

## Matthew R. Siegfried [he/him]

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ACADEMIC APPOINTMENTS	<b>Associate Professor</b> <b>Assistant Professor</b> Department of Geophysics Hydrologic Science and Engineering, Affiliated Faculty Space Resources Program, Affiliated Faculty Payne Institute for Public Policy, Faculty Fellow Colorado School of Mines	April 2024 to present January 2019 to April 2024
	<b>Thompson Postdoctoral Fellow</b> Department of Geophysics School of Earth, Energy, and Environmental Sciences Stanford University Mentor: Dr. Dustin M. Schroeder	May 2017 to December 2018
	<b>Postdoctoral Scholar</b> Institute of Geophysics and Planetary Physics Scripps Institution of Oceanography University of California, San Diego Supervisor: Dr. Helen A. Fricker	October 2015 to April 2017
EDUCATION	<b>PhD in Earth Sciences</b> Institute of Geophysics and Planetary Physics Scripps Institution of Oceanography, La Jolla, CA Dissertation: <i>Investigating Antarctic ice sheet subglacial processes beneath the Whillans Ice Plain, West Antarctica, using satellite altimetry and GPS</i> Adviser: Dr. Helen A. Fricker	October 2015
	<b>Master of Science in Earth Sciences</b> Dartmouth College, Hanover, NH Thesis: <i>On the use of high-precision GPS surveys for validation of ICESat altimetry measurements and investigation of seasonal ice-surface fluctuations</i> Adviser: Dr. Robert L. Hawley	July 2010
	<b>Bachelor of Arts in Earth Sciences</b> Dartmouth College, Hanover, NH <i>Magna cum Laude, Phi Beta Kappa</i> Senior Thesis for High Honors: <i>Hydrothermal Waters of Ischia, Italy: A revisit of groundwater mixing and the ramifications for environmental arsenic contamination</i> Adviser: Dr. Benjamin Bostick	June 2008
MANUSCRIPTS IN REVIEW	[94] *Follingstad, V. M., R. J. Michaelides*, <b>M. R. Siegfried</b> , T. M. Meng, J. Bradford, K. H. Hughson, A. R. Kubas, A. Mullen, E. Quartini, A. Routt, H. G. Sizemore, A. Swidinsky and B. E. Schmidt, in review. Quantifying the Surface Deformation of Pingos on the Alaskan North Slope using Interferometric Synthetic Aperture Radar (InSAR), <i>Permafrost and Periglacial Processes</i> .	* indicates student or postdoctoral advisee ^ indicates student on whose dissertation committee I served † indicates co-first authors

- [93] \*Garvey, S., **M. R. Siegfried**, J. Shragge, L. Zoet, D. Hansen and N. Stevens, in review. Multi-component Rayleigh wave dispersion analysis, *Journal of Glaciology*.
- [92] \*Hills, B., **M. R. Siegfried**, N. Holschuh, H. Verboncoeur\* and D. Schroeder, in review. Resolving radiostratigraphy with squinted synthetic aperture radar focusing, *Journal of Glaciology*.
- [91] ^Peter, I. C., E. J. Anderson, **M. R. Siegfried**, A. B. Villas Bôas and N. T. Kurtz, in review. Advancing Large Lake Ice Observations: Water Surface Representation from ICESat-2 Altimetry, Operational Hydrodynamic Models, and Shoreline Gauges, *Water Resources Research*.
- [90] \*Snow, T., A. Harris, S. Grigsby, E. Abrahams, E. Savidge\*, T. Scambos, F. Pérez, C. Shuman, W. Abdalati and **M. R. Siegfried**, in review. Application of a new Landsat sea surface temperature algorithm to the Amundsen Sea, West Antarctica, *IEEE Transactions on Geoscience and Remote Sensing*.
- [89] \*Verboncoeur, H., B. H. Hills\*, **M. R. Siegfried**, E. Abrahams\* and N. Holschuh, in review. Subglacial conditions estimated from unsupervised clustering analysis of radar bed-echo shape, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*
- [88] Doran, P. T., **M. R. Siegfried**, H. Dugan, K. Hubbard and J. Lawrence, in review. Glacier surface lowering and subglacial outflow coincide with Blood Falls discharge event in the McMurdo Dry Valleys, *Antarctic Science*.
- [87] Matsuoka, K., G. Moholdt, J. F. Arthur, J. A. Bodart, X. Cui, F. Ferraccioli, R. Forsberg, V. Goel, T. A. Jordan, F. S. McCormack, R. Mottram, H. D. Pritchard, C. Shackleton, K. Tinto, F. Boberg, M. G. P. Cavitte, R. Drews, P. Dutrieux, J. Ebbing, O. Eisen, H. Eisermann, A. S. Gardner, C. A. Greene, N. Holschuh, S. S. R. Jamieson, B.-H. Kim, N. Krauzig, B. Kulessa, C. Leuschen, J. Li, L. Li, J. Liebsch, J. A. MacGregor, E. MacKie, A. Mahagaonkar, J. Maton, M. Morlighem, F. Navarro, P. Neff, I. N. Otosaka, F. Pattyn, A. Ruppel, R. J. Sanderson, H. Seroussi, A. Shepherd, **M. R. Siegfried**, T. Slater, A. P. Stroeven, M. Studinger, T. Teisberg, R. A. Venturelli, P. J. Winberry, C. Zhao, L. An, J. L. Bamber, R. E. Bell, R. G. Bingham, J. Brehmer-Moltmann, G. Eagles, J. Greenbaum, J. Gronset, W. S. Lee, E. L. Meur, L. M. Jon, K. Lindbäck, S. Lidström, M. Lösing, M. Minowa, M. Pandey, Y. Ray, M. Scheinert, D. M. Schroeder, T. Seehaus, K. Shahateet, D. Steinhage, X. Tang, D. Taylor, H. Verboncoeur\*, J. Yang and D. A. Young, in review. Towards an improved understanding of the Antarctic coastal zone and its contribution to future global sea level, *Reviews of Geophysics*.
- [86] Meng, T. M., R. J. Michaelides, S. Vivero, A. Nguyen and **M. R. Siegfried**, in review. Fusion of InSAR and stereophotogrammetry improves 3D alpine permafrost surface displacement measurements, *Earth and Space Science*.
- [85] Ross, N., R. J. Sanderson, B. Kulessa, M. Siegert, G. J. G. Paxman, K. A. Nichols, **M. R. Siegfried**, S. S. R. Jamieson, M. J. Bentley, T. A. Jordan, C. L. Batchelor, D. Small, O. Eisen, K. Winter, R. G. Bingham, S. L. Callard, R. Carr, C. F. Dow, H. A. Fricker, E. Hill, B. H. Hills\*, C. Hofstede, H. Jeofry, F. Napoleoni and W. Sauthoff\*, in review. Review Article: The Foundation-Patuxent-Academy ice stream system, Antarctica, *The Cryosphere*, doi:10.5194/egusphere-2025-3625.
- [84] Smith, B., T. C. Sutterley, H. A. Fricker, L. Padman, **M. R. Siegfried**, T. Black, D. Felikson, B. I. D. Freer, A. Gibbons, S. L. Howard, B. Jolley, M. King, B. Medley, M. Morlighem, C. Sadlik and W. Sauthoff\*, in review. ICESat-2 land ice products resolve Greenland and Antarctic ice-sheet height changes on seasonal to multiyear time scales, *Journal of Glaciology*, doi:10.22541/essoar.175882970.07697715/v1.
- REFEREED JOURNAL PUBLICATIONS**
- [83] \*Sauthoff, W., **M. R. Siegfried**, R. A. Venturelli and B. E. Smith, 2026. Dynamic Boundaries of Antarctic Active Subglacial Lakes Reveal Underestimated Water Fluxes

