

Department of Earth & Planetary Sciences
207 Fairchild Hall
Hanover NH 03755, USA
☎ +1 (603) 646-0287
✉ Mathieu.Morlighem@Dartmouth.edu
icefuture.org
in [mathieumorlighem](#)
🌐 [MathieuMorlighem](#)
ID 0000-0001-5219-1310
🔍 Google Scholar
O-9942-2014

Mathieu Morlighem

Evans Family Professor, Dartmouth

EDUCATION

- 2008-2011 **Ph.D. in Mechanical Engineering**, *École Centrale Paris*, Châtenay-Malabry, France,
Thesis Title: Ice sheet properties inferred by combining numerical modeling and remote sensing data
- 2005-2008 **Master's Degree in Engineering**, *École Centrale Paris*, Châtenay-Malabry, France,
Major in Mechanical and Aerospace Engineering (Specialization: Computational Mechanics and Design) with first class honors
- 2007-2008 **Research Master's Degree in Structural Dynamics and Coupled Systems**, *École Centrale Paris*, France,
Double degree program with honors
- 2005-2006 **Bachelor of Science in fundamental physics**, *University of Paris*, Orsay, France,
Double degree program at the University of Paris in partnership with École Centrale with honors
- 2003-2005 **Classes préparatoires (preparatory classes)**, *Lycée Sainte Geneviève*, Versailles, France,
Two-year preparation for entrance examinations to the Grandes Ecoles

PROFESSIONAL EXPERIENCES

- 2021 - present **Dartmouth**, *Hanover NH, United States*,
Evans Family Distinguished Professor of Earth and Planetary Sciences
- 2025 - 2028 **University of Liverpool**, *Liverpool, United Kingdom*,
Honorary Senior Research Fellow
- 2020 - 2023 **Victoria University of Wellington**, *Wellington, New Zealand*,
Honorary Research Associate
- 2018 - 2021 **University of California Irvine**, *Irvine CA, United States*,
Associate Professor, department of Earth System Science
- 2014 - 2018 **University of California Irvine**, *Irvine CA, United States*,
Assistant Professor, department of Earth System Science
- 2011 - 2014 **University of California Irvine**, *Irvine CA, United States*,
Project Scientist, department of Earth System Science
- 2008 - 2011 **NASA Jet Propulsion Laboratory**, *Pasadena CA, United States*,
Research Affiliate

RESEARCH INTERESTS

- Polar climate change
- Ice sheet contribution to sea level rise
- Ice-ocean interactions
- Ice sheet numerical modeling
- Data assimilation and inverse modeling in geosciences

- Finite element method and high-performance computing

HONORS AND AWARDS

- Apr. 2025 **American Geophysical Union**, *Earth's Future and Geophysical Research Letters* Top 10 most-cited and Top 10% most-viewed papers published by the journal in 2024
- Dec. 2024 **American Geophysical Union (AGU)**, *Elected fellow*, for fundamental and innovative advances in understanding ice sheet dynamics by combining observations and models.
- Apr. 2023 **International Glaciological Society (IGS)**, *Richardson Medal*, Awarded to the ISMIP6 Team for its academic and leadership activities in the design and production of future sea-level projections.
- 2022–2023 **Computational Infrastructure for Geodynamics (CIG)**, *Distinguished Speaker*
- Nov. 2022 **Research.com**, *Rising Star of Science Award*
- Since 2021 **World's Top 2% Scientists**, Listed as one of Elsevier/Stanford University's *Top 2% Scientists*
- May 2020 **UCI Physical Sciences**, *Outstanding Contributions to Undergraduate Education Award*
- Jan. 2020 **Guinness World Records**, *Discovery of the deepest point on land* underneath Denman Glacier, East Antarctica
- Oct. 2019 **NASA Honor Award**, *Group achievement award (Ice Sheet System Model Team)*, for achievements in the modeling and projection of the evolution of polar ice sheets and corresponding sea-level change
- Feb. 2019 **American Geophysical Union**, *Earth and Space Science Top 10 Most Downloaded Papers in 2018* for two papers in *Geophysical Research Letters* and *Journal of Geophysical Research - Solid Earth*
- Apr. 2018 **European Geosciences Union (EGU)**, *Arne Richter Award for Outstanding Early Career Scientists*, for his outstanding research in the field of ice-sheet modelling and his contribution to the dissemination of modelling methods and knowledge in the cryospheric community.
- Feb. 2018 **American Geophysical Union**, *Earth and Space Science Top 10 Most Downloaded Papers in 2017* for three papers in *Geophysical Research Letters* and *Journal of Geophysical Research - Solid Earth*
- Apr. 2015 **International Association of Cryospheric Sciences (IACS)**, *2015 Early Career Scientist Prize*
- Jan. 2015 **NASA Cryospheric Sciences Most Valuable Player for 2014**, for outstanding work improving our knowledge of the Greenland ice sheet and underlying bed
- Jul. 2011 **NASA Honor Award**, *Group achievement award (Ice Sheet System Model Team)*, for outstanding accomplishment in the development of the Ice Sheet System Model that models and simulates ice sheet systems flowing and melting in our warming environment

PUBLICATIONS

Peer-Reviewed Articles

2026

214. Maffezzoli, N., Rignot, E., Barbante, C., **Morlighem, M.**, Petersen, T. C., Vascon, S., Machine-learned global glacier ice volumes, *Scientific Data*, 13(1), 1104, [10.1038/s41597-026-07744-9](https://doi.org/10.1038/s41597-026-07744-9), 2026.
213. Chartrand, A. M., MacGregor, J. A., **Morlighem, M.**, Sergienko, O. V., Ockenden, H., Colgan, W. T., Cheng, G. *, A Vast Valley Network Beneath the Greenland Ice Sheet, *Geophys. Res. Lett.*, 53(13), e2026GL122028, [10.1029/2026GL122028](https://doi.org/10.1029/2026GL122028), 2026.
212. Barnett, J., Holmes, F. A., Greenwood, S. L., **Morlighem, M.**, Kirchner, N., Jakobsson, M., Comparing calving laws at Greenland's three largest ice shelves, *The Cryosphere*, 20(6), 3599–3617, [10.5194/tc-20-3599-2026](https://doi.org/10.5194/tc-20-3599-2026), 2026.
211. Krishna, M. *, Cheng, G. *, **Morlighem, M.**, Inferring subglacial topography using physics informed machine learning constrained by two conservation laws, *The Cryosphere*, 20(6), 3533–3558, [10.5194/tc-20-3533-2026](https://doi.org/10.5194/tc-20-3533-2026), 2026.
210. McCormack, F. S., **Morlighem, M.**, Pattyn, F., Robel, A. A., Seroussi, H., Emergent decadal predictability in Antarctic contribution to sea-level rise, *Nature*, 654(8119), 609–613, [10.1038/s41586-026-10614-4](https://doi.org/10.1038/s41586-026-10614-4), 2026.
209. Abele, D., Kleiner, T., Fischler, Y., Uekermann, B., Chourdakis, G., **Morlighem, M.**, Basermann, A., Bischof, C., Bungartz, H., Humbert, A., New generic coupling adapters for ice sheet and subglacial hydrology models (ISSM-preCICE Adapter 0.4, CUAS-MPI 0.1), *Geosci. Model Dev.*, 19(11), 5019–5039, [10.5194/gmd-19-5019-2026](https://doi.org/10.5194/gmd-19-5019-2026), 2026.

