

Brent Minchew

Class of 1948 Associate Professor
Chair, Program in Geophysics
Department of Earth, Atmospheric and Planetary Sciences
Massachusetts Institute of Technology

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Curriculum Vitae**Education**

- 2016 Ph.D. Geophysics, California Institute of Technology
Thesis: Mechanics of deformable glacier beds
Advisor: Mark Simons
- 2010 M.S. Aerospace Engineering, University of Texas at Austin
Thesis: Polarimetric SAR decomposition of temperate ice cap Hofsjökull, Central Iceland
Advisors: Sean Buckley and Scott Hensley
- 2008 B.S. Aerospace Engineering, University of Texas at Austin

Research Interests

Mechanics of fluids and solids

Glaciology: Deformable glacier beds, ice-ocean interactions, ice rheology, subglacial hydrology, grounding zone dynamics, erosion and deposition of glacial sediments, ice-flow modeling, inverse theory

Landslides: Distribution, environmental and tectonic controls, granular flow

Remote Sensing

Geodesy: Kinematic observations of cryospheric and terrestrial systems, interferometric synthetic aperture radar, time-series analysis, data assimilation

Hazard response: Location and characterization of oil and hazardous chemical spills in marine environments using polarimetric synthetic aperture radar, extent and severity of wildfires using polarimetric synthetic aperture radar

Academic Positions

- 2024– Chair of the Program in Geophysics, Massachusetts Institute of Technology
2024– Associate Professor (with tenure), Massachusetts Institute of Technology
2023–2024 Associate Professor (without tenure), Massachusetts Institute of Technology
2018–2023 Assistant Professor, Massachusetts Institute of Technology
2016–2018 NSF Postdoctoral Fellow, British Antarctic Survey
2010–2015 Graduate Research and Teaching Assistant, California Institute of Technology
2009 & 2010 Graduate Research Fellow, NASA Jet Propulsion Laboratory
2006–2010 Research and Teaching Assistant, University of Texas at Austin

Other Relevant Positions

- 2024– Co-Founder and Chief Scientist, Arête Glacier Initiative
1996–2004 US Marine (Staff Sergeant)

Academic Awards and Honors

- 2022 Class of 1948 Career Development Professorship
2019 Cecil and Ida Green Career Development Assistant Professorship
2014 NSF Earth Sciences Postdoctoral Fellowship
2013–2015 ARCS and Albert Parvin Foundation Fellowship
2012 IEEE Transactions on Geoscience and Remote Sensing Editor's Choice Award
2011–2014 NASA Earth and Space Sciences Fellowship
2011–2013 ARCS Foundation Fellowship
2011 California Institute of Technology Graduate Fellowship

Publications and Presentations

Scholarly articles (Group members and advisees: * indicates graduate students, ** undergraduates, and * postdocs and research scientists when the bulk of the work was done)

41. N. Narayanan*, A. Sommer, W. Chu, J. Steiner, M. A. Siddique, C. R. Meyer, and **B. M. Minchew**. “Simulating seasonal evolution of subglacial hydrology at a surging glacier in the Karakoram”. *Journal of Glaciology* in press (2025). DOI: 10.31223/X56X43.
40. S. Wells-Moran**, M. Ranganathan*, and **B. M. Minchew**. “Fracture criteria and tensile strength for natural glacier ice calibrated from remote sensing observations of Antarctic ice shelves”. *Journal of Glaciology* in press (2025). DOI: 10.1017/jog.2024.104.
39. U. Oviemhada*, M. Hines-Shanks, M. Krisch, A. Diongue, **B. M. Minchew**, and D. Wood. “Spatiotemporal Facility-Level Patterns of Summer Heat Exposure, Vulnerability, and Risk in United States Prison landscapes”. *GeoHealth* 8.9 (2024). DOI: 10.1029/2024GH001108.
38. M. Ranganathan* and **B. M. Minchew**. “A modified viscous flow law for natural glacier ice: Scaling from laboratories to ice sheets”. *Proceedings of National Academy of Sciences* 121.23 (2024). DOI: 10.1073/pnas.2309788121.
37. F. Clerc*, M. D. Behn, and **B. M. Minchew**. “Deglaciation-enhanced mantle CO₂ fluxes at Yellowstone imply positive climate feedbacks”. *Nature Communications* 15.1526 (2024), pp. 1–10. DOI: 10.1038/s41467-024-45890-z.
36. Y. Sun*, B. V. Riel*, and **B. M. Minchew**. “Disintegration and Buttressing Effect of the Landfast Sea Ice in the Larsen B Embayment, Antarctic Peninsula”. *Geophysical Research Letters* 50.16 (2023). DOI: 10.1029/2023GL104066.
35. M. Ranganathan*, J. W. Barotta**, C. R. Meyer, and **B. M. Minchew**. “Meltwater generation in ice stream shear margins: Case study in Antarctic ice streams”. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 479.2273 (2023). DOI: 10.1098/rspa.2022.0473.
34. B. V. Riel* and **B. M. Minchew**. “Variational inference of ice shelf rheology with physics-informed machine learning”. *Journal of Glaciology* 69.277 (2023), pp. 1167–1186. DOI: 10.1017/jog.2023.8.
33. M. Zhong, M. Simons, **B. M. Minchew**, and L. Zhu. “Inferring tide-induced ephemeral grounding and subsequent dynamical response in an ice-shelf-stream system: Rutford Ice Stream, West Antarctica”. *Journal of Geophysical Research – Earth Surface* 128.2 (2023). DOI: 10.1029/2022JF006789.
32. L. Ultee*, D. Felikson, **B. M. Minchew**, L. A. Stearns, and B. V. Riel*. “Statistical inference of the ice velocity response to meltwater runoff, terminus position, and bed topography at Helheim Glacier, Greenland”. *Nature Communications* 13.6022 (2022). DOI: 10.1038/s41467-022-33292-y.
31. J. D. Millstein*, **B. M. Minchew**, and S. S. Pegler. “Ice viscosity is more sensitive to stress than commonly assumed”. *Nature Communications Earth and Environment* 3.57 (2022). DOI: 10.1038/s43247-022-00385-x.

