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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 Sciences

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, Development of the Ice Sheet System Model, a massively parallel finite element ice sheet model

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

Dec. 2024 **American Geophysical Union**, *Elected fellow*

Apr. 2023 **International Glaciological Society**, *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

Apr. 2018 **European Geosciences Union Award: 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

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 Publications

* denotes advised graduate students and postdocs

199. G. Cheng*, M. Krishna, and **M. Morlighem**. A Python library for solving ice sheet modeling problems using physics-informed neural networks, PINNICLE v1.0. *Geosci. Model Dev.*, 18(16):5311–5327, 2025. [link]

198. Sophie L. Norris, John C. Gosse, Romain Millan, Jeremie Mouginot, Antoine Rabatel, **Mathieu Morlighem**, Matthew S. M. Bolton, and Richard B. Alley. Drivers of global glacial erosion rates. *Nat. Geosci.*, 18(8):732–739, Aug 2025. [link]

197. F. A. Holmes, J. Barnett, H. Åkesson*, **M. Morlighem**, J. Nilsson, N. Kirchner, and M. Jakobsson. 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, 2025. [link]

196. Steven Palmer, Charlie Kirkwood, Chunbo Luo, and **Mathieu Morlighem**. A quantile regression forest estimate of Greenland's subglacial topography. *J. Glaciol.*, pages 1–25, 2025. [link]

195. Y. Koo, G. Cheng*, **M. Morlighem**, and M. Rahnemoonfar. Calibrating calving parameterizations using graph neural network emulators: application to Helheim Glacier, East Greenland. *The Cryosphere*, 19(7):2583–2599, 2025. [link]

194. E. Y. H. Lippert*, **M. Morlighem**, G. Cheng*, D. L. Berg, J. Hassan, and S. A. Khan. Ice Front and Mélange Dynamics at Kangerlussuaq Glacier, Eastern Greenland, Since 1981, and Future Stability. *Geophysical Research Letters*, 52(13):e2024GL113982, 2025. [link]

193. S. A. Khan, H. Seroussi, **M. Morlighem**, W. Colgan, V. Helm, G. Cheng*, D. Berg, V. R. Barletta, N. K. Larsen, W. Kochtitzky, M. van den Broeke, K. H. Kjær, A. Aschwanden, B. Noël, J. E. Box, J. A. MacGregor, R. S. Fausto, K. D. Mankoff, I. M. Howat, K. Oniszk, D. Fahrner, A. Løkkegaard, E. Y. H. Lippert*, A. Bråtner, and J. Hassan. Smoothed monthly Greenland ice sheet elevation changes during 2003–2023. *Earth Syst. Sci. Data*, 17(6):3047–3071, 2025. [link]

192. Joel A. Wilner*, Alice M. Doughty, Meredith A. Kelly, and **Mathieu Morlighem**. Disentangling topographic and climatic controls on glacier length: A case study in the tropical colombian andes. *Earth Planet. Sci. Lett.*, 667:119511, 2025. [link]

191. Jessica A. Badgeley*, **Mathieu Morlighem**, and Hélène Seroussi. Increased sea-level contribution from northwestern Greenland for models that reproduce observations. *Proc. Natl. Acad. Sci.*, 122(25):e2411904122, 2025. [link]

190. Thomas O. Teisberg, Dustin M. Schroeder, Paul T. Summers, and **Mathieu Morlighem**. Measurement of englacial velocity fields with interferometric radio echo sounders. *J. Geophys. Res. - Earth Surface*, 130(6):e2025JF008286, 2025. [link]

189. J. K. Cuzzone*, A. Barth, K. Barker, and **M. Morlighem**. 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, 2025. [link]

188. Benjamin Getraer* and **Mathieu Morlighem**. Increasing the Glen–Nye Power-Law Exponent Accelerates Ice-Loss Projections for the Amundsen Sea Embayment, West Antarctica. *Geophys. Res. Lett.*, 52(7):e2024GL112516, 2025. [link]

