THE UNIVERSITY OF ARIZONA

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Tucson, AZ 85721

Dr. Christopher T. Harig
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Positions Held

2016 – present	*Assistant Professor*, Department of Geosciences, University of Arizona ◦ Earth Dynamics Observatory (EDO) ◦ Graduate Interdisciplinary Program in Global Change ◦ Graduate Interdisciplinary Program in Remote Sensing
2013 – 2016	*Associate Research Scholar*, Geosciences Department, Princeton University
2010 – 2013	*Postdoctoral Research Associate*, Geosciences Department, Princeton University
2006 – 2010	*Research Assistant*, University of Colorado at Boulder
2004 – 2006	*Teaching Assistant*, University of Colorado at Boulder
2000 – 2004	*Lab Assistant*, GIS Lab, Cornell University

Education

12/2010	University of Colorado at Boulder, Boulder, CO *Ph.D., Geophysics*, Department of Geological Sciences *Advisors*: Peter Molnar and Shijie Zhong *Topic*: The effects of lithospheric thickness variations on the dynamics of the Earth's upper mantle.
5/2004	Cornell University, Ithaca, NY *B.S., Geological Sciences*, Department of Earth and Atmospheric Sciences

Publications

Peer-reviewed Manuscripts
http://goo.gl/sNDvUD

° Post-doctoral researcher advisee, ‡ Graduate student advisee, † Undergraduate student advisee

In Preparation

Harig, C. and A. Plattner.
Potential-field estimation from regional data at varying satellite altitude using altitude- and noise-cognizant Slepian functions.
In preparation.

In Review/Revision

†Lee, E.-L., and **C. Harig**.
The Impact of GIA Corrections on Gravimetric Basin-Scale Ocean Mass Budgets.
Submitted, In revision at Journal of Geophysical Research: Solid Earth
Preprint on EarthArXiv.org: https://doi.org/10.31223/X5RR16

‡Gourley, K. C., Bennett, R. A., and **C. Harig**.
Quantifying Changes in Water Loading in the U.S. Southwest via Comparison of GNSS, GRACE, and SWE Datasets.
Submitted, In revision at Water Resources Research
Preprint on EarthArXiv.org: https://doi.org/10.31223/X54134

Otosaka, I. N., Shepherd, A., Amory, C., Horwath, M., Ivins, E. R., King, M. D., Nowicki, S., Payne, A. J., Rignot, E., Sandberg-Sørensen, L., Schlegel, N.-J., Simon, K. M., Smith, B. E., Sutterley, T. E., Van den Broeke, M. R., Velicogna, I., A, G., Agosta, C., Ditmar, P., Döhne, T., Engdahl, M. E., Fettweis, X., Forsberg, R., Gardner, A. S., Gilbert, L., Goelzer, H., Gourmelen, N., Groh, A., Hansen, N., **Harig, C.**, Helm, V., Khan, S. A., Kittel, C., Langen, P. L., Larsen, M., Loomis, B. D., McMillan, M., Medley, B., Melini, D., Mottram, R. H., Muir, A., Nilsson, J., Noël, B., Pattle, M. E., Roca i Aparici, M., Sasgen, I., Save, H. V., Scheuchl, B., Schrama, E. J. O., Schröder, L., Seo, K.-W., Simonsen, S. B., Slater, T., Spada, G., Vishwakarma, B. D., Wever, N., Wiese, D. N., Wouters, B.
Mass balance of the Greenland and Antarctic ice sheets from the 1970s to 2023.
Submitted, Nature Scientific Data

°Osei Tutu, A. and **C. Harig**
Variations in Earth's 1D viscosity structure in different tectonic regimes.
Ongoing Revise and Resubmit at Geophysical Research Letters
Preprint on EarthArXiv.org: https://doi.org/10.31223/X5WG9Q