30. M. Ranganathan*, **B. M. Minchew**, C. R. Meyer, and M. Pec. “Recrystallization of ice enhances creep and the vulnerability to fracture of ice shelves”. *Earth and Planetary Science Letters* 576 (2021). DOI: 10.1016/j.epsl.2021.117219.
29. B. V. Riel*, **B. M. Minchew**, and T. Bischoff. “Data-driven inference of the mechanics of slip along glacier beds using physics-informed neural networks: Case study on Rutford Ice Stream, Antarctica”. *Journal of Advances in Modeling Earth Systems* 13.11 (2021), e2021MS002621. DOI: 10.1029/2021MS002621.
28. G. Guerin**, A. Mordret*, D. Rivet, B. P. Lipovsky, and **B. M. Minchew**. “Frictional origin of slip events of the Whillans Ice Stream, Antarctica”. *Geophysical Research Letters* 48.11 (2021), pp. 1–9. DOI: 10.1029/2021GL092950.
27. K. S. Shah*, S. S. Pegler, and **B. M. Minchew**. “Dynamics of two-layer fluid flows on inclined surfaces”. *Journal of Fluid Mechanics* 917.A54 (2021), pp. 1–33. DOI: 10.1017/jfm.2021.273.
26. P. Hunter*, C. R. Meyer, **B. M. Minchew**, M. Haseloff, and A. Rempel. “Thermal controls on ice stream shear margins”. *Journal of Glaciology* 67.263 (2021), pp. 435–449. DOI: 10.1017/jog.2020.118.
25. B. V. Riel*, **B. M. Minchew**, and I. Joughin. “Observing traveling waves in glaciers with remote sensing: New flexible time-series methods and application to Sermeq Kujalleq (Jakobshavn Isbræ), Greenland”. *The Cryosphere* 15.1 (2021), pp. 407–429. DOI: 10.5194/tc-15-407-2021.
24. M. Ranganathan*, **B. M. Minchew**, C. R. Meyer, and G. H. Gudmundsson. “A new approach to inferring basal drag and ice rheology in ice streams, with applications to West Antarctic ice streams”. *Journal of Glaciology* 67.262 (2021). DOI: 10.1017/jog.2020.95.
23. E. H. Ultee*, C. R. Meyer, and **B. M. Minchew**. “Tensile strength of glacial ice deduced from observations of the 2015 Eastern Skaftá Cauldron collapse, Vatnajökull ice cap, Iceland”. *Journal of Glaciology* 66.260 (2020), pp. 1024–1033. DOI: 10.1017/jog.2020.65.
22. **B. M. Minchew** and C. R. Meyer. “Dilation of subglacial sediment governs incipient surge motion in glaciers with deformable beds”. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 476.2238 (2020). DOI: 10.1098/rspa.2020.0033.
21. **B. M. Minchew** and I. Joughin. “Toward a universal glacier slip law”. *Science* 368.6486 (2020), pp. 29–30. DOI: 10.1126/science.abb3566.
20. F. Clerc*, **B. M. Minchew**, and M. D. Behn. “Marine ice cliff instability mitigated by slow removal of ice shelves”. *Geophysical Research Letters* 46.21 (2019), pp. 12108–12116. DOI: 10.1029/2019GL084183.
19. **B. M. Minchew**, C. R. Meyer, S. S. Pegler, B. P. Lipovsky, A. W. Rempel, G. H. Gudmundsson, and N. R. Iverson. “Comment on: “Friction at the bed does not control fast glacier flow” by L. A. Stearns and C. J. van der Veen”. *Science* 363.6427 (2019). DOI: 10.1126/science.aau6055.
18. C. R. Meyer, A. Yehya, **B. M. Minchew**, and J. R. Rice. “A model for the downstream evolution of temperate ice and subglacial hydrology along ice stream shear margins”. *Journal of Geophysical Research - Earth Surface* 123.8 (2018), pp. 1682–1698. DOI: 10.1029/2018JF004669.
17. C. R. Meyer and **B. M. Minchew**. “Temperate ice in the shear margins of the Antarctic Ice Sheet: controlling processes and preliminary locations”. *Earth and Planetary Science Letters* 498 (2018), pp. 17–26. DOI: 10.1016/j.epsl.2018.06.028.