187. Hamish D. Pritchard, Peter T. Fretwell, Alice C. Fremand, Julien A. Bodart, James D. Kirkham, Alan Aitken, Jonathan Bamber, Robin Bell, Cesidio Bianchi, Robert G. Bingham, Donald D. Blankenship, Gino Casassa, Knut Christianson, Howard Conway, Hugh F. J. Corr, Xiangbin Cui, Detlef Damaske, Volkmar Damm, Boris Dorschel, Reinhard Drews, Graeme Eagles, Olaf Eisen, Hannes Eisermann, Fausto Ferraccioli, Elena Field, René Forsberg, Steven Franke, Vikram Goel, Siva Prasad Gogineni, Jamin Greenbaum, Benjamin Hills, Richard C. A. Hindmarsh, Andrew O. Hoffman, Nicholas Holschuh, John W. Holt, Angelika Humbert, Robert W. Jacobel, Daniela Jansen, Adrian Jenkins, Wilfried Jokat, Lenneke Jong, Tom A. Jordan, Edward C. King, Jack Kohler, William Krabill, Joséphine Maton, Mette Kusk Gillespie, Kirsty Langley, Joohan Lee, German Leitchenkov, Cartlon Leuschen, Bruce Luyendyk, Joseph A. MacGregor, Emma MacKie, Geir Moholdt, Kenichi Matsuoka, **Mathieu Morlighem**, Jérémie Mouginot, Frank O. Nitsche, Ole A. Nost, et al.. Bedmap3 updated ice bed, surface and thickness gridded datasets for Antarctica. *Nature Sci. Data.*, 12(1):414, Mar 2025. [link]

186. Nicole Aretz, Max Gunzburger, **Mathieu Morlighem**, and Karen Willcox. Multifidelity uncertainty quantification for ice sheet simulations. *Computational Geosciences*, 29(1):5, Jan 2025. [link]

185. F. Baldacchino*, N. R. Golledge, H. Horgan, **M. Morlighem**, A. V. Alevropoulos-Borrill, A. Malyarenko, A. Gossart, D. P. Lowry, and L. van Haastrecht. 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, 2025. [link]

184. Shivani Ehrenfeucht*, Christine Dow, Koi McArthur, **Mathieu Morlighem**, and Felicity S. McCormack. Antarctic Wide Subglacial Hydrology Modeling. *Geophys. Res. Lett.*, 52(1):e2024GL111386, 2025. [link]

183. Martin Jakobsson, Rezwan Mohammad, Marcus Karlsson, Silvia Salas-Romero, Florian Vacek, Florian Heinze, Caroline Bringensparr, Carlos F. Castro, Paul Johnson, Juliet Kinney, Sara Cardigos, Michael Bogonko, Daniela Accettella, David Amblas, Lu An, Aileen Bohan, Angelika Brandt, Stefan Bünz, Miquel Canals, José Luis Casamor, Bernard Coakley, Natalie Cornish, Seth Danielson, Maurizio Demarte, Davide Di Franco, Mary-Lynn Dickson, Boris Dorschel, Julian A. Dowdeswell, Simon Dreutter, Alice C. Fremand, John K. Hall, Bryan Hally, David Holland, Jon Kuk Hong, Roberta Ivaldi, Paul C. Knutz, Diana W. Krawczyk, Yngve Kristofferson, Galderic Lastras, Caroline Leck, Renata G. Lucchi, Giuseppe Masetti, **Mathieu Morlighem**, Julia Muchowski, Tove Nielsen, Riko Noormets, Andreia Plaza-Faverola, Megan M. Prescott, Autun Purser, Tine L. Rasmussen, Michele Rebesco, Eric Rignot, Søren Rysgaard, Anna Silyakova, Pauline Snoeijs-Leijonmalm, Aqqaluk Sørensen, Fiammetta Straneo, David A. Sutherland, Alex J. Tate, Paola Travaglini, et al.. The International Bathymetric Chart of the Arctic Ocean Version 5.0. *Scientific Data*, 11(1):1420, Dec 2024. [link]