2025

20. The GLAMBIE Team.
Zemp, M., Jakob, L., Dussaillant, I., Nussbaumer, S. U., Gourmelen, N., Dubber, S., A, G., Abdullahi, S., Andreassen, L. M., Berthier, E., Bhattacharya, A., Blazquez, A., Boehm Vock, L. F., Bolch, T., Box J., Braun, M. H., Brun, F., ‡Cicero, E., Colgan, W., Eckert, N., Farinotti, D., Florentine, C., Floricioiu, D., Gardner, A., **Harig, C.,** Hassan, J., Hugonnet, R., Huss, M., Johannesson, T., Liang, C-C. A., Ke, C-Q., Khan, S. A., King, O., Kneib, M., Krieger, L., Maussion, F., Mattea, E., McNabb, R., Menounos, B., Miles, E.„ Moholdt, G., Nilsson, J., Palsson, F., Pfeffer, J., Piermattei, L., Plummer, S., Richter, A., Sasgen, I., Schuster, L., Seehaus, T., Shen, X., Sommer, C., Sutterley, T., Treichler, D., Velicogna, I., Wouters, B., Zekollari, H., and Zheng, W.
Community estimate of global glacier mass changes from 2000 to 2023.
Nature, 639, 382–388, 2025.
https://doi.org/10.1038/s41586-024-08545-z

2024

19. ‡Gourley, K. C. and **C. Harig**.
The influence of mantle structure on dynamic topography in southern Africa.
J. Geophys. Res., 129 (10), 2024.
https://doi.org/10.1029/2024JB029223

2023

18. Otosaka, I. N., Shepherd, A., Ivins, E. R., Schlegel, N.-J., Amory, C., van den Broeke, M. R., Horwath, M., Joughin, I., King, M. D., Krinner, G., Nowicki, S., Payne, A. J., Rignot, E., Scambos, T., Simon, K. M., Smith, B. E., Sørensen, L.

S., Velicogna, I., Whitehouse, P. L., A, G., Agosta, C., Ahlstrøm, A. P., Blazquez, A., Colgan, W., Engdahl, M. E., Fettweis, X., Forsberg, R., Gallée, H., Gardner, A., Gilbert, L., Gourmelen, N., Groh, A., Gunter, B. C., **Harig, C.**, Helm, V., Khan, S. A., Kittel, C., Konrad, H., Langen, P. L., Lecavalier, B. S., Liang, C.-C., Loomis, B. D., McMillan, M., Melini, D., Mernild, S. H., Mottram, R., Mouginot, J., Nilsson, J., Noël, B., Pattle, M. E., Peltier, W. R., Pie, N., Roca, M., Sasgen, I., Save, H. V., Seo, K.-W., Scheuchl, B., Schrama, E. J. O., Schröder, L., Simonsen, S. B., Slater, T., Spada, G., Sutterley, T. C., Vishwakarma, B. D., van Wessem, J. M., Wiese, D., van der Wal, W., and Wouters, B.:
Mass balance of the Greenland and Antarctic ice sheets from 1992 to 2020,
Earth Syst. Sci. Data, 15, 1597–1616, 2023.
`https://doi.org/10.5194/essd-15-1597-2023`

2020

17. ‡Knowles, L. A., R. A. Bennett, and **C. Harig**.
Vertical displacements of the Amazon basin from GRACE and GPS.
J. Geophys. Res., 125 (2), 2020.
`http://dx.doi.org/10.1029/2019JB018105`

16. The IMBIE team.
Shepherd, A., E. Ivins, E. Rignot, B. Smith, M. van den Broeke, I. Velicogna, P. Whitehouse, K. Briggs, I. Joughin, G. Krinner, S. Nowicki, T. Payne, T. Scambos, N. Schlegel, G. A, C. Agosta, A. Ahlstrøm, G. Babonis, V. Barletta, A. Blazquez, J. Bonin, W. Colgan, B. Csatho, R. Cullather, M. Engdahl, D. Felikson, X. Fettweis, R. Forsberg, A. Hogg, H. Gallée, A. Gardner, L. Gilbert, N. Gourmelen, A. Groh, B. Gunter, E. Hanna, **C. Harig**, V. Helm, A. Horvath, M. Horwath, S. Khan, K. Kjeldsen, H. Konrad, P. Langen, B. Lecavalier, B. Loomis, S. Luthcke, M. McMillan, D. Melini, S. Mernild, Y. Mohajerani, P. Moore, R. Mottram, J. Mouginot, G. Moyano, A. Muir, T. Nagler, G. Nield, J. Nilsson, B. Noel, I. Otosaka, M. Pattle, W. R. Peltier, N. Pie, R. Rietbroek, H. Rott, L. Sandberg-Sørensen, I. Sasgen, H. Save, B. Scheuchl, E. Schrama, L. Schröder, K.-W. Seo, S. Simonsen, T. Slater, G. Spada, T. Sutterley, M. Talpe, L. Tarasov, W. Jan van de Berg, W. van der Wal, M. van Wessem, B. D. Vishwakarma, D. Wiese, T. Wagner, and B. Wouters.
Mass balance of the Greenland ice sheet from 1992–2018.
Nature, 579, 233–239, 2020
`http://dx.doi.org/10.1038/s41586-019-1855-2`
Covered by over 138 media outlets worldwide, including *The New York Times*.
Ranked #1017 of 14,556,678 in all articles ever tracked by Altmetric
`https://www.altmetric.com/details/72528571` and ranked in the 99.8th percentile of all articles from *Nature* (Retrieved 3/26/2020)

