2019	Structure from Motion | 1 Day | **Easton Glacier, Mt. Baker**
2019	Glacier Mass Balance | 1 Week | **South Cascade Glacier, North Cascades**
2018	Cryospheric Microbiology | 1-Day Trips | **Easton Glacier, Mt. Baker**
2015-16	Hot-water drilling | ~1-Month Trips | **Isunnguata Sermia, Greenland**

SERVICE

2019-present	**Peer Reviewer** Geophysical Research Letters; Journal of Glaciology; Annals of Glaciology; Acta Astronautica
Summer 2022	Louis Stokes Alliance for Minority Participation | University of Washington
2020-present	Geosciences Access and Inclusivity Network | University of Washington
2018-present	Rockin' Out | University of Washington
2015-2017	Interdisciplinary Collaboration Network | University of Montana
2014-2015	Volunteer Ski Patrol | Big Sky Ski Resort | Big Sky, MT

PROFESSIONAL AFFILIATIONS

2016-present	American Geophysical Union
2017-present	International Glaciological Society
2018-present	European Geosciences Union
2017-present	Geological Society of America

HONORS

2020	Outstanding Student Presentation Award | AGU Fall Meeting
2017	Top Scholar Award | University of Washington | *RA funding for one quarter*
2010-2014	Montana University Scholarship | *undergraduate tuition for four years*
2012	Direct Exchange | University of Canterbury | *exchange student tuition*
2010	Distinguished Scholar | Helena Education Foundation

SKILLS

Programming	Comfortable in Python, Matlab, Bash, Git. Some experience with Fortran. For some examples of code, see my github account https://github.com/benhills.
Modeling	Proficient with finite-difference methods and with a finite-element solver called FEniCS. Experience running several ice-sheet models (e.g. icepack and MALI).
2015	Swiftwater Rescue Technician | *Montana River Guides*
2014	Fundamentals of Engineering | *NCEES*
2014 (expired)	Emergency Medical Technician | *National Registry for EMTs*
2013	Avalanche Technician | *American Avalanche Institute*

RELEVANT COURSEWORK | please request transcripts for more detail

Engineering	Fluid Dynamics, Fluid Mechanics, Statics, Dynamics, Mechanics of Materials
Physics	Geophysical Inverse Theory, Thermo and Stat Mechanics, General Physics
Mathematics	Ordinary/Partial Differential Equations, Multivariable Calculus
Geosciences	Continuum Mechanics, Physics of Ice, Ice Dynamics, Hydrologic Modeling,
Field-Component	Snow Dynamics and Accumulation, Mountain Geography, Geomorphology

PEER-REVIEWED ARTICLES

in Review

Løkkegaard, A., et al. Greenland and Canadian Arctic ice temperature profiles. *The Cryosphere*.

Hoffman A. O., Holschuh N. D., et al. Scars of tectonic extension promote ice-sheet nucleation from Hercules Dome, West Antarctica.

Fudge, T. J., **Hills, B. H.**, Annika N. Horlings, Nick Holschuh, Gemma K. O'Connor, John Erich Christian, Lindsey Davidge, Andrew Hoffman, Knut Christianson, and Eric J. Steig. A site for deep ice coring at West Hercules Dome: results from ground-based geophysics and modeling. *Journal of Glaciology*.

Hills, B. H., Christianson K., Jacobel, R. W., Petersson, R. Radar attenuation demonstrates advective cooling at the Siple Coast ice streams. *Journal of Glaciology*.

2022

Hills, B. H., Christianson K., Hoffman A., Fudge, T. J., Holschuh N, Kahle, E. C., Conway, H., Christian, J., Horlings, A., O'Connor, G., Steig, E. J. Geophysics and Thermodynamics at South Pole Lake indicate stability and a regionally thawed bed. *Geophysical Research Letters,* 49. https://doi.org/10.1029/2021GL096218

2020

Lilien, D. A., **Hills, B. H.**, Driscol, J., Jacobel, R. W., & Christianson, K., ImpDAR: An open-source impulse radar processor. *Annals of Glaciology,* 61(81), 114-123 https://doi.org/10.1017/aog.2020.44

Hills, B. H., Christianson K., & Holschuh N. A framework for attenuation method selection evaluated with ice-penetrating radar data at South Pole Lake. *Annals of Glaciology*, *61*(81), 176-187. doi:10.1017/aog.2020.32

2018

Hills, B. H., Harper J. T., Meierbachtol T. W., Johnson J. V., Humphrey N. F., & Wright P. J. Processes influencing heat transfer in the near-surface ice of Greenland's ablation zone. *The Cryosphere*, 12, 3215–3227, https://doi.org/10.5194/tc-12-3215-2018.