182. Shfaqat A. Khan, **Mathieu Morlighem**, Shivani Ehrenfeucht*, Helene Seroussi, Youngmin Choi*, Eric Rignot, Angelika Humbert, Derek Pickell, and Javed Hassan. Inland Summer Speedup at Zachariae Isstrøm, Northeast Greenland, Driven by Subglacial Hydrology. *Geophysical Research Letters*, 51(18):e2024GL110691, 2024. [link]

181. Hélène Seroussi, Tyler Pelle*, William H. Lipscomb, Ayako Abe-Ouchi, Torsten Albrecht, Jorge Alvarez-Solas, Xylar Asay-Davis, Jean-Baptiste Barre, Constantijn J. Berends, Jorge Bernales, Javier Blasco, Justine Caillet, David M. Chandler, Violaine Coulon, Richard Cullather, Christophe Dumas, Benjamin K. Galton-Fenzi, Julius Garbe, Fabien Gillet-Chaulet, Rupert Gladstone, Heiko Goelzer, Nicholas Golledge, Ralf Greve, G. Hilmar Gudmundsson, Holly Kyeore Han, Trevor R. Hillebrand, Matthew J. Hoffman, Philippe Huybrechts, Nicolas C. Jourdain, Ann Kristin Klose, Petra M. Langebroek, Gunter R. Leguy, Daniel P. Lowry, Pierre Mathiot, Marisa Montoya, **Mathieu Morlighem**, Sophie Nowicki, Frank Pattyn, Antony J. Payne, Aurélien Quiquet, Ronja Reese, Alexander Robinson, Leopekka Saraste, Erika G. Simon, Sainan Sun, Jake P. Twarog, Luke D. Trusel, Benoit Urruty, Jonas Van Breedam, Roderik S. W. van de Wal, Yu Wang, Chen Zhao, and Thomas Zwinger. Evolution of the Antarctic Ice Sheet Over the Next Three Centuries From an ISMIP6 Model Ensemble. *Earth's Future*, 12(9):e2024EF004561, 2024. [link]

180. G. Cheng*, **M. Morlighem**, and G. H. Gudmundsson. Numerical stabilization methods for level-set-based ice front migration. *Geosci. Model Dev.*, 17(16):6227–6247, 2024. [link]

179. **Mathieu Morlighem**, Daniel Goldberg, Jowan M. Barnes, Jeremy N. Bassis, Douglas I. Benn, Anna J. Crawford, G. Hilmar Gudmundsson, and Hélène Seroussi. The West Antarctic Ice Sheet may not be vulnerable to marine ice cliff instability during the 21st century. *Science Advances*, 10(34):eado7794, 2024. [link]

178. A. N. Sommers*, C. R. Meyer, K. Poinar, J. Mejia, **M. Morlighem**, H. Rajaram, K. L. P. Warburton, and W. Chu. 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, 2024. [link]

177. Gong Cheng*, **Mathieu Morlighem**, and Sade Francis. 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, 2024. [link]

176. Shivani Ehrenfeucht*, Eric Rignot, and **Mathieu Morlighem**. Seawater Intrusion in the Observed Grounding Zone of Petermann Glacier Causes Extensive Retreat. *Geophys. Res. Lett.*, 51(12):e2023GL107571, 2024. [link]

175. Joseph A. MacGregor, William T. Colgan, Guy J. G. Paxman, Kirsty J. Tinto, Beáta Csathó, Fiona A. Darbyshire, Mark A. Fahnestock, Thomas F. Kokfelt, Emma J. MacKie, **Mathieu Morlighem**, and Olga V. Sergienko. Geologic provinces beneath the greenland ice sheet constrained by geophysical data synthesis. *Geophys. Res. Lett.*, 51(8):e2023GL107357, 2024. [link]

174. I.-W. Park, E. K. Jin, **M. Morlighem**, and K.-K. Lee. Impact of boundary conditions on the modeled thermal regime of the Antarctic ice sheet. *Cryosphere*, 18(3):1139–1155, 2024. [link]