16. **B. M. Minchew**, C. R. Meyer, A. A. Robel, G. H. Gudmundsson, and M. Simons. “Processes controlling the downstream evolution of ice rheology in glacier shear margins: Case study on Rutford Ice Stream, West Antarctica”. *Journal of Glaciology* 64.246 (2018), pp. 583–594. DOI: 10.1017/jog.2018.47.
15. **B. M. Minchew**, G. H. Gudmundsson, A. Gardner, F. S. Paolo, and H. A. Fricker. “Modeling the dynamic response of outlet glaciers to observed ice-shelf thinning in the Bellingshausen Sea Sector, West Antarctica”. *Journal of Glaciology* 64.244 (2018), pp. 333–342. DOI: 10.1017/jog.2018.24.
14. S. Angelliaume, P. Dubois-Fernandez, C. E. Jones, B. Holt, **B. M. Minchew**, E. Amri, and V. Miegbielle. “SAR imagery for detecting sea surface slicks: Performance assessment of polarimetric parameters”. *IEEE Transactions on Geoscience and Remote Sensing* 56.8 (2018), pp. 4237–4257. DOI: 10.1109/TGRS.2018.2803216.
13. A. A. Robel, V. C. Tsai, **B. M. Minchew**, and M. Simons. “Tidal modulation of ice shelf buttressing stresses”. *Annals of Glaciology* 58.74 (2017), pp. 12–20. DOI: 10.1017/aog.2017.22.
12. P. Milillo, **B. M. Minchew**, M. Simons, P. Agram, and B. Riel. “Geodetic imaging of time-dependent three-component surface deformation: application to tidal-timescale ice flow of Rutford Ice Stream, West Antarctica”. *IEEE Transactions on Geoscience and Remote Sensing* 55.10 (2017), pp. 5515–5524. DOI: 10.1109/TGRS.2017.2709783.
11. S. Angelliaume, **B. M. Minchew**, S. Chatiang, P. Martineau, and V. Miegbielle. “Multifrequency radar imagery and characterization of hazardous and noxious substances at sea”. *IEEE Transactions on Geoscience and Remote Sensing* 55.5 (2017). DOI: 10.1109/TGRS.2017.2661325.
10. **B. M. Minchew**, M. Simons, B. V. Riel, and P. Milillo. “Tidally induced variations in vertical and horizontal motion on Rutford Ice Stream, West Antarctica, inferred from remotely sensed observations”. *Journal of Geophysical Research: Earth Surface* 122 (2017), pp. 167–190. DOI: 10.1002/2016JF003971.
9. **B. M. Minchew**, M. Simons, H. Björnsson, F. Pálsson, M. Morlighem, H. Seroussi, E. Larour, and S. Hensley. “Plastic bed beneath Hofsjökull Ice Cap, central Iceland, and the sensitivity of ice flow to surface meltwater flux”. *Journal of Glaciology* 62.231 (2016), pp. 147–158. DOI: 10.1017/jog.2016.26.
8. P. Milillo, B. Riel, **B. M. Minchew**, S. H. Yun, M. Simons, and P. Lundgren. “On the synergistic use of SAR constellations’ data exploitation for earth science and natural hazard response”. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 9.3 (2015), pp. 1095–1100. DOI: 10.1109/JSTARS.2015.2465166.
7. M. J. Collins, M. Denbina, **B. M. Minchew**, C.E. Jones, and B. Holt. “On the use of simulated airborne compact polarimetric SAR for characterizing oil-water mixing of the Deepwater Horizon oil spill”. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 8.3 (2015), pp. 1062–1077. DOI: 10.1109/JSTARS.2015.2401041.
6. **B. M. Minchew**, M. Simons, S. Hensley, H. Björnsson, and F. Pálsson. “Early melt-season velocity fields of Langjökull and Hofsjökull ice caps, central Iceland”. *Journal of Glaciology* 61.226 (2015), pp. 253–266. DOI: 10.3189/2015JOG14J023.

