ALEXANDER ROBEL

robel@eas.gatech.edu ◇ Short CV ◇ Group Website
ES&T 2252 ◇ 311 Ferst Drive ◇ Atlanta, GA 30318

PROFESSIONAL APPOINTMENTS

Georgia Institute of Technology, Atlanta, GA
Associate Professor, School of Earth and Atmospheric Sciences — *2024-Present*
Assistant Professor, School of Earth and Atmospheric Sciences — *2018-2024*

California Institute of Technology, Pasadena, CA
NOAA CGC and Stanback Postdoctoral Fellow — *2015-2018*

EDUCATION

Harvard University, Cambridge, MA — *2010-2015*
PhD, Earth & Planetary Sciences
Duke University, Durham, NC — *2006-2010*
BS w/Honors, Earth & Ocean Sciences ◇ BA, Physics ◇ Minor, Mathematics

PUBLICATIONS

*GT Group members during work

1. **Robel, A.A.**, E.H. Ultee, *M. Ranganathan, M. Nash (2024). For Whom and By Whom is Glaciology?, *Journal of Glaciology*, In Press.

2. *Verjans, V & **A.A. Robel** (2024). Accelerating subglacial hydrology for ice sheet models with deep learning methods, *Geophysical Research Letters*, DOI:10.1029/2023GL105281.

3. Hariz, R*, W. Chu, & **A.A. Robel** (2024). What can radar-based measures of subglacial hydrology tell us about basal shear stress? A case study at Thwaites Glacier, West Antarctica, *Journal of Glaciology*, DOI: 10.1017/jog.2024.3.

4. Ultee, E.H*, **A.A. Robel**, and S. Castruccio (2024). A stochastic parameterization of ice sheet surface mass balance for the Stochastic Ice-Sheet and Sea-Level System Model (StISSM v1.0), *Geoscientific Model Development*, DOI: 10.5194/gmd-17-1041-2024.

5. **Robel, A.A.**., S.J. Sim, C. Meyer, M.R. Siegfried, C. Gustafson (2023). Contemporary ice sheet thinning drives subglacial groundwater exfiltration with potential feedbacks on glacier flow, *Science Advances*, DOI: 10.1126/sciadv.adh3693

6. *Muruganandham, S., **A.A. Robel**, M. Hoffman, and S. Price (2023). Statistical Generation of Ocean Forcing with Realistic Spatiotemporal Variability for Ice Sheet Models, *In press at Computing in Science and Engineering*

7. *Verjans, V., **A.A. Robel**, A. Thompson, and H. Seroussi (2023). Bias correction and statistical modeling of variable oceanic forcing of Greenland outlet glaciers, *Journal of Advances in Modeling Earth Systems*, DOI:10.1029/2023MS003610.

8. *Christian, J.E., **A.A. Robel**. & G. Catania (2022). A probabilistic framework for quantifying the role of anthropogenic climate change in marine-terminating glacier retreats, *The Cryosphere*, DOI: 10.5194/tc-2021-394.

9. *Verjans, V., **A.A. Robel**, H. Seroussi, *E.H. Ultee, and A. Thompson (2022). The Stochastic Ice-Sheet and Sea-Level System Model (StISSM v1.0), *Geoscientific Model Development*. DOI: 10.5194/gmd-15-8269-2022.

10. **Robel, A.A.**, S. Pegler, G. Catania, D. Felikson, and L. Simkins (2022). Ambiguous stability of glaciers at bed peaks, *Journal of Glaciology*, DOI: 10.1017/jog.2022.31.

11. **Robel, A.A.**., E. Wilson & H. Seroussi (2022). Layered seawater intrusion and melt under grounded ice, *The Cryosphere*. DOI:10.5194/tc-16-451-2022.

12. *Mann, L, **A.A. Robel** & C. Meyer (2021). Synchronization of Heinrich and Dansgaard-Oeschger Events through Ice-Ocean Interactions, *Paleoceanography and Paleoclimatology*, DOI:10.1029/2021PA004334.