- and Overestimated Lakebed Active Areas, *Geophysical Research Letters*, doi:10.1029/2025GL117121, accepted.
- [82] \*Willis, R., J. Grimm, F. Stanek, P. Edme, A. Fichtner, B. P. Lipovsky, P. Paitz, F. Walter, **M. R. Siegfried** and E. R. Martin, 2026. Creating a Comprehensive Cryoseismic Catalog at Rhonegletscher: A Scalable Approach Using Distributed Acoustic Sensing and Machine Learning, *Machine Learning: Earth*, accepted.
- [81] \*Katz, Z. S., **M. R. Siegfried** and L. Padman, 2026. Slip-Event Timing and Ice Velocity Vary at Long-Period Ocean Tidal Frequencies at Whillans Ice Plain, West Antarctica, *Journal of Geophysical Research: Earth Surface*, **131**(1), e2025JF008770, doi:10.1029/2025JF008770, accepted.
- [80] Schroeder, D. M., E. Abrahams, A. L. Broome, W. Chu, R. Culberg, E. J. Dawson, E. J. MacKie, D. F. May, **M. R. Siegfried**, T. O. Teisberg and S. Zhao, 2026. Next generation radar bed measurements should be optimized for assimilation or repeat-pass profiling, *Philosophical Transactions of the Royal Society A*, accepted.
- 2025 [79] \*Hills<sup>†</sup>, B. H., T. J. Young<sup>†</sup>, D. A. Lilien<sup>†</sup>, E. Babcock, N. Bienert, D. Blankenship, J. Bradford, G. Brighi, A. Brisbourne, J. Dall, R. Drews, O. Eisen, M. R. Ershadi, T. A. Gerber, N. Holschuh, D. Jansen, T. M. Jordan, N. B. Karlsson, J. Li, C. Martín, K. Matsuoka, D. May, F. M. Oraschewski, J. Paden, N. M. Rathmann, N. Ross, D. M. Schroeder, M. Siegert, **M. R. Siegfried**, E. Smith and O. Zeising, 2025. Radar Polarimetry in Glaciology: Theory, Measurement Techniques, and Scientific Applications for Investigating the Anisotropy of Ice Masses, *Reviews of Geophysics*, **63**(4), e2024RG000842, doi:10.1029/2024RG000842.
- [78] ^Peter, I., E. J. Anderson, **M. R. Siegfried** and N. T. Kurtz, 2025. A Novel Algorithm for Ice-Water Discrimination in Large Lakes using ICESat-2 and Data Driven Machine Learning, *Earth and Space Science*, **12**(6), e2024EA004155, doi:10.1029/2024EA004155.
- [77] ^Sartore, N. B., T. J. Wagner, **M. R. Siegfried**, N. Pujara and L. K. Zoet, 2025. Wave erosion, frontal bending, and calving at Ross Ice Shelf, *The Cryosphere*, **19**, 249–265, doi:10.5194/tc-19-249-2025.
- [76] \*Savidge, E., J. Millstein\*, T. Snow\*, **M. R. Siegfried**, C. Bézu, K. Alley and B. Riel, 2025. Deteriorating Structural Integrity of Pine Island Glacier's Southern Ice Shelf (2017–23) Identified with Satellite-Derived Surface Deformation, Ice Velocity, and Strain Rates, *Journal of Glaciology*, **71**(e116), 1–9, doi:10.1017/jog.2025.10076.
- [75] \*Verboncoeur, H., **M. R. Siegfried**, J. P. Winberry, N. Holschuh, D. Byrne\*, W. Sauthoff\*, T. C. Sutterley and B. Medley, 2025. Multi-decadal evolution of Crary Ice Rise region, West Antarctica, amid modern ice-stream deceleration, *Journal of Glaciology*, **71**(e3), 1–11, doi:10.1017/jog.2024.79.
- [74] Bingham<sup>†</sup>, R. G., J. A. Bodart<sup>†</sup>, M. G. P. Cavitte<sup>†</sup>, A. Chung<sup>†</sup>, R. J. Sanderson<sup>†</sup>, J. C. R. Sutter<sup>†</sup>, O. Eisen, N. B. Karlsson, J. A. MacGregor, N. Ross, D. A. Young, D. W. Ashmore, A. Born, W. Chu, R. Drews, S. Franke, V. Goel, J. W. Goode, A. C. J. Henry, A. Hermant, B. H. Hills\*, N. Holschuh, M. R. Koutnik, G. J.-M. C. Leysinger Vieli, E. J. MacKie, E. Mantelli, C. Martín, F. S. L. Ng, F. M. Oraschewski, F. Napoleoni, F. Parrenin, S. V. Popov, T. Rieckh, R. Schlegel, D. M. Schroeder, M. J. Siegert, T. O. Teisberg, K. Winter, X. Cui, X. Tang, S. Yan, H. Davis, C. F. Dow, T. J. Fudge, T. A. Jordan, B. Kulessa, K. Matsuoka, C. J. Nyqvist, M. Rahmehoonfar, **M. R. Siegfried**, S. Singh, V. Višnjević, R. Zamora and A. Zuhr, 2025. Review article: AntArchitecture – building an age–depth model from Antarctica's radiostratigraphy to explore ice-sheet evolution, *The Cryosphere*, **19**(10), 4611–4655, doi:10.5194/tc-19-4611-2025.
- [73] Bryant, M. B., A. A. Borsa, E. J. Anderson, C. C. Masteller, R. J. Michaelides\*, **M. R. Siegfried** and A. P. Young, 2025. Multiple modes of shoreline change along the Alaskan Beaufort Sea observed using ICESat-2 altimetry and satellite imagery, *The Cryosphere*,

- 19**, 1825–1847, doi:10.5194/tc-19-1825-2025.
- [72] Campbell, T. C., M. L. Skidmore, M. O. Patterson, J. E. Dore, D. M. Harwood, A. Leventer, A. B. Michaud, B. E. Rosenheim, **M. R. Siegfried**, A. Steigmeyer, M. Tranter, R. A. Venturelli, J. C. Priscu and the SALSA Science Team, 2025. Dynamic subglacial meltwater history archived in Antarctic subglacial lake sediments , *GSA Bulletin*, doi: 10.1130/B37731.1.
- [71] Horgan, H. J., C. Stewart, C. Stevens, G. Dunbar, L. Balfoort, B. E. Schmidt, P. Washam, M. A. Werder, D. Mandeno, J. Marschalek, C. Hulbe, N. Holschuh, R. Levy, B. Hurwitz, S. Jendersie, K. Johnson, J. Lawrence, R. Morgenstern, A. D. Mullen, E. Quartini, W. Sauthoff\*, **M. R. Siegfried**, H. Still, S. Thorpe-Loversuch, T. van de Flierdt, R. Venturelli and A. Whiteford, 2025. A West Antarctic grounding-zone environment shaped by episodic water flow, *Nature Geoscience*, **18**(5), 389–395, doi:10.1038/s41561-025-01687-3.
- [70] Roth, D., M. Bezada, G. Jin, C. Masteller, **M. R. Siegfried**, A. Titov and B. Tate, 2025. A River on Fiber: Spatially Continuous Fluvial Monitoring with Distributed Acoustic Sensing, *Seismica*, **4**(2), doi:10.26443/seismica.v4i2.1696.
- [69] Sutterley, T. C., S. L. Howard, L. Padman and **M. R. Siegfried**, 2025. pyTMD: Python-based tidal prediction software, *Journal of Open Source Software*, **10**(116), 8566, doi: 10.21105/joss.08566.
- 2024 [68] \*Hills, B. H., **M. R. Siegfried** and D. M. Schroeder, 2024. Entrained Water in Basal Ice Suppresses Radar Bed-Echo Power at Active Subglacial Lakes, *Geophysical Research Letters*, **51**(13), doi:10.1029/2024gl109248.
- [67] \*Michaelides, R. J., **M. R. Siegfried**, J. Lovekin, K. Berry, B. Dugan and D. L. Roth, 2024. Wildfire Progression Time Series Mapping With Interferometric Synthetic Aperture Radar (InSAR), *IEEE Geoscience and Remote Sensing Letters*, **21**, 1–5, doi:10.1109/lgrs.2024.3365994.
- [66] Freer, B. I. D., O. J. Marsh, H. A. Fricker, A. E. Hogg, **M. R. Siegfried**, D. Floricioiu, W. Sauthoff\*, R. Rigby and S. F. Wilson, 2024. Coincident Lake Drainage and Grounding Line Retreat at Engelhardt Subglacial Lake, West Antarctica, *Journal of Geophysical Research: Earth Surface*, **129**(9), e2024JF007724, doi:10.1029/2024JF007724.
- 2023 [65] \*Savidge, E., T. Snow\*, **M. R. Siegfried**, Y. Zheng, A. B. Villas Bôas, G. A. Bortolotto, L. Boehme and K. E. Alley, 2023. Wintertime Polynya Structure and Variability From Thermal Remote Sensing and Seal-Borne Observations at Pine Island Glacier, West Antarctica, *IEEE Transactions on Geoscience and Remote Sensing*, **61**, 1–13, doi:10.1109/tgrs.2023.3271453.
- [64] \*Savidge, E., T. Snow\* and **M. R. Siegfried**, 2023. Multi-decadal Record of Sensible-Heat Polynya Variability from Satellite Optical and Thermal Imagery at Pine Island Glacier, West Antarctica, *Geophysical Research Letters*, **50**(22), doi:10.1029/2023gl106178.
- [63] **Siegfried<sup>†</sup>**, **M. R.**, R. A. Venturelli<sup>†</sup>, M. O. Patterson, W. Arnuk, T. D. Campbell, C. D. Gustafson<sup>‡</sup>, A. B. Michaud, B. K. Galton-Fenzi, M. B. Hausner, S. N. Holzschuh\*, B. Huber, K. D. Mankoff, D. M. Schroeder, P. Summers, S. Tyler, S. P. Carter, H. A. Fricker, D. M. Harwood, A. Leventer, B. E. Rosenheim, M. L. Skidmore, J. C. Priscu and the SALSA Science Team, 2023. The life and death of a subglacial lake in West Antarctica, *Geology*, **51**(5), 434–438, doi:10.1130/G50995.1.
- [62] \*Snow, T., W. Zhang, E. Schreiber, **M. R. Siegfried**, W. Abdalati and T. Scambos, 2023. Alongshore Winds Force Warm Atlantic Water Toward Helheim Glacier in Southeast Greenland, *Journal of Geophysical Research: Oceans*, **128**, doi:10.1029/2023JC019953.
- [61] Davis, C. L., R. A. Venturelli, A. B. Michaud, J. R. Hawkings, A. M. Achberger, T. J. Vick-Majors, B. E. Rosenheim, J. E. Dore, A. Steigmeyer, M. L. Skidmore, J. D. Barker, L. G. Benning, **M. R. Siegfried**, J. C. Priscu, B. C. Christner and the SALSA Science