173. E. Y. H. Lippert*, **M. Morlighem**, G. Cheng*, and S. A. Khan. Modeling a Century of Change: Kangerlussuaq Glacier's Mass Loss From 1933 to 2021. *Geophys. Res. Lett.*, 51(4):e2023GL106286, 2024. [link]

172. Edward Hanna, Dániel Topál, Jason E. Box, Sammie Buzzard, Frazer D. W. Christie, Christine Hvidberg, **Mathieu Morlighem**, Laura De Santis, Alessandro Silvano, Florence Colleoni, Ingo Sasgen, Alison F. Banwell, Michiel R. van den Broeke, Robert DeConto, Jan De Rydt, Heiko Goelzer, Alexandra Gossart, G. Hilmar Gudmundsson, Katrin Lindbäck, Bertie Miles, Ruth Mottram, Frank Pattyn, Ronja Reese, Eric Rignot, Aakriti Srivastava, Sainan Sun, Justin Toller, Peter A. Tuckett, and Lizz Ultee. Short- and long-term variability of the Antarctic and Greenland ice sheets. *Nat. Rev. Earth Environ.*, Feb 2024. [link]

171. A. Sandip, L. Räss, and **M. Morlighem**. 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, 2024. [link]

170. Atefeh Jebeli, Bayu Adhi Tama, Vandana P. Janeja, Nicholas Holschuh, Claire Jensen, **Mathieu Morlighem**, Joseph A. MacGregor, and Mark A. Fahnestock. TSSA: Two-Step Semi-Supervised Annotation for radargrams on the Greenland Ice Sheet. In *IGARSS 2023 - 2023 IEEE INTERNATIONAL GEOSCIENCE AND REMOTE SENSING SYMPOSIUM*, IEEE International Symposium on Geoscience and Remote Sensing IGARSS, pages 56–59, . IEEE; Inst Elect & Elect Engineers, Geoscience & Remote Sensing Soc, 2023. [link]

169. Katherine Yi, Angelina Dewar, Tartela Tabassum, Jason Lu, Ray Chen, Homayra Alam, Omar Faruque, Sikan Li, **Mathieu Morlighem**, and Jianwu Wang. Evaluating Machine Learning and Statistical Models for Greenland Subglacial Bed Topography. In *2023 International Conference on Machine Learning and Applications (ICMLA)*, pages 659–666, 2023. [link]

168. Y. Choi*, H. Seroussi, **M. Morlighem**, N.-J. Schlegel, and A. Gardner. Impact of time-dependent data assimilation on ice flow model initialization and projections: a case study of Kjer Glacier, Greenland. *Cryosphere*, 17(12):5499–5517, 2023. [link]

167. Kristian Svennevig, Matthew J. Owen, Michele Citterio, Tove Nielsen, Salik Rosing, Jan Harff, Rudolf Endler, **Mathieu Morlighem**, and Eric Rignot. Holocene gigascale rock avalanches in Vaigat strait, West Greenland—Implications for geohazard. *Geology*, 12 2023. [link]

166. H. Seroussi, V. Verjans, S. Nowicki, A. J. Payne, H. Goelzer, W. H. Lipscomb, A. Abe-Ouchi, C. Agosta, T. Albrecht, X. Asay-Davis, A. Barthel, R. Calov, R. Cullather, C. Dumas, B. K. Galton-Fenzi, R. Gladstone, N. R. Golledge, J. M. Gregory, R. Greve, T. Hattermann, M. J. Hoffman, A. Humbert, P. Huybrechts, N. C. Jourdain, T. Kleiner, E. Larour, G. R. Leguy, D. P. Lowry, C. M. Little, **M. Morlighem**, F. Pattyn, T. Pelle*, S. F. Price, A. Quiquet, R. Reese, N.-J. Schlegel, A. Shepherd, E. Simon, R. S. Smith, F. Straneo, S. Sun, L. D. Trusel, J. Van Breedam, P. Van Katwyk, R. S. W.