13. Ji, W., **A.A. Robel**, E. Tziperman & J. Yang (2021). Laurentide ice saddle mergers drive rapid sea level drops during glaciations, *Geophysical Research Letters*, DOI:10.1029/2021GL094263.

14. Christian, J.E., **A.A. Robel**, C. Proistosescu, G. Roe, M. Koutnik and K. Cristianson (2020), The contrasting response of outlet glaciers to interior and ocean forcing, *The Cryosphere*, DOI:10.5194/tc-2019-301.

15. **Robel, A.A.** and A. Banwell (2019), A speed limit on ice shelf collapse through hydrofracture, *Geophysical Research Letters*, DOI:10.1029/2019GL084397.

16. Pico, T. **A.A. Robel**, E. Powell, A.C. Mix and J.X. Mitrovica (2019). Leveraging the rapid retreat of Amundsen Ice Stream 13,000 yrs ago to reveal insight into North American deglaciation, *Geophysical Research Letters*, DOI:10.1029/2019GL084789.

17. **Robel, A.A.**, H. Seroussi and G. Roe (2019), Marine ice sheet instability amplifies and skews uncertainty in projections of future sea level rise, *Proceedings of the National Academy of Sciences*, 116, 30, 14887-14892, DOI:10.1073/pnas.1904822116.

18. Meyer, C., **A.A. Robel** and A.W. Rempel (2019), Frozen fringe explains sediment freeze-on during Heinrich events, *Earth and Planetary Science Letters*, 524, DOI:10.1016/j.epsl.2019.115725.

19. **Robel, A.A.** and V. Tsai (2018), A simple model for deglacial meltwater pulses, *Geophysical Research Letters*, 45, DOI:10.1029/2018GL080884.

20. **Robel, A.A.**, G. Roe, M. Haseloff (2018), Response of marine-terminating glaciers to forcing: Time scales, sensitivities, instabilities and stochastic dynamics, *Journal of Geophysical Research - Earth Surface*, 123, 2205–2227, DOI:10.1029/2018JF004709.

21. Minchew, B.M., C. Meyer, **A.A. Robel**, G.H. Gudmundsson and M. Simons (2018), Processes controlling the downstream evolution of ice rheology in glacier shear margins: Case study on Rutford Ice Stream, West Antarctica, *Journal of Glaciology*, DOI:10.1017/jog.2018.47.

22. **Robel, A.A.** (2017), Thinning sea ice weakens buttressing force of iceberg mélange and promotes calving, *Nature Communications*, 8, 14596, DOI:10.1038/ncomms14596.

23. **Robel, A.A.**, V. Tsai, B. Minchew, and M. Simons (2017), Tidal modulation of ice stream buttressing stresses, *Annals of Glaciology*, 58, 74, 12–20, DOI:10.1017/aog.2017.22.

24. **Robel, A.A.** and E. Tziperman (2016), The role of ice stream dynamics in deglaciation, *Journal of Geophysical Research - Earth Surface*, 121, 1540–1554, DOI:10.1002/2016JF003937.

25. **Robel, A.A.**, C. Schoof, and E. Tziperman (2016), Persistence and variability of ice stream grounding lines on retrograde bed slopes, *The Cryosphere*, 10, 1883-1896, DOI:10.5194/tc-10-1883-2016.

26. **Robel, A.A.**, C. Schoof, and E. Tziperman (2014), Rapid grounding line migration induced by internal ice stream variability, *Journal of Geophysical Research - Earth Surface*, 119, 2430–2447, DOI:10.1002/2014JF003251.

27. **Robel, A.A.**, E. DeGiuli, C. Schoof, and E. Tziperman (2013), Dynamics of ice stream temporal variability: Modes, scales, and hysteresis, *Journal of Geophysical Research - Earth Surface*, 118, 925–936, DOI:10.1002/jgrf.20072.

28. **Robel, A.A.**, M.S. Lozier, S.F Gary, G.L Shillinger, H. Bailey, S.J Bograd, (2011). Projecting

uncertainty onto marine megafauna trajectories. *Deep Sea Research I, 58, 915-921*,
DOI:10.1016/j.dsr.2011.06.009.