- Team, 2023. Biogeochemical and historical drivers of microbial community composition and structure in sediments from Mercer Subglacial Lake, West Antarctica, *ISME Communications*, **3**(1), doi:10.1038/s43705-023-00216-w.
- [60] Robel, A., S. Sim, C. Meyer, **M. R. Siegfried** and C. Gustafson, 2023. Contemporary ice sheet thinning drives subglacial groundwater exfiltration with potential feedbacks on glacier flow, *Science Advances*, **9**(33), doi:10.1126/sciadv.adh3693.
- [59] Rosenheim<sup>†</sup>, B. E., A. B. Michaud<sup>†</sup>, J. Broda, A. Gagnon, R. A. Venturelli, T. D. Campbell, A. Leventer, M. Patterson, **M. R. Siegfried**, B. C. Christner, D. Duling, D. Harwood, J. E. Dore, M. Tranter, M. L. Skidmore, J. C. Priscu and the SALSA Science Team, 2023. A method for successful collection of multicores and gravity cores from Antarctic subglacial lakes, *Limnology and Oceanography: Methods*, **21**(5), 279–294, doi:10.1002/lom3.10545.
- [58] Ryan, J. C., B. Medley, C. M. Stevens, T. C. Sutterley and **M. R. Siegfried**, 2023. Role of snowfall versus air temperatures for Greenland Ice Sheet melt-albedo feedbacks, *Earth and Space Science*, **10**(11), e2023EA003158, doi:10.1029/2023EA003158.
- [57] Stubblefield, A. G., C. R. Meyer, **M. R. Siegfried**, W. Sauthoff\* and M. Spigelman, 2023. Reconstructing subglacial lake activity with an altimetry-based inverse method, *Journal of Glaciology*, 1–15, doi:10.1017/jog.2023.90.
- [56] Venturelli, R. A., B. Boehman, C. Davis, J. R. Hawkings, S. E. Johnston, C. D. Gustafson, A. B. Michaud, C. Mosbeux, **M. R. Siegfried**, T. J. Vick-Majors, V. Galy, R. G. M. Spencer, S. Warny, B. C. Christner, H. A. Fricker, D. M. Harwood, A. Leventer, J. C. Priscu, B. E. Rosenheim and the SALSA Science Team, 2023. Constraints on the Timing and Extent of Deglacial Grounding Line Retreat in West Antarctica, *AGU Advances*, **4**, e2022AV000846, doi:10.1029/2022AV000846.
- 2022
- [55] ^Gustafson, C. D., K. Key, **M. R. Siegfried**, J. P. Winberry, H. A. Fricker, R. A. Venturelli and A. B. Michaud, 2022. A dynamic saline groundwater system mapped beneath an Antarctic ice stream, *Science*, **376**(6593), 640–644, doi:10.1126/science.abm3301.
- [54] Bienert, N. L., D. M. Schroeder, S. T. Peters, E. J. MacKie, E. J. Dawson, **M. R. Siegfried**, R. Sanda and P. Christoffersen, 2022. Post-Processing Synchronized Bistatic Radar for Long Offset Glacier Sounding, *IEEE Transactions on Geoscience and Remote Sensing*, **60**, 1–17, doi:10.1109/tgrs.2022.3147172.
- [53] Livingstone, S. J., Y. Li, A. Rutishauser, R. J. Sanderson, K. Winter, J. Mikucki, H. Björnsson, J. S. Bowling, W. Chu, C. Dow, H. A. Fricker, M. McMillan, F. Ng, N. Ross, M. J. Siegert, **M. R. Siegfried** and A. J. Sole, 2022. Global synthesis of subglacial lakes and their changing role in a warming climate, *Nature Reviews Earth & Environment*, **3**, 106–124, doi:10.1038/s43017-021-00246-9.
- 2021
- [52] **Siegfried, M. R.** and H. A. Fricker, 2021. Illuminating active subglacial lake processes with ICESat-2 laser altimetry, *Geophysical Research Letters*, **48**(14), doi:10.1029/2020GL091089.
- [51] \*Michaelides<sup>†</sup>, R. J., M. Bryant<sup>†</sup>, **M. R. Siegfried** and A. A. Borsa, 2021. Quantifying Permafrost Deformation with ICESat-2, *Earth and Space Science*, **8**(8), e2020EA001538, doi:10.1029/2020EA001538.
- [50] Barchek, C. G., E. E. Brodsky, P. M. Fulton, M. A. King, **M. R. Siegfried** and S. Tulaczyk, 2021. Migratory earthquake precursors are dominant on an ice stream fault, *Science Advances*, **7**(6), doi:10.1126/sciadv.abd0105.
- [49] Becker, M., S. Howard, H. A. Fricker, L. Padman, C. Mosbeux and **M. R. Siegfried**, 2021. Buoyancy-driven flexure at the front of Ross Ice Shelf, Antarctica, observed by ICESat-2 satellite laser altimetry, *Geophysical Research Letters*, **48**(12), e2020GL091207, doi:10.1029/2020GL091207.

- [48] Horgan, H. J., L. van Haastrecht, R. B. Alley, S. Anandakrishnan, L. H. Beem, K. Christianson, A. Muto and **M. R. Siegfried**, 2021. Grounding zone subglacial properties from calibrated active-source seismic methods, *The Cryosphere*, **15**(4), 1863–1880, doi:10.5194/tc-15-1863-2021.
- [47] MacGregor, J., L. Boisvert, B. Medley, A. Petty, J. Harbeck, R. Bell, B. Blair, E. Blanchard-Wrigglesworth, E. Buckley, M. Christoffersen, J. Cochran, B. Csatho, E. De Marco, R. Dominguez, M. Fahnestock, S. Farrell, S. P. Gogineni, J. Greenbaum, C. Hansen, M. Hofton, J. Holt, K. Jezek, L. Koening, N. Kurtz, R. Kwok, C. Larsen, C. Leuschen, S. Manizade, S. Martin, T. Neumann, S. Nowicki, J. Paden, J. Richter-Menge, E. Rignot, F. Rodríguez-Morales, **M. R. Siegfried**, B. Smith, J. Sonntag, M. Studinger, K. Tinto, M. Truffer, T. Wagner, J. Woods, D. Young and J. Yungel, 2021. The scientific legacy of NASA’s Operation IceBridge, *Reviews of Geophysics*, **59**(2), e2020RG000712, doi:10.1029/2020RG000712.
- [46] Priscu, J. C., J. Kalin, J. Winans, T. Campbell, **M. R. Siegfried**, M. Skidmore, J. E. Dore, A. Leventer, D. Harwood, D. Duling, R. Zook, J. Burnett, D. Gibson, E. Krula, A. Mironov, J. McManis, G. Roberts, B. E. Rosenheim, B. C. Christner, K. Kasic, H. A. Fricker, W. B. Lyons, J. Barker, M. Bowling, B. Collins, C. Davis, A. Gagnon, C. Gardner, C. Gustafson, O.-S. Kim, W. Li, A. B. Michaud, M. Patterson, M. Tranter, R. Venturelli, T. Vick-Majors and C. Elsworth, 2021. Scientific Access into Mercer Subglacial Lake: Scientific Objectives, Drilling Operations and Initial Observations, *Annals of Glaciology*, **62**(85–86), 340–352, doi:10.1017/aog.2021.10.
- [45] Stubblefield, A. G., T. T. Creyts, J. Kingslake, **M. R. Siegfried** and M. Spiegelman, 2021. Surface expression and apparent timing of subglacial lake oscillations controlled by viscous ice flow, *Geophysical Research Letters*, **48**(17), e2021GL094658, doi:10.1029/2021GL094658.
- 2020
- [44] Adusumilli, S., H. A. Fricker, B. Medley, L. Padman and **M. R. Siegfried**, 2020. Interannual variations in meltwater input to the Southern Ocean from Antarctic ice shelves, *Nature Geoscience*, **13**(9), 616–620, doi:10.1038/s41561-020-0616-z.
- [43] Begeman, C., S. Tulaczyk, L. Padman, M. King, **M. R. Siegfried**, T. Hodson and H. A. Fricker, 2020. Tidal pressurization of the ocean cavity near an Antarctic ice shelf grounding line, *Journal of Geophysical Research – Oceans*, **125**(4), doi:10.1029/2019JC015562.
- [42] Das, I., L. Padman, R. E. Bell, H. A. Fricker, K. J. Tinto, C. L. Hulbe, C. S. Siddoway, T. Dhakal, N. P. Frearson, C. Mosbeux, S. I. Cordero and **M. R. Siegfried**, 2020. Multidecadal Basal Melt Rates and Structure of the Ross Ice Shelf, Antarctica, Using Airborne Ice Penetrating Radar, *Journal of Geophysical Research – Earth Surface*, **125**(3), doi:10.1029/2019JF005241.
- [41] Elsworth, C., D. M. Schroeder and **M. R. Siegfried**, 2020. Interpreting englacial layer deformation in the presence of complex ice flow history with synthetic radargrams, *Annals of Glaciology*, **61**(81), 206–213, doi:10.1017/aog.2019.41.
- [40] Hawkings, J. R., M. L. Skidmore, J. L. Wadham, J. C. Priscu, P. L. Morton, J. E. Hatton, C. B. Gardner, T. J. Kohler, M. Stibal, E. A. Bagshaw, A. Steigmeyer, J. Barker, J. E. Dore, W. B. Lyons, M. Tranter, R. G. M. Spencer and the SALSA Science Team (incl. **M. R. Siegfried**), 2020. Enhanced trace element mobilization by Earth’s ice sheets, *Proceedings of the National Academy of Sciences*, **117**(50), 31648–31659, doi:10.1073/pnas.2014378117.
- [39] Jordan, T., D. Schroeder, C. Elsworth and **M. R. Siegfried**, 2020. Estimation of ice fabric within Whillans Ice Stream using polarimetric phase-sensitive radar sounding, *Annals of Glaciology*, **61**(81), 74–83, doi:10.1017/aog.2020.6.
- [38] MacKie, E. J., D. M. Schroeder, J. Caers, **M. R. Siegfried** and C. Scheidt, 2020. Antarctic topographic realizations and geostatistical modeling used to map subglacial lakes,