5. J. S. Scheingross, **B. M. Minchew**, B.H. Mackey, M. Simons, M.P. Lamb, and S. Hensley. “Fault zone controls on the spatial distribution of slow-moving landslides”. *GSA Bulletin* 125.3-4 (2013), pp. 473–489. DOI: 10.1130/B30719.1.
4. **B. M. Minchew**, C.E. Jones, and B. Holt. “Polarimetric analysis of backscatter from the Deepwater Horizon oil spill using L-band synthetic aperture radar”. *IEEE Transactions on Geoscience and Remote Sensing* 50.10 (2012), pp. 3812–3830. DOI: 10.1109/TGRS.2012.2185804.
3. **B. M. Minchew**. “Determining the mixing of oil and seawater using polarimetric synthetic aperture radar”. *Geophysical Research Letters* 39.16 (2012). L16607. DOI: 10.1029/2012GL052304.
2. V. C. Tsai, **B. M. Minchew**, M. P. Lamb, and J. P. Ampuero. “A physical model for seismic noise generation from sediment transport in rivers”. *Geophysical Research Letters* 39.2 (2012). L02404. DOI: 10.1029/2011GL050255.
1. C. E. Jones, **B. M. Minchew**, B. Holt, and S. Hensley. “Studies of the Deepwater Horizon Oil Spill with the UAVSAR radar”. *Monitoring and Modeling the Deepwater Horizon Oil Spill: A Record-Breaking Enterprise*. Vol. 195. Washington, DC: AGU, 2011, pp. 33–50. DOI: 10.1029/2011GM001113.

Working manuscripts and preprints (Group members and advisees: * indicates graduate students, ** undergraduates, and * postdocs and research scientists)

2. F. M. Elgart, **B. M. Minchew**, and C. R. Meyer. “Tidal flexure reveals effective elasticity in grounding zones on the Ross Ice Shelf”. *submitted* (2025). DOI: 10.31223/X53X6X.
1. B. Riel and **B. M. Minchew**. “Identifying the mechanisms behind seasonal velocity changes in Greenland glaciers”. *submitted* (2024).

Invited presentations (past 5 years only)

- B. M. Minchew. “Glacier dynamics from viscous flow to iceberg calving”. *Geodynamics Seminar, Woods Hole Oceanographic Institution*. 2025.
- B. M. Minchew. “Glacier dynamics from viscous flow to iceberg calving”. *Geodynamics Seminar, Lamont Doherty Earth Observatory, Columbia University*. 2025.
- B. M. Minchew and C. R. Meyer. “Between a rock and hard place: Some thoughts on how to approach responsible glacier interventions”. *AGU Fall Meeting*. Dec. 2024.
- B. M. Minchew. “Slowing glaciers by increasing drag at the bed: A brief primer”. *Glacial Geoengineering Workshop, Stanford University*. Dec. 2023.
- B. M. Minchew. “Glacier dynamics from viscous flow to iceberg calving”. *Geological and Planetary Sciences Division Seminar, California Institute of Technology*. Nov. 2023.
- B. M. Minchew. “Principles behind modulating basal slip in fast-flowing glaciers”. *Glacial Geoengineering Workshop, University of Chicago*. Oct. 2023.
- B. M. Minchew. “Our evolving understanding of the flow, deformation, and fracture of glacier ice”. *Geology and Geophysics Department Seminar, Woods Hole Oceanographic Institute*. Aug. 2023.
- B. M. Minchew. “Our evolving understanding of the flow, deformation, and fracture of glacier ice”. *Geophysics Seminar, Stanford University*. Apr. 2023.