208. Smith, B., Sutterley, T. C., Fricker, H. A., Padman, L., Siegfried, M. R., Black, T., Felikson, D., Freer, B. I. D., Gibbons, A., Howard, S. L., Jelley, B., King, M., Medley, B., **Morlighem, M.**, Sadlik, C., Sauthoff, W., Neumann, T., ICESat-2 land ice products resolve Greenland and Antarctic ice-sheet height changes on seasonal to multiyear time scales, *J. Glaciol.*, 72, e64, [10.1017/jog.2026.10152](https://doi.org/10.1017/jog.2026.10152), 2026.
207. Moses, W. S., Cheng, G.*, Churavy, V., Gelbrecht, M., Klöwer, M., Kump, J., **Morlighem, M.**, Williamson, S., Apte, D., Berg, P., Giordano, M., Hill, C., Loose, N., Montoisson, A., Narayanan, S. H. K., Pal, A., Schanen, M., Silvestri, S., Wagner, G., Heimbach, P., DJ4Earth: Differentiable, and Performance-Portable Earth System Modeling via Program Transformations, *J. Adv. Model. Earth Syst.*, 18(5), [10.1029/2025MS005615](https://doi.org/10.1029/2025MS005615), 2026.
206. **Morlighem, M.**, Charrassin, R., Maffezzoli, N., Millan, R., Ockenden, H., Schlegel, N., Seroussi, H., Wood, M., New high-resolution subglacial bed topography and coastal bathymetry of the Antarctic and Greenland Ice Sheets, *Phil. Trans. R. Soc. A: Mathematical, Physical and Engineering Sciences*, 384(2319), 20240538, [10.1098/rsta.2024.0538](https://doi.org/10.1098/rsta.2024.0538), 2026.
205. Goldberg, D. N., **Morlighem, M.**, Gourmelen, N., Recent Observations of Thwaites Glacier, West Antarctica Are Consistent With High Rates of Loss in Next 50 Years, *Geophys. Res. Lett.*, 53(5), [10.1029/2025GL118823](https://doi.org/10.1029/2025GL118823), 2026.
204. Ockenden, H., Bingham, R. G., Goldberg, D., Curtis, A., **Morlighem, M.**, Complex mesoscale landscapes beneath Antarctica mapped from space, *Science*, 391(6782), 314-319, [10.1126/science.ady2532](https://doi.org/10.1126/science.ady2532), 2026.

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203. Tama, B. A., Krishna, M.*, Alam, H., Cham, M., Faruque, O., Cheng, G.*, Wang, J., **Morlighem, M.**, Janeja, V., DeepTopoNet: A Framework for Subglacial Topography Estimation on the Greenland Ice Sheets, in *Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems*, Association for Computing Machinery, [10.1145/3748636.3764162](https://doi.org/10.1145/3748636.3764162), 2025.
202. Chen, H., Rignot, E., Scheuchl, B., Milillo, P., **Morlighem, M.**, Gadi, R., Ciraci, E., Kim, J. H., Dini, L., Rapid retreat of Berry Glacier, West Antarctica, linked to seawater intrusions revealed by radar interferometry, *Nat. Commun.*, 16(1), 9292, [10.1038/s41467-025-64330-0](https://doi.org/10.1038/s41467-025-64330-0), 2025.
201. Mohammadi-Aragh, M., Zeising, O., Reinert, M., Klingbeil, K., Humbert, A., McPherson, R., **Morlighem, M.**, Timmermann, R., Wekerle, C., Burchard, H., Impact of Ice Topography, Basal Channels and Subglacial Discharge on Basal Melting Under the Floating Ice Tongue of 79N Glacier, Northeast Greenland, *J. Adv. Model. Earth Syst.*, 17(9), e2024MS004735, [10.1029/2024MS004735](https://doi.org/10.1029/2024MS004735), 2025.
200. Barnett, J., Holmes, F. A., Cuzzone, J.*, Åkesson, H.*, **Morlighem, M.**, O'Regan, M., Nilsson, J., Kirchner, N., Jakobsson, M., Simulating the Holocene evolution of Ryder Glacier, North Greenland, *The Cryosphere*, 19(9), 3631–3653, [10.5194/tc-19-3631-2025](https://doi.org/10.5194/tc-19-3631-2025), 2025.
199. Cheng, G.*, Krishna, M.*, **Morlighem, M.**, A Python library for solving ice sheet modeling problems using physics-informed neural networks, PINNACLE v1.0, *Geosci. Model Dev.*, 18(16), 5311–5327, [10.5194/gmd-18-5311-2025](https://doi.org/10.5194/gmd-18-5311-2025), 2025.
198. Norris, S. L., Gosse, J. C., Millan, R., Mouginot, J., Rabatel, A., **Morlighem, M.**, Bolton, M. S. M., Alley, R. B., Drivers of global glacial erosion rates, *Nat. Geosci.*, 18(8), 732-739, [10.1038/s41561-025-01747-8](https://doi.org/10.1038/s41561-025-01747-8), 2025.
197. Holmes, F. A., Barnett, J., Åkesson, H.*, **Morlighem, M.**, Nilsson, J., Kirchner, N., Jakobsson, M., Sea level rise contribution from Ryder Glacier in northern Greenland varies by an order of magnitude by 2300 depending on future emissions, *The Cryosphere*, 19(7), 2695–2714, [10.5194/tc-19-2695-2025](https://doi.org/10.5194/tc-19-2695-2025), 2025.
196. Palmer, S., Kirkwood, C., Luo, C., **Morlighem, M.**, A quantile regression forest estimate of Greenland's subglacial topography, *J. Glaciol.*, 71, e115, [10.1017/jog.2025.10071](https://doi.org/10.1017/jog.2025.10071), 2025.
195. Koo, Y., Cheng, G.*, **Morlighem, M.**, Rahnemoonfar, M., Calibrating calving parameterizations using graph neural network emulators: application to Helheim Glacier, East Greenland, *The Cryosphere*, 19(7), 2583–2599, [10.5194/tc-19-2583-2025](https://doi.org/10.5194/tc-19-2583-2025), 2025.
194. Lippert, E. Y. H.*, **Morlighem, M.**, Cheng, G.*, Berg, D. L., Hassan, J., Khan, S. A., Ice Front and Mélange Dynamics at Kangerlussuaq Glacier, Eastern Greenland, Since 1981, and Future Stability, *Geophysical Research Letters*, 52(13), e2024GL113982, [10.1029/2024GL113982](https://doi.org/10.1029/2024GL113982), 2025.