- Journal of Geophysical Research – Earth Surface*, **125**(3), doi:10.1029/2019JF005420.
- [37] Smith, B., H. A. Fricker, A. S. Gardner, B. Medley, J. Nilsson, F. S. Paolo, N. Holschuh, S. Adusumilli, K. Brunt, B. Csatho, K. Harbeck, T. Markus, T. Neumann, **M. R. Siegfried** and H. J. Zwally, 2020. Pervasive ice sheet mass loss reflects competing ocean and atmosphere processes, *Science*, **368**(6496), 1239–1242, doi:10.1126/science.aaz5845.
- [36] Venturelli, R. A., **M. R. Siegfried**, K. Roush, W. Li, J. Burnett, R. Zook, H. A. Fricker, J. Priscu, A. Leventer and B. Rosenheim, 2020. Mid-Holocene grounding line variability in the southern Ross Embayment, *Geophysical Research Letters*, **47**(15), e2020GL088476, doi:10.1029/2020GL088476.
- 2019
- [35] Schroeder, D. M., J. A. Dowdeswell, M. J. Siegert, R. G. Bingham, W. Chu, E. J. MacKie, **M. R. Siegfried**, K. I. Vega, J. R. Emmons and K. Winstein, 2019. Multidecadal observations of the Antarctic ice sheet from restored analog radar records, *Proceedings of the National Academy of Sciences*, **116**(38), 18867–18873, doi:10.1073/pnas.1821646116.
- [34] Smith, B. E., N. Holschuh, A. S. Gardner, S. Adusumilli, K. M. Brunt, B. Csatho, H. A. Fricker, K. Harbeck, A. Huth, T. Neumann, J. Nilsson and **M. R. Siegfried**, 2019. Land ice height-retrieval algorithm for NASA's ICESat-2 photon-counting laser altimeter, *Remote Sensing of Environment*, **233**, 111352, doi:10.1016/j.rse.2019.111352.
- [33] Tinto, K., L. Padman, C. Siddoway, S. Springer, H. A. Fricker, I. Das, F. C. Tontini, D. Porter, N. Frearson, S. Howard, **M. R. Siegfried** and et al., 2019. Ross Ice Shelf response to climate driven by the tectonic imprint on seafloor bathymetry, *Nature Geoscience*, **12**, 441–449, doi:10.1038/s41561-019-0370-2.
- 2018
- [32] **Siegfried, M. R.** and H. A. Fricker, 2018. Thirteen years of subglacial lake activity in Antarctica from multi-mission altimetry, *Annals of Glaciology*, **59**(76), 42–55, doi:10.1017/aog.2017.36.
- [31] Chu, W., D. M. Schroeder and **M. R. Siegfried**, 2018. Retrieval of Englacial Firn Aquifer Thickness from Ice-Penetrating Radar Sounding in Southeast Greenland, *Geophysical Research Letters*, **45**(21), 11,770–11,778, doi:10.1029/2018GL079751.
- [30] Begeman, C. M., S. M. Tulaczyk, O. J. Marsh, J. A. Mikucki, T. P. Stanton, T. O. Hodson, **M. R. Siegfried**, R. D. Powell, K. Christianson and M. A. King, 2018. Ocean stratification and low melt rates at the Ross Ice Shelf grounding zone, *Journal of Geophysical Research – Oceans*, **123**(10), 7438–7452, doi:10.1029/2018JC013987.
- [29] Adusumilli, S., H. A. Fricker, **M. R. Siegfried**, L. Padman, F. Paolo and S. Ligtenberg, 2018. Variable basal melt rates of Antarctic Peninsula ice shelves, 1994–2016, *Geophysical Research Letters*, **45**(9), 4086–4095, doi:10.1002/2017GL076652.
- [28] Padman, L., **M. R. Siegfried** and H. A. Fricker, 2018. Ocean tide influences on ice sheet processes, *Reviews of Geophysics*, **56**(1), 142–184, doi:10.1002/2016RG000546.
- [27] Paolo, F. S., L. Padman, H. A. Fricker, S. Adusumilli, S. Howard and **M. R. Siegfried**, 2018. Response of Pacific-sector Antarctic ice shelves to the El Niño/ Southern Oscillation, *Nature Geoscience*, **11**, 121–126, doi:10.1038/s41561-017-0033-0.
- 2017
- [26] **Siegfried, M. R.**, B. Medley, K. Larson, H. A. Fricker and S. Tulaczyk, 2017. Snow accumulation variability on a West Antarctic ice stream observed with GPS reflectometry, 2007–2017, *Geophysical Research Letters*, **44**(15), 7808–7816, doi:10.1002/2017GL074039.
- [25] Carter, S. P., H. A. Fricker and **M. R. Siegfried**, 2017. Antarctic subglacial lakes drain through sediment-floored canals: Theory and model testing on real and idealized domains, *The Cryosphere*, **11**, 381–405, doi:10.5194/tc-11-381-2017.
- [24] Damsgaard, A., J. Suckale, J. Piotrowski, M. Houssais, **M. R. Siegfried** and H. A. Fricker, 2017. Sediment behavior controls equilibrium width of subglacial channels, *Journal of Glaciology*, **63**(242), 1034–1048, doi:10.1017/jog.2017.71.
- [23] Key, K. and **M. R. Siegfried**, 2017. The feasibility of ground-based electromagnetic

- methods for mapping the subglacial hydrological structure beneath ice streams, *Journal of Glaciology*, **63**(241), 755–771, doi:10.1017/jog.2017.36.
- [22] Scambos, T. A., R. E. Bell, A. M. Smith, D. G. Vaughan, R. B. Alley, S. Anandakrishnan, D. H. Bromwich, K. M. Brunt, K. Christianson, T. T. Creyts, S. B. Das, R. DeConto, P. Dutrieux, H. A. Fricker, D. Holland, J. MacGregor, B. Medley, D. Pollard, **M. R. Siegfried**, E. J. Steig and P. Yager, 2017. How Much, How Fast? A Review and Science Plan for Research on the Instability of Antarctica's Thwaites Glacier in the 21st Century, *Global and Planetary Change*, **153**, 16–34, doi:10.1016/j.gloplacha.2017.04.008.
- 2016
- [21] **Siegfried, M. R.**, H. A. Fricker, S. P. Carter and S. Tulaczyk, 2016. Episodic ice velocity fluctuations triggered by a subglacial flood in West Antarctica, *Geophysical Research Letters*, **43**(6), 2640–2648, doi:10.1002/2016GL067758.
- [20] Alley, K. E., T. A. Scambos, **M. R. Siegfried** and H. A. Fricker, 2016. Impacts of warm water on Antarctic ice shelf stability through basal channel formation, *Nature Geoscience*, **9**(4), 290–293, doi:10.1038/ngeo2675.
- [19] Achberger, A. M., B. C. Christner, A. B. Michaud, J. C. Priscu, M. L. Skidmore, T. J. Vick-Majors and the WISSARD Science Team (incl. **M. R. Siegfried**), 2016. Microbial Community Structure of Subglacial Lake Whillans, West Antarctica, *Frontiers in Microbiology*, **7**, 1457, doi:10.3389/fmicb.2016.01457.
- [18] Damsgaard, A., D. L. Eghold, L. H. Beem, S. Tulaczyk, N. K. Larsen, J. A. Piotrowski and **M. R. Siegfried**, 2016. Ice flow dynamics forced by rapid water-pressure variations in subglacial granular beds, *Geophysical Research Letters*, **43**(23), 165–173, doi:10.1002/2016GL071579.
- [17] Hodson, T., R. Powell, S. Brachfeld, S. Tulaczyk, R. Scherer and the WISSARD Science Team (incl. **M. R. Siegfried**), 2016. Physical processes in Subglacial Lake Whillans, West Antarctica: inferences from sediment cores, *Earth and Planetary Science Letters*, **444**, 56–63, doi:10.1016/j.epsl.2016.03.036.
- [16] Marsh, O. J., H. A. Fricker, **M. R. Siegfried**, K. Christianson, K. W. Nicholls, H. F. J. Corr and G. Catania, 2016. High basal melting forming a channel at the grounding line of Ross Ice Shelf, Antarctica, *Geophysical Research Letters*, **43**(1), 250–255, doi:10.1002/2015gl066612.
- [15] Vick-Majors, T. J., A. C. Mitchell, A. M. Achberger, B. C. Christner, J. E. Dore, A. B. Michaud, J. A. Mikucki, A. M. Purcell, M. L. Skidmore, J. C. Priscu and the WISSARD Science Team (incl. **M. R. Siegfried**), 2016. Physiological ecology of microorganisms in Subglacial Lake Whillans, *Frontiers in Microbiology*, **7**, 1705, doi:10.3389/fmicb.2016.01705.
- 2015
- [14] Fisher, A. T., K. D. Mankoff, S. M. Tulaczyk, S. W. Tyler, N. Foley and the WISSARD Science Team (incl. **M. R. Siegfried**), 2015. High geothermal heat flux measured below the West Antarctic Ice Sheet, *Science Advances*, **1**(6), e1500093–e1500093, doi:10.1126/sciadv.1500093.
- [13] Fricker, H. A., **M. R. Siegfried**, S. P. Carter and T. A. Scambos, 2015. A decade of progress in observing and modeling Antarctic subglacial water systems, *Philosophical Transactions of the Royal Society A*, **374**(2059), 20140294, doi:10.1098/rsta.2014.0294.
- [12] Mikucki, J., P. Lee, D. Ghosh, A. Purcell, A. Mitchell, K. Mankoff, A. T. Fisher, S. Tulaczyk, S. P. Carter, **M. R. Siegfried**, H. A. Fricker, T. Hodson, J. Coenen, R. Powell, R. P. Scherer, T. Vick-Majors, A. M. Achberger, B. C. Christner and M. Tranter, 2015. Subglacial Lake Whillans biogeochemistry: a synthesis of current knowledge, *Philosophical Transactions of the Royal Society A*, **374**(2059), 20140290, doi:10.1098/rsta.2014.0290.
- 2014
- [11] **Siegfried, M. R.**, H. A. Fricker, M. Roberts, T. A. Scambos and S. Tulaczyk, 2014.