2019

15. †von Hippel, M. and **C. Harig**.
Long-Term and Inter-annual Mass Changes in the Iceland Ice Cap Determined From GRACE Gravity Using Slepian Functions.
Front. Earth Sci., 7 (171), 1–10, 2019.
`http://doi.org/10.3389/feart.2019.00171`

14. Bevis, M., **C. Harig**, S. .A. Khan, A. Brown, F. J. Simons, M. Willis, F. B. Madsen, X. Fettweis, M. R. van den Broeke, E. Kendrick, D. Caccamise, T. van Dam, Per Knudsen.

Accelerating changes in ice mass within Greenland and the ice sheet's sensitivity to atmospheric forcing.
Proc. Natl. Acad. Sc., 116 (6), 1934–1939, 2019.
https://www.pnas.org/cgi/doi/10.1073/pnas.1806562116
Covered by over 45 media outlets worldwide, including *The New York Times*.
In the top 0.2% of all articles scored by Altmetric https://goo.gl/CP63an and in the 99th percentile of articles from *Proc. Natl. Acad. Sc.* (Retrieved 3/16/2019)

2018 13. †Beveridge, A. K., **C. Harig***, and F. J. Simons.
The changing mass of glaciers on the Tibetan Plateau, 2003–2016, using time-variable gravity from the GRACE satellite mission.
Journal of Geodetic Science, 8 (1), 83–97. * corresponding author
https://doi.org/10.1515/jogs-2018-0010

12. The IMBIE team.
Shepherd, A., E. Ivins, E. Rignot, B. Smith, M. van den Broeke, I. Velicogna, P. Whitehouse, K. Briggs, I. Joughin, G. Krinner, S. Nowicki, T. Payne, T. Scambos, N. Schlegel, G. A, C. Agosta, A. Ahlstrøm, G. Babonis, V. Barletta, A. Blazquez, J. Bonin, B. Csatho, R. Cullather, D. Felikson, X. Fettweis, R. Forsberg, H. Gallee, A. Gardner, L. Gilbert, A. Groh, B. Gunter, E. Hanna, **C. Harig**, V. Helm, A. Horvath, M. Horwath, S. Khan, K. Kjeldsen, H. Konrad, P. Langen, B. Lecavalier, B. Loomis, S. Luthcke, M. McMillan, D. Melini, S. Mernild, Y. Mohajerani, P. Moore, J. Mouginot, G. Moyano, A. Muir, T. Nagler, G. Nield, J. Nilsson, B. Noel, I. Otosaka, M. Pattle, W. R. Peltier, N. Pie, R. Rietbroek, H. Rott, L. Sandberg-Sørensen, I. Sasgen, H. Save, B. Scheuchl, E. Schrama, L. Schroder, K.-W. Seo, S. Simonsen, T. Slater, G. Spada, T. Sutterley, M. Talpe, L. Tarasov, W. Jan van de Berg, W. van der Wal, M. van Wessem, B. D. Vishwakarma, D. Wiese, and B. Wouters.
Mass balance of the Antarctic ice sheet, 1992–2017.
Nature, 558, 219–222, 2018.
http://dx.doi.org/10.1038/s41586-018-0179-y