193. Khan, S. A., Seroussi, H., **Morlighem, M.**, Colgan, W., Helm, V., Cheng, G.* , Berg, D., Barletta, V. R., Larsen, N. K., Kochtitzky, W., van den Broeke, M., Kjær, K. H., Aschwanden, A., Noël, B., Box, J. E., MacGregor, J. A., Fausto, R. S., Mankoff, K. D., Howat, I. M., Oniszk, K., Fahrner, D., Løkkegaard, A., Lippert, E. Y. H.* , Bråtner, A., Hassan, J., Smoothed monthly Greenland ice sheet elevation changes during 2003–2023, *Earth Syst. Sci. Data*, 17(6), 3047–3071, [10.5194/essd-17-3047-2025](https://doi.org/10.5194/essd-17-3047-2025), 2025.
192. Wilner, J. A.* , Doughty, A. M., Kelly, M. A., **Morlighem, M.**, Disentangling topographic and climatic controls on glacier length: A case study in the tropical Colombian Andes, *Earth Planet. Sci. Lett.*, 667, 119511, [10.1016/j.epsl.2025.119511](https://doi.org/10.1016/j.epsl.2025.119511), 2025.
191. Badgeley, J. A.* , **Morlighem, M.**, Seroussi, H., Increased sea-level contribution from northwestern Greenland for models that reproduce observations, *Proc. Natl. Acad. Sci.*, 122(25), e2411904122, [10.1073/pnas.2411904122](https://doi.org/10.1073/pnas.2411904122), 2025.
190. Teisberg, T. O., Schroeder, D. M., Summers, P. T., **Morlighem, M.**, Measurement of Englacial Velocity Fields With Interferometric Radio Echo Sounders, *J. Geophys. Res. - Earth Surface*, 130(6), e2025JF008286, [10.1029/2025JF008286](https://doi.org/10.1029/2025JF008286), 2025.
189. Cuzzone, J. K.* , Barth, A., Barker, K., **Morlighem, M.**, Ice sheet model simulations reveal that polythermal ice conditions existed across the northeastern USA during the Last Glacial Maximum, *The Cryosphere*, 19(4), 1559–1575, [10.5194/tc-19-1559-2025](https://doi.org/10.5194/tc-19-1559-2025), 2025.
188. Getraer, B.* , **Morlighem, M.**, Increasing the Glen–Nye Power-Law Exponent Accelerates Ice-Loss Projections for the Amundsen Sea Embayment, West Antarctica, *Geophys. Res. Lett.*, 52(7), e2024GL112516, [10.1029/2024GL112516](https://doi.org/10.1029/2024GL112516), 2025.
187. Pritchard, H. D., Fretwell, P. T., Fremand, A. C., Bodart, J. A., Kirkham, J. D., Aitken, A., Bamber, J., Bell, R., Bianchi, C., Bingham, R. G., Blankenship, D. D., Casassa, G., Christianson, K., Conway, H., Corr, H. F. J., Cui, X., Damaske, D., Damm, V., Dorschel, B., Drews, R., Eagles, G., Eisen, O., Eisermann, H., Ferraccioli, F., Field, E., Forsberg, R., Franke, S., Goel, V., Gogineni, S. P., Greenbaum, J., Hills, B., Hindmarsh, R. C. A., Hoffman, A. O., Holschuh, N., Holt, J. W., Humbert, A., Jacobel, R. W., Jansen, D., Jenkins, A., Jokat, W., Jong, L., Jordan, T. A., King, E. C., Kohler, J., Krabill, W., Maton, J., Gillespie, M. K., Langley, K., Lee, J.* , Leitchenkov, G., Leuschen, C., Luyendyk, B., MacGregor, J. A., MacKie, E., Moholdt, G., Matsuoka, K., **Morlighem, M.**, Mouginot, J., Nitsche, F. O., Nost, O. A., Paden, J., Pattyn, F., Popov, S., Rignot, E., Rippin, D. M., Rivera, A., Roberts, J. L., Ross, N., Ruppel, A., Schroeder, D. M., Siegert, M. J., Smith, A. M., Steinhage, D., Studinger, M., Sun, B., Tabacco, I., Tinto, K. J., Urbini, S., Vaughan, D. G., Wilson, D. S., Young, D. A., Zirizzotti, A., Bedmap3 updated ice bed, surface and thickness gridded datasets for Antarctica, *Nature Sci. Data.*, 12(1), 414, [10.1038/s41597-025-04672-y](https://doi.org/10.1038/s41597-025-04672-y), 2025.
186. Aretz, N., Gunzburger, M., **Morlighem, M.**, Willcox, K., Multifidelity uncertainty quantification for ice sheet simulations, *Computational Geosciences*, 29(1), 5, [10.1007/s10596-024-10329-3](https://doi.org/10.1007/s10596-024-10329-3), 2025.
185. Baldacchino, F.* , Golledge, N. R., Horgan, H., **Morlighem, M.**, Alevropoulos-Borrill, A. V., Malyarenko, A., Gossart, A., Lowry, D. P., van Haastrecht, L., Modelling GNSS-observed seasonal velocity changes of the Ross Ice Shelf, Antarctica, using the Ice-sheet and Sea-level System Model (ISSM), *The Cryosphere*, 19(1), 107–127, [10.5194/tc-19-107-2025](https://doi.org/10.5194/tc-19-107-2025), 2025.
184. Ehrenfeucht, S.* , Dow, C., McArthur, K., **Morlighem, M.**, McCormack, F. S., Antarctic Wide Subglacial Hydrology Modeling, *Geophys. Res. Lett.*, 52(1), e2024GL111386, [10.1029/2024GL111386](https://doi.org/10.1029/2024GL111386), 2025.

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183. Jakobsson, M., Mohammad, R., Karlsson, M., Salas-Romero, S., Vacek, F., Heinze, F., Bringensparr, C., Castro, C. F., Johnson, P., Kinney, J., Cardigos, S., Bogonko, M., Accettella, D., Amblas, D., An, L., Bohan, A., Brandt, A., Bünz, S., Canals, M., Casamor, J. L., Coakley, B., Cornish, N., Danielson, S., Demarte, M., Di Franco, D., Dickson, M., Dorschel, B., Dowdeswell, J. A., Dreutter, S., Fremand, A. C., Hall, J. K., Hally, B., Holland, D., Hong, J. K., Ivaldi, R., Knutz, P. C., Krawczyk, D. W., Kristofferson, Y., Lastras, G., Leck, C., Lucchi, R. G., Masetti, G., **Morlighem, M.**, Muchowski, J., Nielsen, T., Noormets, R., Plaza-Faverola, A., Prescott, M. M., Purser, A., Rasmussen, T. L., Rebesco, M., Rignot, E., Rysgaard, S., Silyakova, A., Snoeijis-Leijonmalm, P., Sørensen, A., Straneo, F., Sutherland, D. A., Tate, A. J., Travaglini, P., Trenholm, N., van Wijk, E., Wallace, L., Willis, J. K., Wood, M., Zimmermann, M., Zinglensen, K. B., Mayer, L., The International Bathymetric Chart of the Arctic Ocean Version 5.0, *Scientific Data*, 11(1), 1420, [10.1038/s41597-024-04278-w](https://doi.org/10.1038/s41597-024-04278-w), 2024.