- A decade of West Antarctic subglacial lake interactions from combined ICESat and CryoSat-2 altimetry, *Geophysical Research Letters*, **41**(3), 891–898, doi:10.1002/2013GL058616.
- [10] Christner, B. C., J. C. Priscu, A. M. Achberger, C. Barbante, S. P. Carter, K. Christianson, A. B. Michaud, J. A. Mikucki, A. C. Mitchell, M. L. Skidmore, T. J. Vick-Majors and the WISSARD Science Team (incl. **M. R. Siegfried**), 2014. A microbial ecosystem beneath the West Antarctic ice sheet, *Nature*, **512**(7514), 310–313, doi:10.1038/nature13667.
  - [9] Holt, T. O., N. F. Glasser, H. A. Fricker, L. Padman, A. Luckman, O. King, D. J. Quincey and **M. R. Siegfried**, 2014. The structural and dynamic responses of Stange Ice Shelf to recent environmental change, *Antarctic Science*, **26**(06), 646–660, doi:10.1017/S095410201400039X.
  - [8] Purcell, A. M., J. A. Mikucki, A. M. Achberger, I. A. Alekhina, C. Barbante, B. C. Christner, D. Ghosh, A. B. Michaud, A. C. Mitchell, J. C. Priscu, R. Scherer, M. L. Skidmore, T. J. Vick-Majors and the WISSARD Science Team (incl. **M. R. Siegfried**), 2014. Microbial sulfur transformations in sediments from Subglacial Lake Whillans, *Frontiers in Microbiology*, **5**, 594, doi:10.3389/fmicb.2014.00594.
  - [7] Tulaczyk, S., J. A. Mikucki, **M. R. Siegfried**, J. C. Priscu, C. G. Barchek, L. H. Beem, A. Behar, J. Burnett, B. C. Christner, A. T. Fisher, F. H. A., K. D. Mankoff, R. D. Powell, F. Rack, D. Sampson, R. P. Scherer, S. Y. Schwartz and the WISSARD Science Team, 2014. WISSARD at Subglacial Lake Whillans, West Antarctica: scientific operations and initial observations, *Annals of Glaciology*, **55**(65), 51–58, doi:10.3189/2014AoG65A009.
- 2013
- [6] Carter, S. P., H. A. Fricker and **M. R. Siegfried**, 2013. Evidence of rapid subglacial water piracy under Whillans Ice Stream, West Antarctica, *Journal of Glaciology*, **59**(218), 1147–1162, doi:10.3189/2013JoG13J085.
  - [5] Holt, T. O., N. F. Glasser, D. J. Quincey and **M. R. Siegfried**, 2013. Speedup and fracturing of George VI Ice Shelf, Antarctic Peninsula, *The Cryosphere*, **7**(3), 797–816, doi:10.5194/tc-7-797-2013.
  - [4] Horgan, H. J., R. B. Alley, K. Christianson, R. W. Jacobel, S. Anandakrishnan, A. Muto, L. H. Beem and **M. R. Siegfried**, 2013. Estuaries beneath ice sheets, *Geology*, **41**(11), 1159–1162, doi:10.1130/G34654.1.
  - [3] Priscu, J. C., A. M. Achberger, J. E. Cahoon, B. C. Christner, R. L. Edwards, W. L. Jones, A. B. Michaud, **M. R. Siegfried**, M. L. Skidmore, R. H. Spigel, G. W. Switzer, S. Tulaczyk and T. J. Vick-Majors, 2013. A microbiologically clean strategy for access to the Whillans Ice Stream subglacial environment, *Antarctic Science*, **25**(5), 637–647, doi:10.1017/s0954102013000035.
- 2012
- [2] Taylor, V. F., B. P. Jackson, **M. R. Siegfried**, J. Navratilova, K. A. Francesconi, J. Kirshtein and M. Voytek, 2012. Arsenic speciation in food chains from mid-Atlantic hydrothermal vents, *Environmental Chemistry*, **9**(2), 130–138, doi:10.1071/EN11134.
- 2011
- [1] **Siegfried, M. R.**, R. L. Hawley and J. F. Burkhart, 2011. High-Resolution Ground-Based GPS Measurements Show Intercampaign Bias in ICESat Elevation Data Near Summit, Greenland, *IEEE Transactions on Geosciences and Remote Sensing*, **49**(10), 3393–3400, doi:10.1109/TGRS.2011.2127483.
- TECHNICAL REPORTS
- Smith, B., D. Hancock, K. Harbeck, L. Roberts, T. Neumann, K. Brunt, H. A. Fricker, A. Gardner, **M. R. Siegfried**, S. Adusumilli, B. Csathoó, N. Holschuh, J. Nilsson and F. Paolo, 2021. Algorithm Theoretical Basis Document (ATBD) for Land Ice Along-Track Height Product (ATL06), Release 004, *NASA Goddard Space Flight Center Technical Reference*.
- OTHER PUBLICATIONS
- Snow, T., C. Holdgraf, W. Sauthoff\*, J. Scheick, E. Abrahams, J. Millstein\*, S. Bhanguj, C. Boettigerk, J. Colliander, L. A. Lopez Espinosa, E. Holmes, J. H. Kennedy, J. S.

- Lowndes, A. I. Mandel, F. Pérez, J-P Swinski, A. Teucher and **M. R. Siegfried**, in review. A path to better science through co-creation and open infrastructure, *Proceedings of the National Academy of Sciences (Commentary)*.
- \*Sauthoff, W., T. Snow\*, J. D. Millstein\*, J. Colliander and **M. R. Siegfried**, 2024. Democratizing Science in the Cloud. *EOS: Earth & Space Science News*, **105**, doi: [10.1029/2024EO240385](https://doi.org/10.1029/2024EO240385).
- Siegfried, M. R.**, and C. D. Gustafson^, 2022. Scientists in Antarctica discover a vast, salty groundwater system under the ice sheet – with implications for sea level rise, *The Conversation*, <https://theconversation.com/scientists-in-antarctica-discover-a-vast-salty-groundwater-system-under-the-ice-sheet-with-implications-for-sea-level-rise-182506>.
- Padman, L., and **M. R. Siegfried**, 2018. Ocean Tides Affect Ice Loss from Large Polar Ice Sheets, *EOS: Earth & Space Science News*, **99**, doi: [10.1029/2018EO092835](https://doi.org/10.1029/2018EO092835).
- Fricker, H. A., F. Paolo, **M. R. Siegfried**, and S. Adusumilli, 2018. Short-term changes in Antarctica's ice shelves are key to predicting their long-term fate, *The Conversation*, <https://theconversation.com/short-term-changes-in-antarcticas-ice-shelves-are-key-to-predicting-their-long-term-fate-95207>.

## DATA SETS

**Siegfried, M. R.**, R. A. Venturelli, M. O. Patterson, W. Arnuk, T. D. Campbell, C. D. Gustafson, A. B. Michaud, B. K. Galton-Fenzi, M. B. Hausner, S. N. Holzschuh, B. Huber, K. D. Mankoff, D. M. Schroeder, P. T. Summers, S. Tyler, S. P. Carter, H. A. Fricker, D. M. Harwood, A. Leventer, B. E. Rosenheim, M. L. Skidmore, J. C. Priscu and T. S. S. Team, 2023. Data for Siegfried\*, Venturelli\*, et al., 2023, Geology, Zenodo, doi: [10.5281/ZENODO.7597019](https://doi.org/10.5281/ZENODO.7597019).

Smith, B. E., H. A. Fricker, A. Gardner, **M. R. Siegfried**, S. Adusumilli, B. M. Csathó, N. Holschuh, J. Nilsson, F. S. Paolo and the ICESat-2 Science Team, 2021. ATLAS/ICESat-2 L3A Land Ice Height, Version 4, NASA National Snow and Ice Data Center Distributed Active Archive Center, Boulder, Colorado USA, doi: [10.5067/ATLAS/ATL06.004](https://doi.org/10.5067/ATLAS/ATL06.004).

## PUBLISHED SOFTWARE

**Siegfried, M. R.**, W. Arnuk, R. A. Venturelli and M. O. Patterson, 2023. SiegVent2023-Geology code repository (Version 1.1), Zenodo, doi: [10.5281/ZENODO.7605994](https://doi.org/10.5281/ZENODO.7605994).

**Siegfried, M. R.**, 2021. mrsiegfried/Siegfried2021-GRL: Initial release with acceptance (Version 1.0), Zenodo, doi: [10.5281/ZENODO.4914107](https://doi.org/10.5281/ZENODO.4914107).

Arendt, A., B. Smith, D. Shean, A. Steiker, Alek Petty, F. Perez, S. Henderson, F. Paolo, J. Nilsson, M. Becker, Susheel Adusumilli, D. Shapero, B. Wallin, J. Meyer, A. Schweiger, S. Dickinson, N. Hoschuh, **M. R. Siegfried** and T. Neumann, 2019. ICESAT-2HackWeek/ICESat2\_hackweek\_tutorials (Version 0.1), Zenodo, doi: [10.5281/ZENODO.3360994](https://doi.org/10.5281/ZENODO.3360994).