2017

Hills, B. H., Harper J. T., Humphrey N. F. & Meierbachtol T. W. Measured horizontal temperature gradients constrain heat transfer mechanisms in Greenland ice. *Geophysical Research Letters*, 44, 9778–9785. https://doi.org/10.1002/2017GL074917

PEER-REVIEWED LETTERS AND CONFERENCE PROCEEDINGS

in Prep

Hills, B. H., Lilien D., Holschuh, N. D., Christianson, K. Phase-processing extensions to the ice-penetrating radar module ImpDAR for ApRES interferometry and polarimetry.

in Review

Walcott, C., Erwin, E., **Hills, B. H.** Ice flow and ice-bed interactions: How they shape our understanding of ice cores.

2021

Hills, B. H., Winebrenner, D. P., Elam, W. T., & Kintner, P. M. S. Avoiding slush formation for hot-point drilling of glacier boreholes. *Annals of Glaciology, 62*(84). 166-170. https://doi:10.1017/aog.2020.70

CONFERENCE ABSTRACTS (*STUDENT COAUTHOR)

2021

*Sauvage, R., Fudge, T. J., **Hills, B. H.**, Linh Vu. Effective Diffusivity of Sulfate Ions in the EPICA Dome C Ice Core for the Last Five Interglacials. *American Geophysical Union Fall Meeting*, December 2021, New Orleans, LA. (poster)

Fudge, T. J., Holschuh, N., **Hills, B. H.**, O'Connor, G. K., Lomeli, J., Steig, E. J. Combining evidence of frozen and thawed beds to constrain geothermal flux: initial results from Hercules Dome, Antarctica. *American Geophysical Union Fall Meeting*, December 2021, New Orleans, LA. (poster)

Hills, B. H., Young, T. J., Horlings, A. N., Holschuh, N., Christianson, K. Radar polarimetry at Hercules Dome reveals ice fabric as it changes along the triple divide. *WAIS Workshop*, September 2021, Algonkian Regional Park, VA (oral presentation)

Hills, B. H., Young, T. J., Horlings, A. N., Holschuh, N., Christianson, K. Polarimetry experiments at Hercules Dome. *Hercules Dome Workshop*, May 2021, Hosted Remotely. (oral presentation)

2020

Hills, B. H., Christianson, K., Hoffman, A. O., Fudge, T. J., Kahle, E. C. Interior ice-sheet dynamics are constrained through the Holocene transition using the thermodynamics of South Pole Lake. *American Geophysical Union Fall Meeting*, December 2020, Hosted Remotely. (poster)

Steig, E. J., Duetsch, M., Blossey, P. N., Pauling, A., Bitz, C. M., Aydin, M., Fudge, T. J., Roop, H., Souney, J. M., Twickler, M., Christianson, K., Christian, J. E. M., Davidge, L., O'Connor, G. K., **Hills, B. H.**, Hoffman, A. O., Holschuh, N., Horlings, A. N. Hercules Dome ice core project: Prospects for obtaining Eemian records that constrain the size of the West Antarctic ice sheet through time. *American Geophysical Union Fall Meeting*, December 2020, Hosted Remotely. (invited talk)

Fudge, T. J., Hoffman, A. O., Horlings, A. N., **Hills, B. H.**, Steig, E. J., O'Connor, G. K., Christian, J. E. M., Christiansen, K. A., Davidge, L., Holschuh, N. Inferring Holocene variations in ice-flow patterns and accumulation gradients at Hercules Dome from radar measurements of internal layering and englacial velocity profiles, and 2D ice-flow modeling. *American Geophysical Union Fall Meeting*, December 2020, Hosted Remotely. (poster)

*Breyer, C., Barcheck, G., Gomez-Fell, R., Hillebrand, T., **Hills, B. H.**, Kaluzienksi, L., Martin, J., Polashenski, D., Shapero, D.. Ice sheet surface velocity determination from ICESat2 repeat tracks.*American Geophysical Union Fall Meeting*, December 2020, Hosted Remotely. (poster)

Hills, B. H., Christianson, K., Hoffman, A. O., Fudge, T. J., Kahle, E. C.. Interior ice-sheet dynamics are constrained through the Holocene transition using the thermodynamics of South Pole Lake. *WAIS Workshop*, September 2020, Hosted Remotely. (oral presentation)

2019

Steig, E. J., Christianson, K. A., Holschuh, N. D., **Hills, B. H.**, Fudge, T. J., Hoffman, A. O., Horlings, A. N., O'Connor, G. K., Christian, J. E. M. Finding the optimal site for a deep ice core at Hercules Dome, Antarctica. *American Geophysical Union Fall Meeting*, December 2019, San Francisco, CA. (poster)

Winebrenner, D. P., **Hills, B. H.**, Elam, W. T. Reaching Depths of Kilometers in Cold Ice with Small Melt Probes, by Managing Melt-Hole Refreezing. *American*

Geophysical Union Fall Meeting, December 2019, San Francisco, CA. (oral presentation)

Hills B. H., Winebrenner, D. P., Elam, W. T., & Kintner, P. An 'extended' Stefan problem with applications for slush formation in glacier boreholes. *West Antarctic Ice Sheet Workshop*, October 2019, Julian, CA. (poster)