182. Khan, S. A., **Morlighem, M.**, Ehrenfeucht, S.*, Seroussi, H., Choi, Y.*, Rignot, E., Humbert, A., Pickell, D., Hassan, J., Inland Summer Speedup at Zachariae Isstrøm, Northeast Greenland, Driven by Subglacial Hydrology, *Geophysical Research Letters*, 51(18), e2024GL110691, [10.1029/2024GL110691](https://doi.org/10.1029/2024GL110691), 2024.
181. Seroussi, H., Pelle, T.*, Lipscomb, W. H., Abe-Ouchi, A., Albrecht, T., Alvarez-Solas, J., Asay-Davis, X., Barre, J., Berends, C. J., Bernales, J., Blasco, J., Caillet, J., Chandler, D. M., Coulon, V., Cullather, R., Dumas, C., Galton-Fenzi, B. K., Garbe, J., Gillet-Chaulet, F., Gladstone, R., Goelzer, H., Golledge, N., Greve, R., Gudmundsson, G. H., Han, H. K., Hillebrand, T. R., Hoffman, M. J., Huybrechts, P., Jourdain, N. C., Klose, A. K., Langebroek, P. M., Leguy, G. R., Lowry, D. P., Mathiot, P., Montoya, M., **Morlighem, M.**, Nowicki, S., Pattyn, F., Payne, A. J., Quiquet, A., Reese, R., Robinson, A., Saraste, L., Simon, E. G., Sun, S., Twarog, J. P., Trusel, L. D., Urruty, B., Van Breedam, J., van de Wal, R. S. W., Wang, Y., Zhao, C., Zwinger, T., Evolution of the Antarctic Ice Sheet Over the Next Three Centuries From an ISMIP6 Model Ensemble, *Earth's Future*, 12(9), e2024EF004561, [10.1029/2024EF004561](https://doi.org/10.1029/2024EF004561), 2024.
180. Cheng, G.*, **Morlighem, M.**, Gudmundsson, G. H., Numerical stabilization methods for level-set-based ice front migration, *Geosci. Model Dev.*, 17(16), 6227–6247, [10.5194/gmd-17-6227-2024](https://doi.org/10.5194/gmd-17-6227-2024), 2024.
179. **Morlighem, M.**, Goldberg, D., Barnes, J. M., Bassis, J. N., Benn, D. I., Crawford, A. J., Gudmundsson, G. H., Seroussi, H., The West Antarctic Ice Sheet may not be vulnerable to marine ice cliff instability during the 21st century, *Science Advances*, 10(34), eado7794, [10.1126/sciadv.ado7794](https://doi.org/10.1126/sciadv.ado7794), 2024.
178. Sommers, A. N.*, Meyer, C. R., Poinar, K., Mejia, J., **Morlighem, M.**, Rajaram, H., Warburton, K. L. P., Chu, W., Velocity of Greenland's Helheim Glacier Controlled Both by Terminus Effects and Subglacial Hydrology With Distinct Realms of Influence, *Geophys. Res. Lett.*, 51(15), e2024GL109168, [10.1029/2024GL109168](https://doi.org/10.1029/2024GL109168), 2024.
177. Cheng, G.*, **Morlighem, M.**, Francis, S., Forward and Inverse Modeling of Ice Sheet Flow Using Physics-Informed Neural Networks: Application to Helheim Glacier, Greenland, *J. Geophys. Res. Machine Learning and Computation*, 1(3), e2024JH000169, [10.1029/2024JH000169](https://doi.org/10.1029/2024JH000169), 2024.
176. Ehrenfeucht, S.*, Rignot, E., **Morlighem, M.**, Seawater Intrusion in the Observed Grounding Zone of Petermann Glacier Causes Extensive Retreat, *Geophys. Res. Lett.*, 51(12), e2023GL107571, [10.1029/2023GL107571](https://doi.org/10.1029/2023GL107571), 2024.
175. MacGregor, J. A., Colgan, W. T., Paxman, G. J. G., Tinto, K. J., Csathó, B., Darbyshire, F. A., Fahnestock, M. A., Kokfelt, T. F., MacKie, E. J., **Morlighem, M.**, Sergienko, O. V., Geologic Provinces Beneath the Greenland Ice Sheet Constrained by Geophysical Data Synthesis, *Geophys. Res. Lett.*, 51(8), e2023GL107357, [10.1029/2023GL107357](https://doi.org/10.1029/2023GL107357), 2024.
174. Park, I., Jin, E. K., **Morlighem, M.**, Lee, K., Impact of boundary conditions on the modeled thermal regime of the Antarctic ice sheet, *Cryosphere*, 18(3), 1139–1155, [10.5194/tc-18-1139-2024](https://doi.org/10.5194/tc-18-1139-2024), 2024.
173. Lippert, E. Y. H.*, **Morlighem, M.**, Cheng, G.*, Khan, S. A., Modeling a Century of Change: Kangerlussuaq Glacier's Mass Loss From 1933 to 2021, *Geophys. Res. Lett.*, 51(4), e2023GL106286, [10.1029/2023GL106286](https://doi.org/10.1029/2023GL106286), 2024.
172. Hanna, E., Topál, D., Box, J. E., Buzzard, S., Christie, F. D. W., Hvidberg, C., **Morlighem, M.**, De Santis, L., Silvano, A., Colleoni, F., Sasgen, I., Banwell, A. F., van den Broeke, M. R., DeConto, R., De Rydt, J., Goelzer, H., Gossart, A., Gudmundsson, G. H., Lindbäck, K., Miles, B., Mottram, R., Pattyn, F., Reese, R., Rignot, E., Srivastava, A., Sun, S., Toller, J., Tuckett, P. A., Ultee, L., Short- and long-term variability of the Antarctic and Greenland ice sheets, *Nat. Rev. Earth Environ.*, [10.1038/s43017-023-00509-7](https://doi.org/10.1038/s43017-023-00509-7), 2024.
171. Sandip, A., Räss, L., **Morlighem, M.**, Graphics-processing-unit-accelerated ice flow solver for unstructured meshes using the Shallow-Shelf Approximation (FastIceFlo v1.0.1), *Geosci. Model Dev.*, 17(2), 899–909, [10.5194/gmd-17-899-2024](https://doi.org/10.5194/gmd-17-899-2024), 2024.

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5. Larour, E., Seroussi, H., **Morlighem, M.**, Rignot, E., Continental scale, high order, high spatial resolution, ice sheet modeling using the Ice Sheet System Model (ISSM), *J. Geophys. Res.*, 117(F01022), 1-20, [10.1029/2011JF002140](https://doi.org/10.1029/2011JF002140), 2012.
4. Seroussi, H., Ben Dhia, H., **Morlighem, M.**, Rignot, E., Larour, E., Aubry, D., Coupling ice flow models of varying order of complexity with the Tiling Method, *J. Glaciol.*, 58 (210), 776-786, [10.3189/2012JoG11J195](https://doi.org/10.3189/2012JoG11J195), 2012.

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3. **Morlighem, M.**, Rignot, E., Seroussi, H., Larour, E., Ben Dhia, H., Aubry, D., A mass conservation approach for mapping glacier ice thickness, *Geophys. Res. Lett.*, 38(L19503), 1-6, [10.1029/2011GL048659](https://doi.org/10.1029/2011GL048659), 2011.
2. Seroussi, H., **Morlighem, M.**, Rignot, E., Larour, E., Aubry, D., Ben Dhia, H., Kristensen, S. S., Ice flux divergence anomalies on 79north Glacier, Greenland, *Geophys. Res. Lett.*, 38(L09501), 1-5, [10.1029/2011GL047338](https://doi.org/10.1029/2011GL047338), 2011.