van de Wal, R. Winkelmann, C. Zhao, T. Zhang, and T. Zwinger. Insights into the vulnerability of Antarctic glaciers from the ISMIP6 ice sheet model ensemble and associated uncertainty. *Cryosphere*, 17(12):5197–5217, 2023. [link]

165. J. A. Wilner*, **M. Morlighem**, and G. Cheng*. Evaluation of four calving laws for antarctic ice shelves. *Cryosphere*, 17(11):4889–4901, 2023. [link]

164. T. Pelle*, J. S. Greenbaum, C. F. Dow, A. Jenkins, and **M. Morlighem**. Subglacial discharge accelerates future retreat of Denman and Scott Glaciers, East Antarctica. *Science Advances*, 9, 2023. [link]

163. T. D. dos Santos*, **M. Morlighem**, J. C. Simões, and P. R. B. Devloo. Sensitivity analysis of a King George Island outlet glacier, South Shetlands, Antarctica. *Anais da Academia Brasileira de Ciências*, 95:e20210560, 2023. [link]

162. Martim Mas e Braga, Richard S. Jones, Jorge Bernales, Jane Lund Andersen, Ola Fredin, **Mathieu Morlighem**, Alexandria J. Koester, Nathaniel A. Lifton, Jonathan M. Harbor, Yusuke Suganuma, Neil F. Glasser, Irina Rogozhina, and Arjen P. Stroeven. A thicker Antarctic ice stream during the mid-Pliocene warm period. *Nature Commun. Earth Environ.*, 4(1):321, Sep 2023. [link]

161. William Kochtitzky, Luke Copland, Michalea King, Romain Hugonnet, Hester Jiskoot, **Mathieu Morlighem**, Romain Millan, Shfaqat Abbas Khan, and Brice Noël. Closing Greenland's Mass Balance: Frontal Ablation of Every Greenlandic Glacier From 2000 to 2020. *Geophys. Res. Lett.*, 50(17), 2023. [link]

160. A. C. Frémand, P. Fretwell, J. A. Bodart, H. D. Pritchard, A. Aitken, J. L. Bamber, R. Bell, C. Bianchi, R. G. Bingham, D. D. Blankenship, G. Casassa, G. Catania, K. Christianson, H. Conway, H. F. J. Corr, X. Cui, D. Damaske, V. Damm, R. Drews, G. Eagles, O. Eisen, H. Eisermann, F. Ferraccioli, E. Field, R. Forsberg, S. Franke, S. Fujita, Y. Gim, V. Goel, S. P. Gogineni, J. Greenbaum, B. Hills, R. C. A. Hindmarsh, A. O. Hoffman, P. Holmlund, N. Holschuh, J. W. Holt, A. N. Horlings, A. Humbert, R. W. Jacobel, D. Jansen, A. Jenkins, W. Jokat, T. Jordan, E. King, J. Kohler, W. Krabill, M. Kusk Gillespie, K. Langley, J. Lee, G. Leitchenkov, C. Leuschen, B. Luyendyk, J. MacGregor, E. MacKie, K. Matsuoka, **M. Morlighem**, J. Mouginot, F. O. Nitsche, Y. Nogi, et al.. Antarctic bedmap data: Findable, accessible, interoperable, and reusable (fair) sharing of 60 years of ice bed, surface, and thickness data. *Earth Syst. Sci. Data*, 15(7):2695–2710, 2023. [link]

159. Aleah Sommers*, Colin Meyer, **Mathieu Morlighem**, Harihar Rajaram, Kristin Poinar, Winnie Chu, and Jessica Mejia. Subglacial hydrology modeling predicts high winter water pressure and spatially variable transmissivity at Helheim Glacier, Greenland. *J. Glaciol.*, pages 1–13, 2023. [link]

158. G. H. Gudmundsson, J. M. Barnes, D. N. Goldberg, and **M. Morlighem**. Limited Impact of Thwaites Ice Shelf on Future Ice Loss From Antarctica. *Geophys. Res. Lett.*, 50(11), 2023. [link]