## EXPANDED ABSTRACTS

- \* indicates student or postdoctoral advisee
- [12] \*Abrahams, E., T. Snow\*, F. Perez and **M. R. Siegfried**, 2024. A Scalable Data Augmentation Strategy Enhancing Tile-Position Invariance in Small Object Segmentation for Earth Observation, *International Conference on Learning Representations: Machine Learning 4 Remote Sensing (ICLR: ML4RS 2024)*, doi: [10.48550/arXiv.2404.10927](https://doi.org/10.48550/arXiv.2404.10927).
- [11] \*Byrne, D., J. Klemm\*, **M. R. Siegfried**, D. Castelletti, R. Michaelides\* and D. M. Schroeder, 2024. Radar Altimetry Simulation to Identify Sub-Footprint Ice-Sheet Surface Change, *IGARSS 2024: 2024 IEEE International Geoscience and Remote Sensing Symposium*, doi: [10.1109/IGARSS53475.2024.10641847](https://doi.org/10.1109/IGARSS53475.2024.10641847).
- [10] Medley, B., S. Bhushan, T. Black, T. Dixon, D. Felikson, A. Gardner, R. Michaelides, P. Milillo, J. Millstein\*, A. Petty, D. Shean, **M. R. Siegfried**, B. Smith, T. Sutterley and T. Teisberg, 2024. Cryospheric Science Activities Supporting Development of

- NASA's Surface Topography and Vegetation Observing System, *IGARSS 2024: 2024 IEEE International Geoscience and Remote Sensing Symposium*.
- [9] Michaelides, R. J., **M. R. Siegfried**, S. Batzli, J. A. Villegas Bravo, D. Losos and W. C. Straka III, 2024. Robust Wildfire Time Series Imaging with Spaceborne Interferometric Synthetic Aperture Radars, *IGARSS 2024: 2024 IEEE International Geoscience and Remote Sensing Symposium*.
  - [8] \*Sauthoff, W., **M. R. Siegfried** and B. E. Smith, 2024. Evolving Outlines of Antarctic Active Subglacial Lakes using an Image Processing Algorithm on Gridded Altimetry Data, *IGARSS 2024: 2024 IEEE International Geoscience and Remote Sensing Symposium*, doi:10.1109/IGARSS53475.2024.10642198.
- 2023
- [7] Bradford, J. H., **M. R. Siegfried**, V. Follingstad\*, K. Hughson, A. Routt, B. Schmidt, A. Kubas, E. Quartini, A. Mullen and A. Swidinsky, 2023. Mapping the internal structure Arctic pingos using ground-penetrating radar: Results from the Pingo Canadian Landmark, *Seventh International Conference on Engineering Geophysics*.
  - [6] Bryant, M., E. Anderson, A. Borsa, C. Masteller, R. Michaelides\*, **M. R. Siegfried** and A. Young, 2023. Integrating ICESat-2 elevation observation and satellite optical imagery to measure coastal topography and retreat rates on the Alaskan Beaufort Sea coast, *IGARSS 2023: 2023 IEEE International Geoscience and Remote Sensing Symposium*.
  - [5] Michalides, R. and **M. R. Siegfried**, 2023. Studying permafrost-wildfire interactions in the age of NISAR, *IGARSS 2023: 2023 IEEE International Geoscience and Remote Sensing Symposium*.
- 2021
- [4] **Siegfried, M. R.**, D. M. Schroeder, W. Sauthoff\* and B. E. Smith, 2021. Investigating a large subglacial lake drainage in East Antarctica with ice-penetrating radar, *SEG Annual Meeting* (invited contribution).
  - [3] \*Klemm, J. and **M. R. Siegfried**, 2021. Open Source Visualization for Radar Altimetry Waveforms, /textit{IEEE International Symposium on Antenna Technology and Applied Electromagnetics}.
  - [2] Summers, P. T., D. M. Schroeder and **M. R. Siegfried**, 2021. Constraining ice sheet basal sliding and horizontal velocity profiles using a stationary phase sensitive radar sounder, *IGARSS 2021: 2021 IEEE International Geoscience and Remote Sensing Symposium*.
- 2020
- [1] Bienert, N., D. M. Schroeder, S. T. Peters and **M. R. Siegfried**, 2020. Processing-based synchronization approach for bistatic glacial tomography, *IGARSS 2020: 2020 IEEE International Geoscience and Remote Sensing Symposium*.  
*Winner of the IEEE GRSS Symposium Prize Paper Award*

## MENTORING

**Postdoctoral Scholars**

Shane Grigsby, 2019–2021

(post Mines: R&amp;D Scientist, National Geospatial Intelligence Agency)

Roger Michaelides, 2020–2022

(post Mines: Asst. Professor, Washington University in St. Louis)

Tasha Snow, 2021–2024

(post Mines: Asst. Researcher, NASA Goddard/U. Maryland)

Benjamin Hills, 2023–2025

(post Mines: Senior Geophysicist, Vista Clara, Inc.)

Joanna Millstein, 2023–present

**Graduate Students**

Jared Klemm (PhD), Geophysics, 2020–2021

(post Mines: Software Engineer II, Atmospheric and Environmental Research)

Kayla Hubbard (MS-NT), Hydrologic Science &amp; Engineering, 2020–2021

(post Mines: Science Assistant, Arctic Sciences Section, National Science Foundation)

Elena Savidge (PhD), Geophysics, 2020–2024  
*(post Mines: Trottier Space Institute Postdoctoral Fellow, McGill University)*  
Wilson Sauthoff (PhD), Hydrologic Science & Engineering, 2020–present  
Hannah Verboncoeur (PhD), Geophysics, 2021–present  
Bailey Mullett (MS-NT), Hydrologic Science & Engineering, 2022–2024  
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Gabriel Thomas (MS), Hydrologic Science & Engineering, 2022–2024  
*co-advised with Kamini Singha*  
Rachel Willis(PhD), Geophysics, 2023–2025  
Zachary Katz (PhD), Geophysics, 2023–present  
Samara Omar (PhD), Geophysics, 2024–present  
*co-advised with Jeff Shragge*  
Rohaiz Haris, Geophysics, 2024–present  
Marianna Marquardt, Geophysics, 2024–present

### **Undergraduate Research**

Matt Oleszko, Geophysics, 2019–2021  
*(post-Mines step: Radar Processing Engineer, The Aerospace Corporation)*  
Anna Valentine, Geophysics, 2020–2021  
*(post-Mines step: PhD student at Dartmouth College)*  
Becca Prentice, Geophysics, 2020–2022  
*(post-Mines step: PhD student at Stanford University)*  
Stephanie Holzschuh, Applied Math and Statistics, 2020–2021  
*(post-Mines step: Data Engineer at Chevron)*  
Michael Field, Geophysics, 2021–2022  
*(post-Mines step: PhD student at University of Florida)*  
Cash Koning, Geophysics, 2020–2023  
*(post-Mines step: Polar Engineer, Earthscope Consortium)*  
Venezia Follingstad, Geophysics, 2021–2023  
*(post-Mines step: PhD student at University of Oregon)*  
Ashleigh Miller, Geophysics, 2022–2023  
*(post-Mines step: PhD student at Georgia Tech)*  
Mia Jungman, Geophysics, 2023–2024  
Duncan Byrne, Geophysics, 2023–2025  
*(post-Mines step: PhD student at University of Colorado, Boulder)*  
Anastasia Horne, Applied Math & Statistics, 2023–2025  
*(post-Mines step: Research Mathematician, Army Corps of Engineers)*  
Lucas Holt, Geophysics, 2024–2025  
Jack Logan, Geophysics, 2024–present

### **Senior Design**

Hannah Haugen, 2021 *(post-Mines: M.S. student at U. Arizona)*  
Bailey Mullett, 2022 *(post-Mines: M.S. student at Colorado School of Mines)*  
Venezia Follingstad, 2022 *(post-Mines: PhD student at U. Oregon)*  
Cash Koning, 2022 *(post-Mines: Polar Engineer, Earthscope Cosortium)*  
Dawn Lipfert, 2024 *(post-Mines: Geophysicist, Collier Geophysics)*

### **Visiting Students**

Emma Pearce (PhD), University of Leeds, 2019  
Joanna Millstein (PhD), MIT, 2021–2023  
Ellie Abrahams (PhD), University of California Berkeley, 2022  
Eojin Lee (UG), Columbia University, 2022–2023  
Sawyer Kaarto (UG), Red Rocks Community College, 2022

### **Dissertation Committee Membership**

Colin Beyers (2025–present) Mines, Department of Geophysics  
Joe Ruggiero (2025–present) Mines, Department of Geology & Geological Engineering

Jason Drebber (2024–present) Mines, Department of Geology & Geological Engineering  
 Kate Huelse (2024–present) Mines, Department of Civil & Environmental Engineering  
 Ellie Longar (2024–present) Mines, Department of Geology & Geological Engineering  
 Ellie Miller (2024–present) Mines, Department of Geology & Geological Engineering  
 Nicolas Sartore (2024–present) U. Wisconsin, Dept. of Atmospheric & Oceanic Sciences  
 Isabelle Peter (2024–present) Mines, Department of Civil & Environmental Engineering  
 Ryan Peterson (2024–present) Mines, Department of Applied Mathematics  
 Nicholas Dorogy (2023–present) Mines, Department of Geophysics  
 Ari Koshkin (2023–2025) Mines, Hydrologic Science & Engineering  
 Ahmad Tourei (2023–2025) Mines, Hydrologic Science & Engineering  
 Melody Zhang (2021–present) Mines, Department of Geology & Geological Engineering  
 Devon Dunmire (2020–2022) U. Colorado Boulder, Atmospheric & Ocean Sciences  
 Chloe Gustafson (2020) Columbia U., Lamont-Doherty Earth Observatory

**Masters Thesis Committee Membership**

Rishi Banerjee (2023–2024) U. Manitoba, Earth Observation Science

**TEACHING EXPERIENCE****Colorado School of Mines**, Golden, CO*Instructor of Record*

GPGN486: Geophysics Field Camp	Summer 2026
GPGN470/570: Applications of Remote Sensing	Spring 2026
CSCI303: Data Science	Spring 2026
GPGN486: Geophysics Field Camp	Summer 2025
GPGN470/570: Applications of Remote Sensing	Spring 2025
GPGN573: Polar Cryosphere in the Earth System	Fall 2024
GPGN486: Geophysics Field Camp	Summer 2024
GPGN470/570: Applications of Remote Sensing	Spring 2024
CSCI303: Data Science	Spring 2024
GPGN486: Geophysics Field Camp	Summer 2023
GPGN470/570: Applications of Remote Sensing	Spring 2023
GPGN598b: Polar Cryosphere in the Earth System	Fall 2022
GPGN486: Geophysics Field Camp	Summer 2022
GPGN470/570: Applications of Remote Sensing	Spring 2022
GPGN599: Ice Dynamics at Whillans Ice Stream	Spring 2022
GPGN470/570: Applications of Remote Sensing	Spring 2021
GPGN101: Geophysics & Society	Spring 2021
GPGN599: Antarctic groundwater modeling	Spring 2021
GPGN470/570: Applications of Remote Sensing	Spring 2020
GPGN101: Geophysics & Society	Spring 2020
GPGN498A/C: Geophysical Remote Sensing	Spring 2019