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1. **Morlighem, M.**, Rignot, E., Seroussi, H., Larour, E., Ben Dhia, H., Aubry, D., Spatial patterns of basal drag inferred using control methods from a full-Stokes and simpler models for Pine Island Glacier, West Antarctica, *Geophys. Res. Lett.*, 37(L14502), 1-6, [10.1029/2010GL043853](https://doi.org/10.1029/2010GL043853), 2010.

Book Chapters

1. **Morlighem, M.**, Goldberg, D., Data Assimilation in Glaciology, in *Applications of Data Assimilation and Inverse Problems in the Earth Sciences*, Cambridge University Press, [10.1017/9781009180412](https://doi.org/10.1017/9781009180412), 2023.

Other Publications

14. Holt, J. W., Andrews, L. C., MacGregor, J. A., Aschwanden, A., Behrangi, A., Campbell, S. W., Daniel, M. F., Enderlin, E. M., Fahnestock, M. A., Felikson, D., Florentine, C., Flowers, G. E., Harig, C. T., Larsen, C. F., Leuschen, C. J., **Morlighem, M.**, O'Neel, S., Robinson, K., Rounce, D. R., Studinger, M., Tober, B. S., Truffer, M., Snow4Flow: Concept Paper for a NASA Earth Venture Suborbital-4 Investigation, [10.5281/zenodo.14230366](https://doi.org/10.5281/zenodo.14230366), 2024.
13. **Morlighem, M.**, Thwaites Glacier won't collapse like dominoes as feared, study finds, but that doesn't mean the 'Doomsday Glacier' is stable, *The Conversation*, [10.64628/AAI.kk96vnyx3](https://doi.org/10.64628/AAI.kk96vnyx3), 2024.
12. Network, A. E., Challenges Facing Scientific Publishing in the Field of Earth & Space Sciences, *AGU Advances*, 5(4), e2024AV001334, [10.1029/2024AV001334](https://doi.org/10.1029/2024AV001334), 2024.
11. Chu, W., Bartholomaeus, T., MacGregor, J., **Morlighem, M.**, Walden, V., Report on the 2023 Future of Greenland ice Sheet Science (FOGSS) Workshop: Unifying Themes, Cross-Cutting Priorities, and Future Directions, [10.18739/A24746T12](https://doi.org/10.18739/A24746T12), 2023.
10. **Morlighem, M.**, Khan, A., Greenland's Largest Ice Stream Likely to Lose Ice Six Times Faster than Thought, *ARCUS Witness Community Highlights*, 24 March 2023, <https://www.arcus.org/witness-the-arctic/2023/3/highlight/1>, 2023.
9. Khan, S. A., **Morlighem, M.**, Research Briefings: Deep-inland thinning of the northeast Greenland glacier predicts fast sea-level rise, *Nature*, [10.1038/d41586-022-03334-y](https://doi.org/10.1038/d41586-022-03334-y), 2022.
8. Matsuoka, K., Forsberg, R., Ferraccioli, F., Moholdt, G., **Morlighem, M.**, Circling Antarctica to unveil the bed below its icy edge, *Eos*, 103, [10.1029/2022EO220276](https://doi.org/10.1029/2022EO220276), 2022.
7. Chu, W., Bartholomaeus, T., MacGregor, J., **Morlighem, M.**, Walden, V., Future of Greenland Ice Sheet Science (FOGSS) Workshop 2022: Summary report, [10.18739/A2SN0157W](https://doi.org/10.18739/A2SN0157W), 2022.
6. **Morlighem, M.**, Mountain glaciers may hold less ice than previously thought – here's what that means for 2 billion downstream water users and sea level rise, *The Conversation*, <https://theconversation.com/mountain-glaciers-may-hold-less-ice-than-previously-thought-heres-what-that-means-for-2-billion-downstream-water-users-and-sea-level-rise-176514>, 2022.
5. Sergienko, O., **Morlighem, M.**, Nowicki, S., Padman, L., Modeling: A Powerful and Versatile Tool in Glaciology, *Eos*, 101, [10.1029/2020eo146349](https://doi.org/10.1029/2020eo146349), 2020.
4. **Morlighem, M.**, The secrets hidden under the Antarctic ice sheet, [10.25250/thescbr.brk390](https://doi.org/10.25250/thescbr.brk390), 2020.
3. **Morlighem, M.**, The landscape under Antarctica revealed, <https://sustainabilitycommunity.springernature.com/posts/59966-the-landscape-under-antarctica-revealed>, 2020.
2. Larour, E., Schlegel, N., **Morlighem, M.**, Modeling the Evolution of Polar Ice Sheets, *Eos*, 95(45), 411, [10.1002/2014EO45](https://doi.org/10.1002/2014EO45), 2014.
1. **Morlighem, M.**, Ice sheet properties inferred by combining numerical modeling and remote sensing data, Ecole Centrale Paris, [10.70675/2e10ac9bz13cfz4675zaddez18d5bc203eb](https://doi.org/10.70675/2e10ac9bz13cfz4675zaddez18d5bc203eb), 2011.

GRANTS

- 2026-2031 **European Research Council (ERC)**, *CALIX: Calving Law for Ice-Climate Simulations*, (Co-PI, Dartmouth: \$103,000 Award [#101199636](https://doi.org/10.1199636))
- 2026-2028 **NSF - Division of Research, Innovation, Synergies and Education (RISE)**, *Collaborative Research: CAIG: Physics-informed Machine Learning of Ice Calving and Sliding*, (Co-PI, Dartmouth: \$505,000 Award [#2530968](https://doi.org/10.2530968))
- 2025-2028 **NSF - Office of Polar Programs (OPP)**, *NERC-NSFGEO: BISTO: Better Ice Sheet forecasts via Transient assimilation and refined Ocean forcing*, (Co-PI, Dartmouth: \$260,000 Award [#2529886](https://doi.org/10.2529886))
- 2024-2027 **NASA Research Opportunities in Space and Earth Sciences (ROSES) - Studies With ICESat-2**, *Using ICESat-2 observations to reduce uncertainty in future ice sheet model projections*, (PI, \$475,000)
- 2024-2027 **NSF - Arctic Research Opportunities**, *Collaborative Research: Using the Ice Sheet and Sea-level System Model and geological constraints to investigate the disappearance of the Laurentide Ice Sheet*, (Co-PI, Dartmouth: \$70,000 Award [#2416600](https://doi.org/10.2416600))
- 2023-2027 **NASA's Making Earth System Data Records for Use in Research Environments (MEaSUREs) Program**, *Earth System Data Record of Ice Motion, Grounding Line, and Bed Topography in Antarctica from NISAR and other sensors*, (Co-I, Dartmouth: \$390,000)