- B. M. Minchew. “Our evolving understanding of the flow, deformation, and fracture of glacier ice”. *Department of Earth, Environmental, and Planetary Sciences Seminar, Brown University*. Feb. 2023.
- B. M. Minchew. “Our evolving understanding of the flow, deformation, and fracture of glacier ice”. *Earth and Environmental Science Seminar, University of Pennsylvania*. Feb. 2023.
- B. M. Minchew. “Our evolving understanding of the flow, deformation, and fracture of glacier ice”. *University of California, Santa Barbara*. Feb. 2023.
- B. M. Minchew. “Observing at currently unobservable space and time scales”. *Caltech Seismo Lab Centennial*. Nov. 2022.
- B. M. Minchew. “Our evolving understanding of the deformation of glacier ice”. *Tufts University, Civil and Environmental Engineering Colloquium*. Oct. 2022.
- B. M. Minchew. “Sea-level rise in the 21st century: Education and innovation driving science and adaptation”. *MIT-Portugal Annual Conference*. Sept. 2022.
- B. M. Minchew. “Earth Science in the age of NISAR”. *NISAR Science Community Workshop*. Aug. 2022.
- B. M. Minchew. “Managing the risks of sea-level rise through improved ice-sheet monitoring”. *Eureka meets the Atlantic — Boston*. Apr. 2022.
- B. M. Minchew. “Flow and deformation of glacier ice”. *Seismolab Seminar, California Institute of Technology*. Mar. 2022.
- B. M. Minchew. “Lessons learned from observing Earth’s cryosphere from satellites”. *Lowell Observatory, I Heart Pluto Festival*. Feb. 2022.
- B. M. Minchew. “Dynamics of (thinning) glacier ice”. *MIT Museum: Teen Science Cafe*. Dec. 2021.
- B. M. Minchew. “Celebrating service and tackling the transition from military to civilian life”. *MIT Veteran’s Day Ceremony*. Nov. 2021.
- B. M. Minchew. “Waves on glaciers and some insights they provide”. *Dartmouth College: Jones Seminar in Science, Technology, and Society*. Nov. 2021.
- B. M. Minchew, J. Millstein, M. Ranganathan, and B. Riel. “How does glacier ice flow and deform?”. *Goddard Institute of Space Studies Sea-Level Rise Seminar*. Oct. 2021.
- B. M. Minchew, A. Dewald, J. Hansman, S. Ravela, and C. Werner. “Closing the frequency gap between remote sensing and in situ observations”. *West Antarctic Ice Sheet Workshop*. 2021.
- B. M. Minchew. “Observing the cryosphere (from satellites)”. *Fluid Dynamics of Sustainability and the Environment, University of Cambridge*. 2021.
- B. M. Minchew. “Glacier velocity as seen with InSAR”. *UNAVCO InSAR/ISCE Workshop*. Aug. 2021.
- B. M. Minchew. “Waves on glaciers and some insights they provide”. *Ice Dynamics and Paleoclimate Seminar, British Antarctic Survey*. 2021.
- B. M. Minchew. “Waves on glaciers and some insights they provide”. *Geophysical Sciences Seminar, University of Chicago*. 2021.
- B. M. Minchew. “Waves on glaciers and some insights they provide”. *Geological and Planetary Sciences Division Seminar, California Institute of Technology*. 2021.
- B. M. Minchew. “Influence of sediment dilation on the initiation of surges in glaciers with deformable beds”. *Laboratory of Hydraulics, Hydrology, and Glaciology, ETH Zürich*. 2021.

- B. M. Minchew and C. R. Meyer. “Influence of sediment dilation on the initiation of surges in glaciers with deformable beds”. *AGU Fall Meeting (MR011)*. 2020.
- B. M. Minchew. “Insights into glacier dynamics from time-dependent surface velocity fields”. *NASA NextGen Airborne SAR Meeting*. 2020.
- B. M. Minchew. “New insights into the mechanics of glacier beds from time-dependent surface velocity fields”. *Marine Geology and Geophysics Seminar, Lamont Doherty Earth Observatory, Columbia University*. 2020.

Non-scholarly articles

1. B. M. Minchew, L. Mahle, P. Ghosh, M. Sistla, and E. N. Martin. “Polar infrastructure and science for national security: A federal agenda to promote glacier resilience and strengthen American competitiveness”. *Day One Project, Federation of American Scientists* (2024).