157. Hilde Oliver, Donald Slater, Dustin Carroll, Michael Wood, **Mathieu Morlighem**, and Mark J. Hopwood. Greenland Subglacial Discharge as a Driver of Hotspots of Increasing Coastal Chlorophyll Since the Early 2000s. *Geophys. Res. Lett.*, 50(10):e2022GL102689, 2023. [link]

156. Nicole Abib, David A. Sutherland, Jason M. Amundson, Dan Duncan, Emily F. Eidam, Rebecca H. Jackson, Christian Kienholz, **Mathieu Morlighem**, Roman J. Motyka, Jonathan D. Nash, and et al.. Persistent overcut regions dominate the terminus morphology of a rapidly melting tidewater glacier. *Ann. Glaciol.*, pages 1–12, 2023. [link]

155. Indrani Das, **Mathieu Morlighem**, Jowan Barnes, G. Hilmar Gudmundsson, Daniel Goldberg, and Thiago Dias dos Santos*. In the Quest of a Parametric Relation Between Ice Sheet Model Inferred Weertman's Sliding-Law Parameter and Airborne Radar-Derived Basal Reflectivity Underneath Thwaites Glacier, Antarctica. *Geophys. Res. Lett.*, 50(10), 2023. [link]

154. William Kochtitzky, Luke Copland, Wesley Van Wychen, Regine Hock, David R. Rounce, Hester Jiskoot, Ted A. Scambos, **Mathieu Morlighem**, Michalea King, Leo Cha, and et al.. Progress towards globally complete frontal ablation estimates of marine-terminating glaciers. *Ann. Glaciol.*, pages 1–10, 2023. [link]

153. Emily Schwans, Byron R. Parizek, Richard B. Alley, Sridhar Anandakrishnan, and **Mathieu M. Morlighem**. Model Insights into Bed Control on Retreat of Thwaites Glacier, West Antarctica. *J. Glaciol.*, pages 1–19, 2023. [link]

152. Shivani Ehrenfeucht*, **Mathieu Morlighem**, Eric Rignot, Christine F. Dow, and Jeremie Mouginot. Seasonal Acceleration of Petermann Glacier, Greenland, From Changes in Subglacial Hydrology. *Geophys. Res. Lett.*, 50(1):e2022GL098009, 2023. [link]

151. Shfaqat A. Khan, Youngmin Choi*, **Mathieu Morlighem**, Eric Rignot, Veit Helm, Angelika Humbert, Jérémie Mouginot, Romain Millan, Kurt H. Kjær, and Anders A. Bjørk. Extensive inland thinning and speed-up of Northeast Greenland Ice Stream. *Nature*, 611(7937):727–732, Nov 2022. [link]

150. F. Baldacchino*, **M. Morlighem**, N. R. Golledge, H. Horgan, and A. Malyarenko. Sensitivity of the Ross Ice Shelf to environmental and glaciological controls. *Cryosphere*, 16(9):3723–3738, 2022. [link]

149. Jacob Downs, Douglas Brinkerhoff, and **Mathieu Morlighem**. Inferring time-dependent calving dynamics at Helheim Glacier. *J. Glaciol.*, pages 1–16, 2022. [link]

148. J. K. Cuzzone*, N. E. Young, **M. Morlighem**, J. P. Briner, and N.-J. Schlegel. Simulating the Holocene deglaciation across a marine-terminating portion of southwestern Greenland in response to marine and atmospheric forcings. *Cryosphere*, 16(6):2355–2372, 2022. [link]

147. D. A. Slater, D. Carroll, H. Oliver, M. J. Hopwood, F. Straneo, M. Wood, J. K. Willis, and **M. Morlighem**. Characteristic depths, fluxes and timescales for Greenland's tidewater glacier fjords from subglacial discharge-driven upwelling during summer. *Geophys. Res. Lett.*, 49(10), 2022. [link]