*Co-Instructor*

GEGN584: Field Methods in Hydrology	Fall 2023
GEGN584: Field Methods in Hydrology	Fall 2022
GPGN498: Electrical & Electromagnetic Methods & Applications	Spring 2022
GPGN486: Geophysics Field Camp	Summer 2021
GPGN486: Geophysics Field Camp	Summer 2019
Cryospheric Science with ICESat-2 Hackweek 2019, U. Washington	July 2019

**Scripps Institution of Oceanography**, La Jolla, CA*Co-Instructor*

SIO115: Ice and the Climate System	Winter 2017
GMT Workshop for geodynamics REU students	June 2016

<i>Teaching Assistant</i>		
Remote Sensing		Spring 2013
Instructors: Dr. David Sandwell, Dr. Helen Fricker		
<b>Dartmouth College</b> , Hanover, NH		
<i>Teaching Assistant</i>		
Dartmouth College Field Program		Fall 2009
<i>Glaciology, Quaternary Geology, Structure and Geologic Mapping</i>		
Instructors: Dr. Bob Hawley, Dr. Erich Osterberg, Dr. Meredith Kelly		
Ecological Agriculture		Summer 2009
Instructors: Dr. Jill Mikucki, Dr. Sarah Smith		
Glaciology		Spring 2009
Instructor: Dr. Robert Hawley		
Polar Geobiology		Fall 2009
Instructor: Dr. Jill Mikucki		
Introduction to Computer Science		Spring 2006
Instructor: Dr. Thomas Cormen		
<i>Laboratory Teaching Assistant</i>		
Mineralogy		Summer 2007
Instructor: Dr. Ed Meyer		
<i>Grader</i>		
Differential Equations		Winter 2008
INVITED TALKS		
Approaches and Capabilities for International Polar Year 5		
<i>National Academies' Exploring Key Research Topics for IPY5</i>		20 May 2025
New insights into ice-sheet change from six years of high resolution ICESat-2 laser altimetry		
<i>AGU Fall Meeting</i>		11 Dec. 2024
Past/ongoing en- and subglacial work: Glaciology		
<i>US Ice Drilling Program En- and Subglacial Access Working Group Meeting</i>		8 Dec. 2024
Big Data, meet Long Data: Examining decadal-scale variability of ice-ocean-freshwater processes in Antarctica		
<i>Mines Research Council Seminar</i>		13 Mar. 2024
Big Data, meet Long Data: Examining decadal-scale variability of ice-ocean-freshwater processes in Antarctica		
<i>Caltech Division of Geological and Planetary Sciences Seminar</i>		4 Mar. 2024
Centering community at scientific meetings: 30 years of the West Antarctic Ice Sheet Workshop		
<i>AGU Fall Meeting 2023</i>		11 Dec. 2023
Cryosphere@Mines		
<i>Finnish Ambassador Visit to Colorado School of Mines</i>		13 Jun. 2023
Subglacial Secrets: What drilling holes through the Antarctic ice sheet can teach us about the past, present, and future of ice		
<i>Osher Lifelong Learning Institute, University of Denver</i>		4 May 2023
Source to sink: Tracing freshwater beneath the Antarctic ice sheet		
<i>Colorado School of Mines Department of Geophysics Heiland Lecture</i>		7 Mar. 2023
Technology at the coast: Probing for ice-water-ocean-Earth processes		
<i>National Academies's Future Directions for Southern Ocean and Antarctic Nearshore and Coastal Research Community Workshop</i>		9 Feb. 2023
Glaciology at Mines		
<i>Colorado School of Mines Student Society of Geophysicists</i>		16 Sep. 2022
Glaciology at Mines		
<i>Tulane University Research Experiences for Undergraduates</i>		15 Jul. 2022

Twelve years of exploring subglacial Antarctica <i>Dartmouth College Journeys</i>	18 Jun. 2022
Process2Paleo: Connecting modern observations to the geologic record to explore the life and death of a subglacial lake <i>Scripps Polar Hour</i>	28 Oct. 2021
Slippery when wet: Exploring the hydrosphere beneath the Antarctic ice sheet <i>Colorado State Antarctic Lecture Series</i>	19 Oct. 2021
Glaciology data volumes and data rates in Antarctica <i>2021 Antarctic Subsea Cable Workshop</i>	28 Jun. 2021
What lies beneath: Exploring the hydrosphere beneath the Antarctic ice sheet <i>Delaware County Institute of Science</i>	8 Feb. 2021
(Seminar on SALSA subglacial lake results) <i>British Antarctic Survey</i>	Jun. 2020
<b>[seminar canceled due to COVID19]</b>	
(Seminar on ICESat-2 results) <i>Newcastle University</i>	Jun. 2020
<b>[fellowship delayed to COVID19; seminar canceled]</b>	
(Seminar declined due to COVID) <i>Stanford Geophysics Seminar</i>	4 Jun. 2020
Antarctica at Depth: New observations of subglacial water beneath ice streams <i>CU Boulder INSTAAR Noon Seminar</i>	16 Mar. 2020
<b>[canceled due to COVID19]</b>	
U.S. work in the Ross Sea Sector <i>International Ross Sea Region Collaboration Workshop, Korea</i>	21 Jul. 2019
Antarctica at Depth: Drilling for Subglacial Access <i>U.S. Ice Drilling Program's School of Ice</i>	24 June 2019
SALSA – A Field Debrief <i>Stanford University Cryospheric Scientists</i>	12 Feb. 2019
Slippery When Wet: Dynamic subglacial hydrology and the Antarctic ice sheet <i>Department of Geosciences Research Seminar, Boise State University</i>	26 Apr. 2018
Building a "Long Data" perspective to examine decadal-scale variability in Antarctica <i>Geophysics Seminar, Colorado School of Mines</i>	4 Apr. 2018
Deep, Dark, and Wet: Dynamic subglacial hydrology in Antarctica <i>Earth &amp; Planetary Science Seminar, Washington University in St. Louis</i>	1 Feb. 2018
Piecing together a "Long Data" perspective to examine Antarctic ice-sheet variability <i>Earth and Climate Seminar, University of Maine</i>	25 Oct. 2017
Piecing together a "Long Data" perspective in Antarctica to understand ice-sheet variability <i>SIO Research Seminar, Scripps Institution of Oceanography</i>	31 Aug. 2017
Subglacial hydrology, basal processes, and velocity transients in Antarctica <i>Ice Sheet System Model Workshop</i>	23 Jun. 2016
Antarctic subglacial hydrology: A review <i>IDPO Subglacial Access Working Group Workshop</i>	21 May 2016
Episodic hydrology, episodic ice streams: Unraveling the impact of active subglacial lakes in Antarctica <i>Earth Section Seminar, University of California, Santa Cruz</i>	10 May 2016
Unraveling the impact of dynamic subglacial lake drainage in Antarctic <i>Geophysics Seminar, Scripps Institution of Oceanography</i>	22 Apr. 2016
Planes, penguins, and cookies: Scientific outreach from Antarctica <i>GPS and the Cyrosphere, 2016 UNAVCO Science Workshop</i>	29 Mar. 2016
Dynamic subglacial hydrology in Antarctica: timescales, evolution, and impacts <i>Geophysics Seminar, Stanford University</i>	1 Mar. 2016
Extending the episodic hydrology record across Antarctica <i>West Antarctic Ice Sheet Workshop</i>	19 Sep. 2015

Peering under the ice to the Antarctic Slip 'n' Slide		
<i>UCSD Extension: Environmental Leadership &amp; Sustainability</i>		06 Jul. 2015
Investigating coupled subglacial hydrologic and ice dynamic evolution using ground- and satellite-based observations		
<i>Center for Climate Sciences Research Seminar, NASA-JPL</i>	19 Jun. 2015	
Using CryoSat-2 to retrieve dynamic surface changes (& observations of stick-slip motion)		
<i>IGPP Geodesy Seminar, Scripps Institution of Oceanography</i>	22 Apr. 2015	
A decade of progress observing and modeling Antarctic subglacial water systems		
<i>Subglacial Antarctic lake exploration: first results and future plans, The Royal Society [H. Fricker invited; M.R.S. presented]</i>	30 Mar. 2015	
Understanding the Antarctic Slip 'n' Slide		
<i>Scripps Donor Brunch, Scripps Institution of Oceanography</i>	1 Mar. 2015	
Highlights and reflections on The Workshop and beyond		
<i>CMBC Brown Bag, Scripps Institution of Oceanography</i>	3 Jun. 2014	
Instability of the Amundsen Sea Embayment		
<i>Climate Journal Club, Scripps Institution of Oceanography</i>	22 May 2014	
WISSARD: Progress, Pictures, and Prospects		
<i>Scripps Polar Seminar, Scripps Institution of Oceanography</i>	4 Jun. 2013	
GLAS accuracy and elevation change at Summit, Greenland		
<i>Geolunch Brown Bag Series, Dartmouth College</i>	11 May 2010	

**PROFESSIONAL SERVICE Committee Service**

- NASA SWOT Mission, Science Team, Member, 2024–present
- EDGE Mission Science Team (in Phase A of NASA's ESE competition), 2023–present
- Ice Drilling Program Science Advisory Board, Member, 2023–present
- NASA Surface Topography and Vegetation Mission Incubation, Science Team, 2023–2025
- NASA ICESat-2 Mission, Science Team, Member, 2021–present
- IRIS/UNAVCO, Polar Science Technology, Co-Chair, 2021–present
- IRIS/UNAVCO, Polar Science Technology Committee, Member, 2018–2020
- NASA IceBridge Mission, Science Team, Member, 2017–2020
- American Meteorological Society Committee on Polar Meteorology and Oceanography, Member, Jan. 2017–2020
- OpenAltimetry User Working Group, Member, Jun. 2017–present
- NASA ICESat-2 Science Definition Team, Participant, 2011–2020

**Editorial Service**

- Scientific Editor, *Journal of Glaciology*, 2019–present
- Section Editor for Cryosphere, *Encyclopedia of Ocean Sciences*, 3rd Ed.