FUNDED GRANT PROPOSALS

1. Promoting data equity in estimating compound hazard risk with communities in Charleston, South Carolina. GT Sustainability Next Seed Grant, $50K, January 1, 2024 - June 30, 2024. Co-PI: J. Macedo (GT CEE). **Co-PI: A. Robel**

2. CAREER: What's Past is Prologue: Seamless Assimilation of Past Observations into Simulations of Future Ice Sheets. NSF Polar Cyberinfrastructure Award 2235920, $780K, Jan 1, 2024 - Dec 31, 2028. **PI: A. Robel**.

3. GLACIOME: Developing a comprehensive model of the coupled glacier-ocean-mélange system. NSF Arctic Natural Science Award 2025692, $975K, June 1, 2021 - May 31, 2024. **Lead-PI: A. Robel**. Co-PIs: R. Jackson (Rutgers), J. Burton (Emory), J. Amundson (UASE).

4. The Stochastic Ice Sheet Project: A New Approach to Sea Level Projections and Attribution of Past Ice Sheet Change. Heising-Simons Foundation, $623K, August 1, 2020 - July 30, 2023. **PI: A. Robel**, Co-Investigators: H. Seroussi (JPL), A. Thompson (Caltech).

5. Like a Knife Through Butter: Glacier Melt by Ocean Plumes Investigated in Novel Laboratory Experiments. GT Small Bets Seed Grant, $75K, July 1, 2020 - June 30, 2021. Co-PI: C. Lai (GT CEE). **Co-PI: A. Robel**

6. Model of Antarctic Ice Shelf Surface Hydrology and Stability (MONARCHS). NASA Modeling Analysis and Prediction Program, $790K, July 1, 2020 - June 30, 2023. **PI: A. Robel**, Co-Investigators: S. Buzzard (GT EAS), Y. Deng (GT EAS), J. Wang (GT CEE).

7. The Antarctic Ice Sheet Large Ensemble (AISLENS) Project: Assessing the Role of Climate Variability in Past and Future Ice Sheet Mass Loss. NSF Antarctic Glaciology Award 1947882, $430K, May 1, 2020 - April 30, 2023. **PI: A. Robel**.

8. Quantifying the Role of Climate Variability in Driving the Recent Acceleration of Earth's Fastest Glacier. NASA JPL SURP, $126K, Sep. 1, 2019 - Aug. 31, 2022. **PI: A. Robel**. Co-PI: H. Seroussi (JPL).

9. Theory and Models of Ice Sheet Surface Melting Instabilities in the Past and Future. NSF Arctic Natural Sciences Award 1735715, $225K, September 1, 2017 - August 31, 2019. PI: V. Tsai (Caltech). **Co-I: A. Robel.**

HONORS AND RECOGNITIONS

· NSF CAREER Award, 2024
· Cullen-Peck Faculty Scholar Award, Georgia Tech College of Sciences, 2023
· EGU Editor's Highlight, The Cryosphere, 2022
· AGU Outstanding Reviewer - Journal of Advances in Modeling Earth Systems, 2019
· NOAA Climate & Global Change Postdoctoral Fellowship, 2015-2017
· Caltech Stanback Postdoctoral Fellowship in Environmental Science, 2015-2017
· National Science Foundation Graduate Research Fellowship, 2013-2015
· National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2010-2013
· Distinction in Teaching, Bok Center for Teaching & Learning, Harvard University, Spring 2012
· Angier B. Duke Memorial Scholarship, 2006-2010
· Robert C. Byrd Scholarship, 2006-2010
· Mellon-Mays Undergraduate Fellowship, 2008-2010
· American Physical Society Corporate Minority Scholarship 2006, 2007
· North Carolina Space Grant Undergraduate Scholarship, 2007

INVITED SEMINARS (UPCOMING AND PAST 3 YEARS)