- 2023-2029 **Novo Nordisk Foundation**, *Center for Ice-Sheet and Sea-Level Predictions (CISP)*, (Co-I, Dartmouth: \$1,000,000)
- 2023-2026 **NASA's Earth Surface and Interior (ESI)**, *Greenland-scape: Uncovering topography and geology beneath the Greenland Ice Sheet*, (Co-I, Dartmouth: \$65,000)
- 2022-2026 **NSF - Harnessing the Data Revolution**, *HDR Institute: HARP- Harnessing Data and Model Revolution in the Polar Regions*, (Co-PI and co-director, Dartmouth: \$1,000,000 Award [#2118285](#))
- 2021-2025 **NSF - Cyberinfrastructure for Sustained Scientific Innovation (CSSI)**, *Collaborative Research: Frameworks: Convergence of Bayesian inverse methods and scientific machine learning in Earth system models through universal differentiable programming*, (Co-I, Dartmouth: \$462,000 Award [#2147601](#))
- 2021-2025 **NSF - ARCSS-Arctic System Science**, *Collaborative Research: GRate – Integrating data and modeling to quantify rates of Greenland Ice Sheet change, Holocene to future*, (Co-I, Dartmouth: \$175,000 Award [#2105960](#))
- 2021-2024 **NASA Research Opportunities in Space and Earth Sciences (ROSES) - Studies With ICESat-2, BedMachine v4: Using ICESat-2 observations to reduce uncertainty in bed mapping and reassess Greenland's vulnerability to ocean warming**, (PI, \$530,000)
- 2019-2023 **Heising Simons Foundation**, *Eyes at the Front: numerical modeling of Helheim's ice-ocean-atmosphere interactions*, (PI, \$403,000)
- 2018-2023 **NSF-NERC - International Thwaites Glacier Collaboration**, *International Thwaites Glacier Collaboration: PROCesses, drivers, Prediction: modeling the History and Evolution of Thwaites (PROPHET)*, (PI, \$1,157,000 Award [#1739031](#) and Award [#2152622](#))
- 2015-2019 **NSF - ARCSS-Arctic System Science**, *Collaborative Research: Ice sheet sensitivity in a changing Arctic system - using data and modeling to test the stable Greenland Ice Sheet hypothesis*, (Co-I, \$692,000 Award [#1504230](#))
- 2015-2018 **NASA Jet Propulsion Laboratory**, *Assimilation of Altimetry Data in NE Greenland using ISSM*, (PI, \$215,005)
- 2015-2019 **NSF - Antarctic Glaciology**, *Collaborative Research: Evaluating retreat in the Amundsen Sea Embayment: Assessing controlling processes, uncertainties, and projections*, (Co-I, UCI \$117,000 Award [#1443229](#))
- 2014-2018 **NASA Research Opportunities in Space and Earth Sciences (ROSES) - Cryospheric Science**, *Greenland Bed Mapping using mass conservation, IceBridge and InSAR data*, (PI, \$304,000)
- 2014-2016 **NASA Research Opportunities in Space and Earth Sciences (ROSES) - Sea Level Rise**, *Mass balance and bed topography datasets of ice sheets for sea level studies*, (Co-I, \$263,158)
- 2014-2016 **NASA Operation IceBridge Science Definition Team (ROSES)**, *Coastal land ice dynamics with OIB data*, (Co-I, \$150,000)
- 2012-2015 **NASA Research Opportunities in Space and Earth Sciences (ROSES) - IceBridge Research**, *Improved mapping of glacier thickness using IceBridge data combined with radar interferometry data*, (PI, \$330,000)

PRESENTATIONS

- Jun. 2026 **Leh Indian Glaciology Summer School (LIGSS)**, *Leh, Ladakh India*, Ice Sheets modeling in the climate system, (invited lecture)
- Feb. 2026 **INSTANT Workshop**, *Wellington, New Zealand*, Reducing the uncertainty in Antarctica's contribution to sea level rise, lessons learned from Greenland, (invited)
- Feb. 2026 **CLiC Open Science Conference**, *Wellington, New Zealand*, New insights into the current and future stability of Thwaites and Pine Island Glaciers, West Antarctica, (invited)
- Dec. 2025 **American Geophysical Union**, *New Orleans LA, USA*, Integrating Machine Learning into Ice Sheet Models using Universal Differentiable Programming
- May 2025 **Kavli Institute for Theoretical Physics**, *Santa Barbara, CA*, Melting Giants: Ice Sheets in the climate system, (invited seminar)
- May 2025 **Royal Society Meeting on Next generation ice-sheet bed measurements**, *Edinburgh, UK*, Mapping subglacial topography: from simple interpolations to physics-informed approaches, (invited)
- Mar. 2025 **Harvard**, *Cambridge, MA*, Melting Giants: Predicting Ice Sheet Impacts on Sea Level, (invited seminar)

- Dec. 2024 **American Geophysical Union**, *Washington, DC*, BedMachine Antarctica v4 - Improved interior topography and continental shelf bathymetry
- Aug. 2024 **Australian Community Climate and Earth System Simulator (ACCESS)**, *virtual*, Using observations to constrain ice sheet numerical models: can they capture recent trends?, (invited seminar)
- Dec. 2023 **American Geophysical Union**, *San Francisco, CA*, Transient calibration of the Amundsen sea embayment using twenty years of satellite interferometry and altimetry
- Nov. 2023 **Stanford University**, *Palo Alto, CA*, How much and how fast are the ice sheets going to raise sea level?, (invited seminar)
- Jul. 2023 **International Union of Geodesy and Geophysics**, *Berlin, Germany*, Transient calibration of the Amundsen sea embayment using twenty years of satellite interferometry and altimetry
- Apr. 2023 **SD School of Mines**, *Rapid City, SD*, How much and how fast are the ice sheets going to raise sea level?, (invited seminar)
- Mar. 2023 **Virginia Tech**, *Blacksburg, VA*, How much and how fast are the ice sheets going to raise sea level?, (invited seminar)
- Mar. 2023 **Appalachian State University**, *Boone, NC*, How much and how fast are the ice sheets going to raise sea level?, (invited seminar)
- Dec. 2022 **American Geophysical Union**, *Chicago, IL*, ICESat-2 time series improve the accuracy of subglacial bed topography mapping
- Oct. 2022 **NASA ICESat-2 Science Team Meeting**, *Austin, TX*, ICESat-2 time series improve the accuracy of subglacial bed topography mapping
- Sep. 2022 **Land-Ice/Ocean Network Exploration with Semiautonomous Systems (LIONESS) project meeting**, *Virtual*, How important is Thwaites Ice Shelf for the future mass loss of the West Antarctic Ice Sheet?, (invited)
- Aug. 2022 **International Symposium on Ice, Snow and Water in a Warming World**, *Reykjavík, Iceland*, Investigating the role of Marine Ice Cliff Instability for glacier retreat in the Amundsen Sea Sector over the next century
- Jul. 2022 **JuliaCon 2022**, *Virtual*, Universal Differentiation applied to Ice Sheet Modeling dJUICE
- Jun. 2022 **Antarctic RINGS, first international workshop**, *Tromsø, Norway*, Combining subglacial bed topography and ocean bathymetry in BedMachine, (invited)
- May 2022 **NASA ICESat-2 Science Team Meeting**, *Boulder, CO*, Using ICESat-2 observations to reduce uncertainty in bed mapping and reassess Greenland's vulnerability to ocean warming
- Jun. 2022 **University of Grenoble Alpes, Institut des Géosciences de l'Environnement**, *Grenoble, France*, Marine Ice Cliff Instability, Myth or reality?, (invited seminar)
- Mar. 2022 **Arctic-Antarctic and North Pacific Mapping Meeting**, *Virtual*, Combining subglacial bed topography and ocean bathymetry in BedMachine, (invited)
- Dec. 2021 **American Geophysical Union**, *New Orleans LA, USA*, Investigating the role of Marine Ice Cliff Instability for glacier retreat in the Amundsen Sea Sector over the next century
- Dec. 2021 **Scientific Computing Seminar (invited)**, *Technische Universität Kaiserslautern, Germany*, The challenges of modeling the ice sheets in a changing climate
- Oct. 2021 **TEDx**, *Vienna, Austria*, The secret landscape buried under the Antarctic ice sheet, (invited)
- Sep. 2021 **Interagency Arctic Research Policy Committee (IARPC) - Meeting**, *Virtual*, Using mass conservation to inform ice penetrating radar campaigns, (invited)
- Feb. 2021 **NASA Goddard Institute for Space Studies, sea level seminar series**, *Remote seminar*, Can we (yet) predict how fast Greenland is going to melt?, (invited seminar)
- Jan. 2021 **IceCube Polar Science Workshop**, *Virtual conference*, BedMachine: mapping the bed under the Antarctic ice sheet by combining sparse radar data and mass conservation, (invited)
- Dec. 2020 **American Geophysical Union**, *Virtual conference*, Sensitivity of the Amundsen Sea Embayment to changes in external forcings using Automatic Differentiation
- Nov. 2020 **Denman-Scott: Observations, Modeling, and Future Change**, *Virtual conference*, How deep is the bed under Denman Glacier?