Grants

- 2024– PI – Grantham Foundation: Reducing the risk of sea-level rise by deliberately slowing glaciers in Antarctica: First steps.
- 2021– PI – John W. Jarve (1978) Seed Fund: Improving projections of sea-level rise by (deep) learning glacier dynamics from data. With Bryan Riel (MIT)
- 2021 PI – MIT Climate Grand Challenges: Ice Sheet Stability and Rapid Sea-Level Rise: Exploring Risk, Impact, and Mitigation Strategies
- 2021 Researcher – MIT Climate Grand Challenges: Stratospheric Airborne Climate Observatory System to Initiate Revolution In Climate Risk Forecasting. with PI John Hansman (MIT)
- 2021–2022 Researcher – National Geographic Society: AI for Glacial Lake Outburst Floods Hazard Potential Assessment in Chitral, Pakistan (AI4GLOF). with PI Muhammad Adnan Siddique (Information Technology University, Lahore, Pakistan)
- 2020–2021 PI – JPL Strategic University Research Partnership: Ice sheet mechanical properties as revealed from time-varying surface velocity fields. Award number 1657974.
- 2020–2022 PI – NEC Corporation Fund for Research in Computers and Communications: Quantifying the Evolution of Stress Fields in Antarctic Ice Shelves by Fusing Data from Multiple Remote Sensing Platforms, Instruments, and Techniques.
- 2020–2023 PI – NSFGEO-NERC: Collaborative Research: A new mechanistic framework for modeling rift processes in Antarctic ice shelves validated through improved strain-rate and seismic observations. Award number 1853918
- 2020–2021 PI – Microsoft AI for Earth: Theory-guided discovery of glacier dynamics using deep learning. With Bryan Riel (MIT)
- 2020–2021 PI – MIT-Germany - FAU Seed Fund: Rift Formation in Antarctic Ice Shelves: Constraining the Mechanical Properties of Glacier Ice Using Time-Dependent, High-Resolution Strain-Rate Fields. With Matthias Braun (FAU)
- 2019–2020 PI – Earl A Killian III (1978) and Waidy Lee Fund: Improving projections of sea-level rise by (deep) learning glacier dynamics from data. With Bryan Riel (MIT)
- 2019–2020 Co-I – Microsoft AI for Earth: Theory-guided discovery of glacier dynamics using deep learning. With Bryan Riel (MIT) and Tobias Bischoff (Microsoft)
- 2018–2023 Researcher – NSF-NERC: Processes, drivers, predictions: Modeling the history and evolution of Thwaites Glacier (PROPHET). Award number 1739031

- 2016–2018 PI – Spatiotemporal characteristics of basal resistance to ice flow in the West Antarctic Ice Sheet from satellite observations and numerical modeling. NSF Earth Sciences Postdoctoral Fellowship award 1452587
- 2013–2015 Research assistant – Subglacial mechanics using repeat-pass InSAR measurements and numerical models of temperate ice caps in Iceland. NASA Cryospheric Science award NNX14AH80G, with PI Mark Simons (Caltech)
- 2011–2014 PI – Investigating the mechanics of subglacial till using airborne radar interferometry and numerical ice flow models. NASA Earth and Space Science Fellowship
- 2011–2012 Research assistant – Temperate glacier studies with UAVSAR. NASA Cryospheric Science, with PI Mark Simons (Caltech)

Mentorship

Postdoctoral researchers

- 2018–2021 Elizabeth (Lizz) Ultee, MIT EAPS; now faculty at Middlebury College
- 2019–2022 Bryan Riel, MIT EAPS; now faculty at Zhejiang University

Graduate students, as a primary advisor

- 2024– Thatcher Chamberlin (PhD, PAOC)
- 2023– Max Filter, MIT EAPS (PhD, Geophysics)
- 2023–2025 Sarah Wells-Moran, MIT EAPS (MS), now PhD student at University of Chicago
- 2022–2024 Ufuoma Oviemhada, MIT AeroAstro (PhD)
- 2021–2023 Neosha Narayanan, MIT EAPS (MS), now PhD student at Georgia Tech
- 2019– Faye Hendley Elgart, MIT EAPS (PhD, PAOC, co-advised with John Marshall)
- 2019– Justin Linick, MIT EAPS (PhD, Geophysics)
- 2018–2023 Joanna Millstein, MIT-WHOI Joint Program (PhD, Marine Geology and Geophysics), now postdoc at Colorado School of Mines
- 2018–2022 Fiona Clerc, MIT-WHOI Joint Program (PhD, Marine Geology and Geophysics), now postdoc at Columbia University and Princeton University
- 2018–2022 Meghana Ranganathan, MIT EAPS (PhD, PAOC), now faculty at University of Chicago
- 2018–2019 Brindha Kanniah, MIT EAPS (MS)