· 9th European Seminar on Computing (ESCO), June 2024, Pilsen, CZ.
· Northern Illinois University, Department Colloquium, April 2024, DeKalb, IL.
· University of Illinois, Ralph E. Grim Lecture, April 2024, Urbana, IL.
· American Physical Society, Climate Physics Seminar, January 2024.
· NASA Goddard Space Flight Center, GMAO Seminar, June 2023, Greenbelt, MD.
· Keynote, Community Surface Dynamics Modeling System Annual Meeting, May 2023, Boulder, CO.
· Keynote, Future of Greenland Ice Sheet Science (FOGSS) workshop, March 2023, Atlanta, GA.
· Focus talk, American Physical Society March Meeting, March 2023, Las Vegas, NV.
· University of Washington, Earth and Space Sciences Dept Colloquium, March 2023, Seattle, WA.
· Keynote, World Climate Research Project Sea Level Conference, July 2022, Singapore.
· MIT Program in Atmospheres, Oceans and Climate Colloquium, March 2022.
· Emory University Physics Department Colloquium, March 2022, Atlanta, GA.
· Machine Learning for Climate Science Winter School, Kavli Institute for Theoretical Physics, November-December 2021, Santa Barbara, CA.
· DOE Artificial Intelligence for Earth System Predictability Workshop, Nov. 2021.

TEACHING AT GT

· EAS 4803/8803, Glacier & Ice Sheet Dynamics (Spring 2019, S21; UG/G)
· EAS 4610, Earth System Modeling (Fall 2019, F21, F22, F23, F24; UG)
· EAS / Civil & Env. Eng. 4803, Sea Level Rise and Coastal Engineering (Spring 2020, S22; UG/G)
· EAS 8802, Practical Coding and Math for Earth Sciences (Fall 2021, F22, F23, F24; UG)

ADVISING AT GT

Graduate Students (primary or co-advisor):
· Shivaprakash Muruganadham, GT OSE PhD, 2021-
· Danielle Grau, GT EAS PhD, 2021-
· Aminat Ambelorun, GT EAS PhD, 2021-
· Madeline Mamer, GT EAS PhD, 2021-
· Ziad Rashed, GT OSE PhD, 2018-
Postdoctoral Fellows:
· Brian Kyanjo, GT, 2024-
· Paul Summers, GT/Rutgers, 2024-
· Meghana Ranganthan, GT, 2022-2024 (Now Assistant Professor, University of Chicago)
· Vincent Verjans, GT, 2021-2023 (Now Research Associate at IBES, South Korea)
· John Christian, GT/UTIG, 2020-2023 (Now Assistant Professor, University of Oregon)
· Lizz Ultee, GT, 2021 (Now Assistant Professor, Middlebury College)
· Samantha Buzzard, GT, 2019-2020 (Now Lecturer, Cardiff Uni., UK)
Undergraduate research students:
· Grant Holly, GT UG, 2023-
· Azeez Hussein, GT UG, 2022-
· Ayushi Rajpoot, GT UG, 2022-
· Ella Stewart, GT UG/MS, 2021-2023
· Nikitha Shivakumar, GT UG, 2023
· Rohaiz Haris, GT UG, 2021-2024
· Grace Hansen, GT UG, 2022-2023
· Danielle Grau, GT REU, 2020-2021 (Now PhD Student, Georgia Tech)
· Hannah Verboncoeur, GT UG, 2019-2021 (Now PhD Student, Colorado School of Mines)
· Logan Mann, GT UG, 2020-2021 (Now PhD Student, Dartmouth)
· Adriana Formby-Fernandez, GT REU, 2019-2021 (Now PhD Student, UCSD SIO)

· Blake Castleman, GT UG, 2019-2020
Committee Member:
· Kiera Tran, Ga Tech EAS PhD Anticipated 2027
· Angelo Tarzona, Ga Tech EAS PhD Anticipated 2026
· Ben Hurwitz, Ga Tech OSE PhD Anticipated 2024
· Renee Clavette, Ga Tech EAS MS 2022
· Chase Chivers, Ga Tech EAS PhD 2022
· Justin Lawrence, Ga Tech EAS PhD 2022
· John Christian, UWash ESS PhD 2020
· Jacob Buffo, Ga Tech EAS PhD 2019
· Lucas Liuzzo, Ga Tech EAS PhD 2018

Current as of March 19, 2024