- Aug. 2020 **Dartmouth, Earth Sciences Geolunch Series Seminar**, *Hanover, NH*, Can we (yet) predict how fast the ice sheets are going to melt?, (invited seminar)
- Jan. 2020 **Mathematical Modeling in Glaciology Workshop**, *Banff, Canada*, From optimal control to automatic differentiation: challenges in data assimilation in ice sheet modeling, (invited)
- Dec. 2019 **American Geophysical Union**, *San Francisco CA, USA*, Deep glacial troughs and stabilizing ridges hidden beneath the ice around the coast of Antarctica
- Jul. 2019 **International Symposia on Antarctic Earth Sciences**, *Incheon, South Korea*, BedMachine Antarctica v1, a new subglacial bed topography and ocean bathymetry dataset of Antarctica, (keynote)
- Jul. 2019 **International Union of Geodesy and Geophysics**, *Montreal, Canada*, BedMachine Antarctica v1, a new subglacial bed topography and ocean bathymetry dataset of Antarctica
- Jun. 2019 **University of Grenoble Alpes, Institut des Géosciences de l'Environnement**, *Grenoble, France*, To understand how ice sheets respond to climate change, look at the bed..., (invited seminar)
- May 2019 **Land-Ice/Ocean Network Exploration with Semiautonomous Systems (LIONESS) project meeting**, *Incheon, South Korea*, Can basal melting under ice shelves be parameterized?
- Apr. 2019 **California Institute of Technology Environmental Science and Engineering Seminar Series**, *Pasadena, CA*, To understand how ice sheets respond to climate change, look at the bed..., (invited seminar)
- Jan. 2019 **Program for Arctic Regional Climate Assessment**, *University of Maryland MD, USA*, Modeling the response of Northwest Greenland to enhanced ocean thermal forcing and subglacial discharge
- Dec. 2018 **American Geophysical Union**, *Washington DC, USA*, BedMachine Antarctica v1: a new subglacial bed topography and ocean bathymetry dataset of Antarctica combining mass conservation, gravity inversion and streamline diffusion
- Dec. 2018 **American Geophysical Union**, *Washington DC, USA*, Modeling the response of Northwest Greenland to enhanced ocean thermal forcing and subglacial discharge, (invited)
- Nov. 2018 **The Future of Earth System Modeling: Polar Climates**, *California Institute of Technology, Pasadena CA*, Modeling the Future of the Ice Sheets: Lessons Learned from the Development of ISSM, (invited)
- Oct. 2018 **Korea Polar Research Institute (KOPRI)**, *Incheon, South Korea*, Can we (yet) predict how fast Greenland is going to melt?, (invited seminar)
- Jul. 2018 **13th World Congress in Computational Mechanics**, *New-York City, NY*, Implementation of higher-order vertical finite elements in ISSM for improved ice sheet flow modeling over paleoclimate timescales, (invited)
- May 2018 **Scripps Institution of Oceanography, UC San Diego**, *La Jolla, CA*, Can we (yet) predict how fast Greenland is going to melt?, (invited seminar)
- Apr. 2018 **European Geosciences Union**, *Vienna, Austria*, Modeling the response of Northwest Greenland to enhanced ocean thermal forcing and subglacial discharge, (award lecture)
- Dec. 2017 **American Geophysical Union**, *New Orleans LA, USA*, Modeling the response of Northwest Greenland to enhanced ocean thermal forcing and subglacial discharge
- Sept. 2017 **NSF Workshop: How Stable is the Greenland Ice Sheet?**, *Buffalo, NY*, Modeling the response of Northwest Greenland to enhanced ocean thermal forcing and subglacial discharge
- Jun. 2017 **Oceans Melting Greenland science team meeting**, *University of California, Irvine*, BedMachine Greenland v3
- Jun. 2017 **IceBridge Land Ice science team meeting**, *University of California, Irvine*, BedMachine Greenland v3, an update
- Jan. 2017 **Program for Arctic Regional Climate Assessment**, *Goddard Space Flight Center MD, USA*, Modeling ice front Dynamics of Northwest Greenland in response to ocean thermal forcing using ISSM and OIB/OMG data
- Dec. 2016 **American Geophysical Union**, *San Francisco CA, USA*, Modeling ice front Dynamics of Northwest Greenland in response to ocean thermal forcing, using ISSM and OMG data
- Sep 2016 **University of Texas, Institute for Geophysics**, *Austin, TX*, The challenge of modeling the ice sheets in a changing climate, (invited seminar)
- May 2016 **Institute for Marine and Antarctic Studies**, *Hobart, Tasmania, Australia*, The challenge of modeling the ice sheets in a changing climate, (invited seminar)