146. Boris Dorschel, Laura Hehemann, Sacha Viquerat, Fynn Warnke, Simon Dreutter, Yvonne Schulze Tenberge, Daniela Accettella, Lu An, Felipe Barrios, Evgenia Bazhenova, Jenny Black, Fernando Bohoyo, Craig Davey, Laura De Santis, Carlota Escutia Dotti, Alice C. Fremand, Peter T. Fretwell, Jenny A. Gales, Jinyao Gao, Luca Gasperini, Jamin S. Greenbaum, Jennifer Henderson Jencks, Kelly Hogan, Jong Kuk Hong, Martin Jakobsson, Laura Jensen, Johnathan Kool, Sergei Larin, Robert D. Larter, German Leitchenkov, Benoît Loubrieu, Kevin Mackay, Larry Mayer, Romain Millan, **Mathieu Morlighem**, Francisco Navidad, Frank O. Nitsche, Yoshifumi Nogi, Cécile Pertuisot, Alexandra L. Post, Hamish D. Pritchard, Autun Purser, Michele Rebesco, Eric Rignot, Jason L. Roberts, Marzia Rovere, Ivan Ryzhov, Chiara Sauli, Thierry Schmitt, Alessandro Silvano, Jodie Smith, Helen Snaith, Alex J. Tate, Kirsty Tinto, Philippe Vandenbossche, Pauline Weatherall, Paul Wintersteller, Chunguo Yang, Tao Zhang, and Jan Erik Arndt. The International Bathymetric Chart of the Southern Ocean Version 2. *Nature Sci. Data.*, 9(1):275, Jun 2022. [link]

145. Gong Cheng*, **Mathieu Morlighem**, Jérémie Mouginot, and Daniel Cheng*. Helheim Glacier's Terminus Position Controls Its Seasonal and Inter-Annual Ice Flow Variability. *Geophys. Res. Lett.*, 49(5):e2021GL097085, 2022. [link]

144. Henning Åkesson*, **Mathieu Morlighem**, Johan Nilsson, Christian Stranne, and Martin Jakobsson. Petermann ice shelf may not recover after a future breakup. *Nat. Comm.*, 13(1):2519, May 2022. [link]

143. Y. Fischler, M. Rückamp, C. Bischof, V. Aizinger, **M. Morlighem**, and A. Humbert. A Scalability Study of the Ice-sheet and Sea-level System Model (ISSM, Version 4.18). *Geosci. Model Dev.*, 15(9):3753–3771, 2022. [link]

142. D. Felikson, S. Nowicki, I. Nias, **M. Morlighem**, and H. Seroussi. Seasonal tidewater glacier terminus oscillations bias multi-decadal projections of ice mass change. *J Geophys. Res.*, 127(2):e2021JF006249, 2022. [link]

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1. **M. Morlighem**, E. Rignot, H. Seroussi, E. Larour, H. Ben Dhia, and D. Aubry. 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, JUL 2010. [link]

Book Chapters

1. **Mathieu Morlighem** and Daniel Goldberg. *Data Assimilation in Glaciology*. Cambridge University Press, June 2023.

Other Publications

13. John W Holt, Lauren C Andrews, Joseph A MacGregor, Andy Aschwanden, Ali Behrangi, Seth W Campbell, Michael F Daniel, Ellyn M Enderlin, Mark A Fahnestock, Denis Felikson, Caitlyn Florentine, Gwenn E Flowers, Christopher T Harig, Christopher F Larsen, Carlton J Leuschen, **Mathieu Morlighem**, Shad O'Neel, Katherine Robinson, David R Rounce, Michael Studinger, Brandon S Tober, and Martin Truffer. Snow4Flow: Concept Paper for a NASA Earth Venture Suborbital-4 Investigation, November 2024. [link]

12. **Mathieu Morlighem**. Thwaites Glacier won't collapse like dominoes as feared, study finds, but that doesn't mean the 'Doomsday Glacier' is stable. *The Conversation*, 2024. August 21, 2024. [link]