Graduate students, as a secondary or project advisor

- 2023– PhD project advisor: Alex Miller, MIT AeroAstro
- 2022– PhD project advisor: Caroline Mouchon, MIT EAPS (Geophysics)
- 2022–2024 PhD project advisor: Annick Dewald (MIT PhD '24, AeroAstro)
- 2021–2023 PhD project advisor: Grace O'Neil, MIT EAPS (PAOC)
- 2021–2023 PhD project advisor: Yudong Sun, MIT EAPS (Geophysics)
- 2021–2023 PhD project advisor: Mila Lubeck, MIT EAPS (Geophysics)
- 2019–2020 MS project co-advisor: Pierce Hunter, University of Oregon (MS '20)
- 2019–2024 PhD project advisor: Erik Tamre, MIT EAPS (MIT PhD '24)
- 2018–2022 PhD project advisor: Kasturi Shah, MIT EAPS (MIT PhD '22)
- 2018–2019 PhD project advisor: Julia Wilcots, MIT EAPS

Undergraduate students

(UROP = MIT Undergrad Research Opportunities Program; MSRP = MIT Summer Research Program)

2024–	UROP advisor: Justin Cole, MIT
2023–	UROP advisor: Rina Cao, MIT
2023	UROP advisor: Kyle Guerre, MIT
2023	UROP advisor: Kristine Bridges, MIT
2021	MSRP advisor: Florencia Corbo-Ferreira, U. of Florida
2021	UROP advisor: Mateo Pisinger, MIT
2021–2022	UROP advisor: Ryan Conti, Math + Comp Sci, MIT
2021	UROP advisor: Jon Rosario, Math + Comp Sci, MIT
2020	UROP advisor: Neosha Narayanan, Mat. Sci., MIT
2020–2023	UROP advisor: Sarah Wells-Morgan, Wellesley College
2020–2023	Project advisor: Max Filter, Computer Science, U. of Virginia
2020–2021	UROP advisor: Jack-William Barotta, Math, MIT
2020	UROP advisor: Gabriela Alvarez, Mech. Eng., MIT
2020	UROP advisor: Jordan Ambrosio, Mech. Eng., MIT
2020	UROP advisor: Stephanie Baez, Civil Eng., MIT
2020	UROP advisor: Anna Chau, EE + Comp. Sci, MIT
2020	UROP advisor: Adriana Flores, AeroAstro, MIT
2020	UROP advisor: Meriah Gannon, Env. Eng., MIT
2020	UROP advisor: Adelynn Paik, Sys. Eng., MIT
2020	UROP advisor: Kristopher Vu, Mech. Eng. + Comp. Sci, MIT
2020	UROP advisor: Joyce Yoon, Mech. Eng., MIT
2015	Project advisor: Benjamin Lauer, Université de Lorraine
2015	Project advisor: Christine Rains, DEVELOP-JPL
2015	Project advisor: Jerry Heo, DEVELOP-JPL
2015	Project advisor: Erika Higa, DEVELOP-JPL
2013	Project advisor: Sandia Akhtar, Caltech

Thesis committee membership (in addition to mentorship)

Internal (MIT) thesis committees

2018–2020	Jeffery Mei (PhD, MIT-WHOI JP; defended Aug 2020)
2018–2021	Eric Stansifer (PhD, MIT EAPS; defended Oct 2021)
2019	Dylan Cohen (MS 2019, MIT EAPS)
2020	Taylor Safrit (MS 2020, MIT EAPS)
2020	Anuar Togaibekov (MS 2020, MIT EAPS)
2021–2023	Ana Glidden (PhD, MIT EAPS)
2021–2025	Alan Gaul (PhD, MIT-WHOI JP)
2021–2023	Cadence Payne (PhD, MIT AeroAstro)
2022	Mathilde Wimez (MS 2022, MIT EAPS)
2023–2025	Evan Kramer (PhD, MIT AeroAstro)
2023–	Kristen Ammons (PhD, MIT AeroAstro)

External (non-MIT) thesis committees

2018–2021	Juan Pinales (MS 2021, University of Miami)
2018–2023	Stephanie Olinger (PhD 2023, Harvard)
2019	Martine Espeseth (PhD 2019, University of Tromso)