- Dec. 2015 **American Geophysical Union, San Francisco CA, USA**, Modeling ice front Dynamics of Greenland outlet glaciers using ISSM
- Dec. 2015 **American Geophysical Union, San Francisco CA, USA**, Bed topography under Antarctic outlet glaciers revealed by mass conservation and radar data, (invited)
- Jun. 2015 **International Union of Geodesy and Geophysics, Prague, Czech Republic**, The present and future challenges of modeling ice sheets in a changing climate, (invited)
- Jun. 2015 **International Union of Geodesy and Geophysics, Prague, Czech Republic**, Modeling ice front dynamics of Greenland outlet glaciers using the Ice Sheet System Model
- Mar. 2015 **SIAM Conference on Computational Science and Engineering, Salt Lake City, USA**, Assessment of Finite Element Schemes for Accurate Modeling of the Grounding Line
- Jan. 2015 **IceBridge Land Ice science meeting, Goddard Space Flight Center MD, USA**, OIB BedMachine for Greenland and Antarctica, and update
- Sept. 2014 **Nansen Environmental and Remote Sensing Center Seminar, NERSC, Bergen, Norway**, Modeling ice sheets in a changing climate, (invited)
- Jun. 2014 **International Glaciological Society - Symposium on Observations, Modelling and Prediction of the Cryospheric Contribution to Sea Level Change, Chamonix, France**, Bed topography under the Greenland ice sheet
- Mar. 2014 **Earth System Science Seminar, UC Irvine, Irvine, CA, USA**, The challenges of modeling ice sheets in a changing climate, (invited seminar)
- Jan. 2014 **IceBridge Land Ice science meeting, Goddard Space Flight Center MD, USA**, OIB BedMachine for the Greenland Ice Sheet, (invited)
- Dec. 2013 **American Geophysical Union, San Francisco CA, USA**, Bed topography under the Greenland outlet glaciers based on mass conservation
- Sep. 2013 **International Glaciological Society - Symposium on Radioglaciology, Lawrence KS, USA**, Bed topography under Greenland outlet glaciers revealed by Operation IceBridge data
- Jun. 2013 **SIAM Conference on Mathematical and Computational Issues in the Geosciences, Padua, Italy**, Ice Sheet Properties Inferred by Combining Numerical Modeling and Remote Sensing Data
- Mar. 2013 **Dix Seismo Lab Seminar, California Institute of Technology, Pasadena CA, USA**, Modeling the Ice Sheets in a changing climate, (invited seminar)
- Jan. 2013 **Program for Arctic Regional Climate Assessment, Goddard Space Flight Center MD, USA**, Bed topography under Greenland outlet glaciers
- Dec. 2012 **American Geophysical Union, San Francisco CA, USA**, Bed topography under Greenland outlet glaciers, revealed by Operation IceBridge data
- Nov. 2012 **ECCO2 meeting, Pasadena CA, USA**, Modeling the response of Pine Island Glacier, West Antarctica, to external forcings for the next 50 years
- Mar. 2012 **Radar forum - Jet Propulsion Laboratory, Pasadena CA, USA**, Monitoring and Modeling the Ice Sheets in a Changing Climate, (invited seminar)
- Feb. 2012 **Community Earth System Model (CESM) - Land Ice Working Group meeting, Boulder CO, USA**, The Ice Sheet System Model: an update, (invited)
- Dec. 2011 **American Geophysical Union, San Francisco CA, USA**, Enhanced inverse method for ice-sheet model calibration technique based on mass conservation, (invited)
- Dec. 2011 **American Geophysical Union, San Francisco CA, USA**, A mass conservation approach for mapping glacier ice thickness, (invited)
- Jul. 2011 **11th US National Congress for Computational Mechanics, Minneapolis MN, USA**, Basal drag estimation of Antarctic glaciers using inverse method
- Jan. 2011 **Program for Arctic Regional Climate Assessment, Goddard Space Flight Center MD, USA**, Jakobshavn balance thickness
- Dec. 2010 **American Geophysical Union, San Francisco CA, USA**, Constructing high-resolution, consistent and seamless ice thicknesses using a new data assimilation technique based on mass conservation

- Dec. 2009 **American Geophysical Union, San Francisco CA, USA**, Spatial patterns of basal drag inferred using control methods from three ice flow models for Pine Island Glacier, West Antarctica
- Nov. 2009 **ECCO2 meeting, Pasadena CA, USA**, Ice Sheet System Model, (invited seminar)
- Dec. 2008 **American Geophysical Union, San Francisco CA, USA**, Basal drag evolution of Pine Island Glacier in the wake of its retreat

TEACHING

- EARS 6.05 **Modeling the Earth System**, Spring 2022, 2023, 2024, Fall 2025
- EARS (1)17 **Statistics for Earth and Planetary Scientists**, Undergraduate/Graduate course, Winter and Fall 2025
- EARS 88 **The Earth System**, Winter 2022, Winter 2023
- EARS 107 **Mathematical Modeling of Earth Processes**, Graduate course, Fall 2022, and 2024
- EARS 202 **Critical Analysis in Earth Sciences**, Graduate course, Winter 2022, and 2024
- ESS 19 **Introduction to modeling the Earth System**, General Education, 2015–2020 (~80 students enrolled)
- ESS 30B **Environmental Issues Affecting the Sustainability of Societies I**, (co-taught with 3 other instructors), Winter 2018
- ESS 30C **Environmental Issues Affecting the Sustainability of Societies II**, (co-taught with 3 other instructors), Spring 2018
- ESS 40C **Earth System Physics**, Spring 2021 (~70 students enrolled)
- ESS 116 **Introduction to Data Analysis in Earth Science**, 2015–2020 (~60 students enrolled)
- ESS 191 **Introduction to Research in Earth System Science**, Lecture on “Modeling ice sheets in a changing climate”, Fall 2014, Spring 2017, Spring 2018
- ESS 280 **Cryosphere Topics**, 2014–2020

PROFESSIONAL ACTIVITIES

- Since 2026 Member of the Executive Steering Committee of **UNESCO's Decade of Action for Cryospheric Sciences (2025–2034)**
- Since 2026 Member of the Science Advisory Board of the Heising-Simons Foundation
- Since 2025 President of the **International Association of Cryospheric Sciences (IACS)**
- Since 2019 Editor for AGU's Geophysical Research Letters
- Since 2008 Co-founder, core developer and user support of the Ice-sheet and Sea-level System Model (**ISSM**)
- Since 2011 Co-organizer of the annual Ice-sheet and Sea-level System Model workshop
- Since 2012 Development of NASA's **BedMachine Greenland**, a high-resolution bed topography dataset of the Greenland ice sheet (first public release in 2014)
- Since 2018 Development of **BedMachine Antarctica**, a high-resolution bed topography dataset of the Antarctic ice sheet (first public release in 2019)
- Since 2022 Co-director of the HDR Institute: **iHARP - Harnessing Data and Model Revolution in the Polar Regions**
- 2023–2025 Vice-chair of the **U.S. National Committee** for the International Union of Geodesy and Geophysics
- 2023–2025 Organizer and coordinator of 2025 Kavli Institute For Theoretical Physics (KITP) Program on **The Physics of Changing Polar Climate**
- Since 2022 Organizer and Convener of the **Future of Greenland ice Sheet Science (FOGSS) Workshop**
- 2021–2026 Member of the **RINGS Action Group** of the Scientific Committee on Antarctic Research (Collaborative international effort to map all Antarctic ice-sheet margins)
- Since 2020 Core Member of the **Bedmap3** Action group of the Scientific Committee on Antarctic Research
- Since 2020 Member of the **INSTANT** steering committee of the Scientific Committee on Antarctic Research (The INSTabilities & Thresholds in ANTArctica)

Intercomparison Projects

- Since 2016 Participating in the [Ice Sheet Model Intercomparison for CMIP6 \(ISMIP6\)](#) project to explore the sea level rise contribution from the Greenland and Antarctic ice sheets
- 2010 – 2012 Participating in the [SeaRISE](#) experiments, which consists of assessing ice sheet contributions to Sea Level through the 21st Century with numerical models

Memberships

- Since 2008 Member of the American Geophysical Union (AGU)
- Since 2016 Member of the European Geosciences Union (EGU)
- Since 2021 Member of the NASA ICESat-2 Science Team
- Since 2022 Member of the American Association for the Advancement of Science (AAAS)
- Since 2022 Member of the International Glaciological Society (IGS)