11. AGU Editorial Network. Challenges Facing Scientific Publishing in the Field of Earth & Space Sciences. *AGU Advances*, 5(4):e2024AV001334, 2024. [link]

10. Winnie Chu, Timothy Bartholomaus, Joseph MacGregor, **Mathieu Morlighem**, and Von Walden. Report on the 2023 Future of Greenland ice Sheet Science (FOGSS) Workshop: Unifying Themes, Cross-Cutting Priorities, and Future Directions. Technical report, Arctic Data Center, 2023. [link]

9. **M. Morlighem** and A. Khan. Greenland's Largest Ice Stream Likely to Lose Ice Six Times Faster than Thought. *ARCUS Witness Community Highlights*, 24 March 2023, 2023. [link]

8. Shfaqat A. Khan and **Mathieu Morlighem**. Research Briefings: Deep-inland thinning of the northeast Greenland glacier predicts fast sea-level rise. *Nature*, 2022. [link]

7. K. Matsuoka, R. Forsberg, F. Ferraccioli, G. Moholdt, and **M. Morlighem**. Circling Antarctica to unveil the bed below its icy edge. *Eos*, 103, 2022. [link]

6. Winnie Chu, Timothy Bartholomaus, Joseph MacGregor, **Mathieu Morlighem**, and Von Walden. Future of Greenland Ice Sheet Science (FOGSS) Workshop 2022: Summary report. Technical report, Arctic Data Center, 2022. [link]

5. **Mathieu Morlighem**. 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*, 2022. February 7, 2022. [link]

4. Olga Sergienko, **Mathieu Morlighem**, Sophie Nowicki, and Laurence Padman. Modeling: A Powerful and Versatile Tool in Glaciology. *Eos*, 101, Jul 2020. [link]

3. **Mathieu Morlighem**. The secrets hidden under the antarctic ice sheet. The Science Breaker, 2020. [link]

2. **Mathieu Morlighem**. The landscape under Antarctica revealed. Nature Research Sustainability Community, 2020. [link]

1. E. Larour, N. Schlegel, and **M. Morlighem**. Modeling the Evolution of Polar Ice Sheets. *Eos*, 95(45):411, 2014. [link]

Presentations

May 2025 **Kavli Institute for Theoretical Physics**, *Santa Barbara, CA*, Melting Giants: Ice Sheets in the climate system, (invited seminar)

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 Greenlandto 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 challengesof modeling ice sheetsin 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

Grants

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)

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)

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)

2023-2026 **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)

Teaching

EARS 6.05	**Modeling the Earth System**, Spring 2022, 2023, and 2024
EARS 17/117	**Statistics for Earth and Planetary Scientists**, *Undergraduate/Graduate course*, Winter 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 2019	Editor for 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 2025	President of the International Association of Cryospheric Sciences
Since 2023	Vice-chair of the U.S. National Committee for the International Union of Geodesy and Geophysics
Since 2022	Co-director of the HDR Institute: iHARP - Harnessing Data and Model Revolution in the Polar Regions
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
Since 2021	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	Member of the INSTANT steering committee of the Scientific Committee on Antarctic Research (The INStabilities & Thresholds in ANTarctica)
Since 2020	Core Member of the Bedmap3 Action group of the Scientific Committee on Antarctic Research
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
Since 2008	Member of the American Geophysical Union
Since 2016	Member of the European Geosciences Union
Since 2021	Member of the NASA ICESat-2 Science Team
Since 2022	Member of the American Association for the Advancement of Science (AAAS)

Journal review	Science Magazine, Nature, Nature Geoscience, Geophysical Research Letters, Earth and Planetary Science Letters, Journal of Geophysical Research, Frontiers in Geoscience, Journal of Glaciology, Annals of Glaciology, The Cryosphere, Geoscientific Model Development, and Research in Geophysics
Proposal review	NASA Earth and Space Science Fellowship, National Science Foundation, Natural Environment Research Council (UK), Belgian Remote Sensing Research Programme, Icelandic Research Fund