2021	Cornelius Quigley (PhD 2021, University of Tromsø)
2022	Aaron Stubblefield (PhD 2022, Columbia University)

Teaching

2025 Spring	MIT 12.421/12.621	Physical Principles of Remote Sensing (undergraduate and graduate)
2024 Spring	MIT 12.203/12.503	Mechanics of Earth (undergraduate and graduate)
2024 Spring	MIT 12.512	Field Geophysics Analysis (graduate)
2024 IAP	MIT 12.511	Geophysics Field Camp (graduate)
2023 Fall	MIT 12.202/12.502	Flow, Deformation, and Fracture in Earth and Other Terrestrial Bodies (undergraduate and graduate)
2023 Fall	MIT 12.214/12.507	Essentials of Applied Geophysics (undergraduate and graduate)
2022 Fall	MIT 12.421/12.621	Physical Principles of Remote Sensing (undergraduate and graduate)
2022 Spring	MIT 12.203/12.503	Mechanics of Earth (undergraduate and graduate)
2022 IAP	MIT 12.511	Geophysics Field Camp (graduate)
2021 Fall	MIT 12.S595	Geophysics Field Course (graduate)
2021 Fall	MIT 12.202/12.502	Flow, Deformation, and Fracture in Earth and Other Terrestrial Bodies (undergraduate and graduate)
2021 Spring	MIT 12.S595	Antarctic Ice Sheet in a Changing Climate (graduate)
2020 Fall	MIT 12.421/12.621	Physical Principles of Remote Sensing (undergraduate and graduate)
2020 Spring	MIT 12.203/12.503	Mechanics of Earth (undergraduate and graduate)
2019 Fall	MIT 12.202/12.502	Flow, Deformation, and Fracture in Earth and Other Terrestrial Bodies (undergraduate and graduate)
2019 Spring	MIT 12.005/12.520	Applications of Continuum Mechanics to Earth, Atmospheric, and Planetary Sciences (undergraduate) / Geodynamics (graduate)
2018 Fall	MIT 12.421/12.621	Physical Principles of Remote Sensing (undergraduate and graduate)

Academic Service (internal and external)

2024–2025	MIT EAPS	Chair, Program in Geophysics
2024	MIT EAPS	Department Head search committee
2024	MIT EAPS	Graduate admissions committee
2023	MIT EAPS	Renovation committee (chair)
2023–2025	MIT-WHOI	MIT-WHOI Joint Program Committee
2022–2025	MIT	Warrior Scholar Project
2022–2023	MIT EAPS	Department website committee
2021	UNAVCO	Guest lecturer for InSAR/ISCE workshop
2021–2024	UNAVCO	WInSAR Executive Committee member
2021–2022	MIT EAPS	Department Lecture Series committee
2020–2024	MIT	Common Ground for Computing Education Committee
2020	NASA	Surface Deformation and Change – Cryosphere Working Group
2019–2025	AGU Journals	Associate Editor, Journal of Geophysical Research: Earth Surface
2019–2020	MIT EAPS	Task Force 2023 committee member
2018–2025	MIT EAPS	Communications committee member
2018–2021	Boston Museum of Science	External advisory committee member
2018–2019	MIT EAPS	Faculty search committee member

Professional Activities

Chief Scientist and Co-Founder: Arête Glacier Initiative (2024–)

Associate Editor: Journal of Geophysical Research: Earth Surface (2019–2025)

Scientific Editor: Annals of Glaciology (2017–2018)

Member: International Glaciological Society, International Association of Cryospheric Sciences, Association of Polar Early Career Scientists, American Geophysical Union, European Geosciences Union, American Association for the Advancement of Science

Notable external committees: Boston Museum of Science advisory board member; NASA Surface Deformation and Change – Cryosphere Working Group; UNAVCO WInSAR Executive Committee member

Selected Outreach Efforts

- Faculty Advisor, MIT Student Veterans Association
- Speaker and Lecturer, Warrior Scholar Project
- Speaker, Lowell Observatory public science event: I Heart Pluto Festival
- Military veteran advising and speaking
- MIT Museum: Teen Science Cafe
- Boston Museum of Science *Pulsar* science podcast
- Gardner Pilot Academy, Alston MA: Introducing 8th grade math students to glaciers and glaciology
- *Arctic Adventure: Exploring with Technology* at the Boston Museum of Science
- NASA Climate Day presenter
- US Embassy Iceland outreach on Arctic climate
- Iridescent Learning: Teaching children about scientific concepts

Military Service

United States Marine Corps

Active duty August 1996–February 2004

Rank: Staff Sergeant

Units: HMX-1, HMH-461, HMM-264, 26th MEU (aboard USS Iwo Jima LHD-7)

Major campaigns: Operation Iraqi Freedom, Combined Joint Task Force–Horn of Africa, Joint Task Force Liberia