**Referee Service**

- Journals: *Nature*, *Nature Geoscience*, *Nature Communications*, *Geophysical Research Letters*, *Journal of Glaciology*, *Annals of Glaciology*, *The Cryosphere*, *IEEE Transactions on Geoscience and Remote Sensing*, *IEEE Geoscience and Remote Sensing Letters*, *Remote Sensing of Environment*, *International Journal of Remote Sensing*, *Journal of Applied Remote Sensing*
- Proposals: *NASA Earth Science* (panel member, ad hoc), *NASA Earth Science Data Systems* (panel member), *NASA Planetary Science* (panel member), *NASA Science Mission Directorate* (panel member), *NSF Antarctic Sciences* (ad hoc), *Royal Society of New Zealand* (ad hoc), *UK Natural Environment Research Council* (ad hoc), *Netherlands Space Office* (ad hoc)

**Conference Service**

- Organizing Committee: *West Antarctic Ice Sheet Workshop*, 2019–present.
- Local Organizing Committee: *International Symposium on Five Decades of Radioglaciology*

(International Glaciological Society, Stanford, CA, 24–28 Jun. 2019); *International Symposium on Interactions of Ice Sheet and Glaciers with the Ocean* (IGS/FRISP, La Jolla, CA, 10–15 Jul. 2016); *Ice Sheet System Model Workshop* (JPL/ NASA, La Jolla, CA, May 2016), *Scripps Student Symposium* (SIO, La Jolla, CA, 24 Sep. 2015); *ICESat-2 Science Definition Team Meeting* (NASA, La Jolla, CA, 24–25 Feb. 2015); *Sea Level Change Team PI Meeting* (NASA, La Jolla, CA, 14–16 Oct. 2014), *West Antarctic Ice Sheet Workshop* (NSF/NASA, Julian, CA, 24–27 Sep. 2014); *International Symposium on Interactions of Ice Sheet and Glaciers with the Ocean* (IGS/FRISP, La Jolla, CA 5–10 Jun. 2011)

- Session Chair: *Archives and Observations From Sub-Ice Environments* (AGU Fall Meeting 2021, 2022, 2023, 2024); *Sub-Ice-Sheet and Sub-Ice-Shelf Environments: Bridging the Gap Between Modern Observations and Geologic Records* (AGU Fall Meeting 2019, 2020); *Cryosphere/Sea-Level* (2018 UNAVCO Science Workshop); *Advances in understanding processes at the beds of glaciers and ice sheets* (AGU Fall Meeting 2015, 2016, 2017); *IgniteIGS—Early career perspectives on the future of ice-ocean research* (IGS La Jolla 2016); *Greenland Run-off* (IGS La Jolla 2016)
- Judging: *Flash Freeze Cryosphere Innovation Award for Students* (AGU Fall Meeting 2017); *Outstanding Student Presentation Award* (AGU Fall Meeting 2017)

### White Papers

- *CryoCloud: Accelerating Discovery for NASA Cryosphere Communities with Open-Cloud Infrastructure*, submitted to NASA NNH23ZDA005L: Request for Information: Scientific Data and Computing Architecture to Support Open Science, 2023. [available [here](#)]
- *2021 Antarctic Subsea Cable Workshop Report: High-Speed Connectivity Needs to Advance US Antarctic Science*, submitted to National Science Foundation Office of Polar Programs, 2021.
- *Dive, Dive, Dive: Accessing the Subsurface of Ocean Worlds*, submitted to the NASA Planetary Science Decadal Survey, 2020.
- *Early Career Community Vision For Future Magnetotelluric Facility*, submitted to the National Science Foundation in preparation for a competition for a future unified geophysical facility, 2020.
- *An Early Career Investigator Community Vision for the Future NSF Geophysical Facility: Instrumentation Services Needs*, submitted to the National Science Foundation in preparation for a competition for a future unified geophysical facility, 2020.
- *Assessment of East Antarctic Ice Sheet sensitivity to warming and its potential for contributions to sea level rise*, submitted to U.S. Ice Drilling Program Subglacial Access Working Group, 2019.
- *Access Drilling Priorities in the Ross Ice Shelf Region*, submitted to U.S. Ice Drilling Program Subglacial Access Working Group, 2019.
- *How much, how fast? A decadal science plan quantifying the rate of change of the West Antarctic Ice Sheet now and in the future*, submitted to NSF Office of Polar Programs, 2016.

UNIVERSITY  
SERVICE

### Colorado School of Mines

- Mines Finance, Administration, and Operations Roundtable, 2025–present  
Mines University Handbook Committee, 2024–present  
Mines Geophysics Undergraduate Advisory Committee, 2022–present (chair, 2025–present)  
Mines Geophysics Field Camp Director, 2021–present  
Mines Geophysics ReImagine Committee, 2021–present  
Mines Geophysics Safety Committee, 2021–present  
Geophysics GP100@100 Fundraising , 2021–present  
Geophysics Diversity, Inclusion, & Access Committee, committee chair, 2019–2025  
Mines Diversity Council, 2019–2025  
Mines Field Session Compensation Task Force, 2022, 2025

Geophysics Graduate Advisory Committee, member, 2019–2022  
 Faculty Search Committee: Computational Science & Data Analytics Cluster, 2020–21  
     Applied Data Science & Machine Learning, subcommittee chair  
     Computation Hydrology, subcommittee member  
 #idigmines, department representative, 2019–2020  
 Faculty Search Committee: Geophysical Data Science, 2019–2020

**Stanford University**

Postdoctoral Scholar Committee for School of Earth Strategic Plan, member, 2017

**Scripps Institution of Oceanography**

Leadership Committee for Peer Mentor Program, founding student member, 2014–2016  
 Scripps Polar Seminar, lead organizer, 2013–2016  
 Scripps Earth Section Seminar, co-organizer 2012–2013

**Dartmouth College**

Faculty Search Committee: Geomorphology, student representative, 2008  
 Faculty Search Committee: Remote Sensing student representative, 2007

SIGNIFICANT FIELD EXPERIENCE	Pingo Canadian Landmark, Surface Geophysics <i>Mines Lead</i> Alaskan North Slope, Surface Geophysics <i>Mines Lead</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>Expedition Lead, Field Medic</i> Greenland, Airborne Geophysics (Operation IceBridge) <i>Mission Science Team member visit</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>Expedition Lead, Field Medic</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>Expedition Lead, Field Medic</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>Expedition Lead, Field Medic</i> Ross Ice Shelf, Antarctica, Airborne Geophysics <i>Flight Scientist, Data Engineer</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>Expedition Lead, Field Medic</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>GPS Team Leader, Field Medic</i> Whillans Ice Plain, West Antarctica, Surface Geophysics <i>Surface Geophysics Team Leader, Field Medic</i> Whillans Ice Plain, West Antarctica, Surface Geophysics Northern New Mexico, Southern Colorado, Geology and Geomorphology <i>Field Trip Organizer and Leader</i> Cherryfield, Maine, Fluvial Geomorphology & Riparian Habitat Surveying Banff National Park, Alberta, Canada, Glaciology Montana, Idaho, Eastern Washington, Geology Ischia Island, Italy, in situ Geochemical Analysis Puerto Rico, Soil and Water Sampling Western United States, Dartmouth Earth Sciences Field Camp Hawaii, Volcanology and Remote Sensing	2023 2021 2019–2020 2019 2018–2019 2017–2018 2016–2017 2015 2014–2015 2013–2014 2012–2013 2011–2012 2010 2009 2008 2008 2008 2007 2006 2006
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**HONORS AND AWARDS****Colorado School of Mines**

Diversity Progress Report President's Choice Award, 2023

Mines Research Council's Excellence in Research Award (Junior Faculty), 2022–2023  
Mines Earth & Society Programs Outstanding Assistant Professor Award, 2022–2023  
University Public Policy Fellow, inaugural cohort, 2022–2023  
Outstanding Mines Faculty Award, 2021–2022  
Department of Geophysics T.K. Young Geophysics Leadership Award, 2021

**National Science Foundation**

Mentor for NSF-OPP Postdoctoral Research Fellow, 2023

NSF CAREER Award recipient, 2022

Mentor for NSF Graduate Research Fellowship Program recipient (H. Verboncoeur), 2022

**National Aeronautics and Space Administration**

Mentor for NASA FINESST Graduate Fellowship Program recipient (Z. Katz), 2025

Robert H. Goddard Award as part of the Operation IceBridge Science Team, 2020

Group Achievement Award as part of the ICESat-2 Mission Science Team, 2020

**National Sciences and Engineering Research Council of Canada**

Mentor for NSERC Graduate Scholarship–Doctoral Recipient (E. Savidge), 2021

**American Geophysical Union**

Editors' Citation for Excellence in Refereeing, Geophysical Research Letters, 2019

**West Antarctic Ice Sheet Workshop**

Mentor for Best Student Presentation recipient (H. Verboncoeur), 2021

Best Student Presentation recipient, 2013

**Scripps Institution of Oceanography**

Student Video Challenge award winner, 2014

Director's Cabinet Quarterly Meeting invited presenter, May 2014

**Pontifical Academy of Sciences/Pontifical Academy of Social Sciences**

*Sustainable Humanity, Sustainable Nature: Our Responsibility*

Joint Workshop invited observer, May 2014

**United States Congress**

Antarctic Service Medal recipient, 2012

**Dartmouth College**

NASA Space Grant Graduate Student Award, 2010

Assistant Curator for Dana Collection of Minerals, 2007–2008

PROFESSIONAL American Geophysical Union, 2008–present

MEMBERSHIPS International Glaciological Society, 2010–present

Society for Advancement of Chicanos/Hispanics and Native Americans in Science

2019–present

Institute of Electrical and Electronics Engineers, 2020–present

American Meteorological Society, 2017–2019

Sigma Xi, 2023–present