Lilien D. A., **Hills B. H.**, Driscol J., Jacobel R. W., & Christianson K. ImpDAR: An open-source impulse radar processor, *Northwest Glaciologists Meeting*, October 2019, Corvallis, OR. (oral presentation)

Hills B. H., Christianson K., Holschuh N., Fudge T. J., & Steig E. Freezing or melting?: New insights into the thermodynamic and glaciological setting of the South Pole subglacial lake from recent ice-penetrating radar surveys. *International Glaciological Society Radioglaciology Symposium*, July 2019, Palo Alto, CA. (oral presentation)

Hills B. H., Christianson K., & Holschuh N. A comparison of multiple radio-wave attenuation methods applied to high-frequency common-offset radar surveys of the Northeast Greenland Ice Stream. *International Glaciological Society Radioglaciology Symposium*, July 2019, Palo Alto, CA. (poster)

Horlings A. N., **Hills B. H.**, Christian J., Whorton E., & Christianson K. Mapping the time-evolving firn structure on South Cascade Glacier, Washington state using monopulse ice-penetrating radar. *International Glaciological Society Radioglaciology Symposium*, July 2019, Palo Alto, CA. (poster)

*Driscol J., Lilien D. A., **Hills B. H.**, Christianson K, & Jacobel R. W. ImpDAR: An Open-Source Impulse Radar Processor in Python. *International Glaciological Society Radioglaciology Symposium*, July 2019, Palo Alto, CA. (poster)

Christian J., Whorton E., Christianson K., & **Hills B. H.** Using snow radar to characterize the accumulation area of South Cascade Glacier. *International Glaciological Society Radioglaciology Symposium*, July 2019, Palo Alto, CA. (poster)

Hills B. H., Christianson K., Holschuh N., & Anandakrishnan S. Using radio wave attenuation to constrain ice temperature in regions of fast flow. *European Geophysical Union General Assembly*, April 2019, Vienna, Austria. (PICO presentation)

2018

Hills B. H., Christianson K., Holschuh N., & Anandakrishnan, S. Using radio wave attenuation to constrain ice temperature in regions of fast flow. *American Geophysical Union Fall Meeting*, December 2018, Washington DC. (poster)

Hoffman M. J., & **Hills B. H.** Impact of evolving subglacial hydrology on marine ice sheet dynamics. *American Geophysical Union Fall Meeting*, December 2018, Washington DC. (oral presentation)

Hills B. H., Christianson K., Holschuh N., & Anandakrishnan S. Electromagnetic wave attenuation in ice: Using airborne and ground-based radio-echo sounding data to measure ice-sheet temperature. *Graduate Climate Conference*, November 2018, Pack Forest, WA. (poster)

Hills B. H., Christianson K., Holschuh N., & Anandakrishnan S. Using radio wave attenenuation to constrain ice temperature in regions of fast flow. *West Antarctic Ice Sheet Workshop*, September 2018, Stony Point, NY. (poster)

Hills B. H., Hoffman M. J., & Christianson K. Feedbacks between subglacial drainage and evolution in a coupled ice sheet model: effect on marine ice sheet stability. *Marine Ice Sheet Modeling Intercomparison Project III*, May 2018, Abu Dhabi, UAE. (poster)

2017

Hills B. H., & Hoffman M. J. Feedbacks between subglacial drainage and evolution in a coupled ice sheet model: effect on marine ice sheet stability. *Northwest Glaciologists Meeting*, October 2017, Vancouver, BC. (poster)

Hills B. H., & Hoffman M. J. Feedbacks between subglacial drainage and evolution in a coupled ice sheet model: effect on marine ice sheet stability. *West Antarctic Ice Sheet Workshop*, October 2017, Coupeville, WA. (poster)

Hills B. H., & Hoffman M. J. Feedbacks between subglacial drainage and evolution in a coupled ice sheet model: effect on marine ice sheet stability. *International Glaciological Society*, August 2017, Boulder, CO. (poster)

2016

Hills B. H., Harper J. T., Humphrey N. F., Meierbachtol T. W., & Johnson J. V. Modeling heat transfer to explain observed temperature anomalies in near-surface ice, Greenland Ice Sheet ablation area, *American Geophysical Union Fall Meeting*, December 2016, San Francisco, CA. (oral presentation)

Hills B. H., Harper J. T., Humphrey N. F., Meierbachtol T. W., & Johnson J. V. Heat transfer at the surface boundary, Greenland Ice Sheet ablation area, *Northwest Glaciologists Meeting*, October 2016, Seattle, WA. (oral presentation)

2015

Hills B. H., & Harper J. T. Near-surface heat flow in the Greenland Ice Sheet ablation area, *Northwest Glaciologists Meeting*, October 2015, Portland, OR. (oral presentation)

2014

Hills B. H. Snowpack Densification: an investigation of density change through snow melt and metamorphosis, *Montana State University Undergraduate Research Symposium*, May 2014, Bozeman, MT. (poster)