2017 11. Mitrovica, J. X., C. C. Hay, R. E. Kopp, **C. Harig**, and K. Latychev.
Quantifying the sensitivity of sea level change in coastal localities to the geometry of polar ice mass flux.
Journal of Climate, 2017
http://dx.doi.org/10.1175/JCLI-D-17-0465.1

10. Chen, X., X. Zhang, J. A. Church, C. S. Watson, M. A. King, D. Monselesan, B. Legresy, and **C. Harig**.
The increasing rate of global mean sea–level rise during 1993–2014.
Nature Climate Change, 7, 492–495, 2017.
http://dx.doi.org/10.1038/nclimate3325

2016 9. Mordret, A., D. Mikesell, **C. Harig**, B. P. Lipovsky, and G. A. Prieto.
Monitoring South-West Greenland's ice sheet melt with ambient seismic noise.
Science Advances, 2 (5), e1501538, 2016.
http://dx.doi.org/10.1126/sciadv.1501538

8. **Harig, C.** and F. J. Simons.
Ice mass loss in Greenland, the Gulf of Alaska, and the Canadian Archipelago: Seasonal cycles and decadal trends.

Geophys. Res. Let., 43 (7), 3150–3159, 2016.
http://dx.doi.org/10.1002/2016GL067759

2015

7. **Harig, C.** and F. J. Simons.
Accelerated West Antarctic ice mass loss continues to outpace East Antarctic gains.
Earth Planet. Sci. Let., 415, 134–141, 2015.
http://dx.doi.org/10.1016/j.epsl.2015.01.029
Covered by over 15 media outlets worldwide, including *The Guardian*.
In the top 1% of all articles scored by Altmetric http://goo.gl/ZSU5PN and ranked #4 of 1277 of articles from *Earth Planet. Sci. Let.*

6. **Harig, C.**, K. W. Lewis, A. Plattner, and F. J. Simons.
A suite of software analyzes data on the sphere,
Eos, 96, 2015. http://dx.doi.org/10.1029/2015EO025851

2013

5. Morrow, E., J. X. Mitrovica, M. G. Sterenborg, and **C. Harig**.
A test of recent inferences of net polar ice mass balance based on long-wavelength gravity.
Journal of Climate, 26, 6535–6540, 2013.
http://dx.doi.org/10.1175/JCLI-D-13-00078.1

2012 and earlier

4. **Harig, C.** and F. J. Simons.
Mapping Greenland's mass loss in space and time.
Proc. Natl. Acad. Sc., 109(49), 19934–19937, 2012.
http://dx.doi.org/10.1073/pnas.1206785109
Covered by over 20 media outlets worldwide, including *CBSNews.com*.
In the top 2% of all articles scored by Altmetric http://goo.gl/0iXsd2 and in the 93rd percentile of articles from *Proc. Natl. Acad. Sc.*

3. **Harig, C.**, S. Zhong, and F. J. Simons.
Constraints on upper mantle viscosity from the flow-induced pressure gradient across the Australian continental keel.
Geochem., Geophys., Geosyst., 11(6), Q06004, 2010.
http://dx.doi.org/10.1029/2010GC003038

2. **Harig, C.**, P. Molnar, and G. A. Houseman.
Lithospheric thinning and localization of deformation during Rayleigh-Taylor instability with nonlinear rheology and implications for intracontinental magmatism.
J. Geophys. Res., 115, B02205, 2010.
http://dx.doi.org/10.1029/2009JB006422

1. **Harig, C.**, P. Molnar, and G. A. Houseman.
Rayleigh-Taylor instability under a shear stress free top boundary condition and its relevance to removal of mantle lithosphere from beneath the Sierra Nevada.
Tectonics, 27, TC6019, 2008.
http://dx.doi.org/10.1029/2007TC002241

Published Software: Main Author

SLEPIAN_Delta: *Analysis of time-variable gravity from the GRACE satellite mission using Spherical Harmonics and spherical Slepian functions*,
version 1.0, 2014.
version 1.1, 2016.

version 1.2, 2020.
http://csdms.colorado.edu/wiki/Model:SLEPIAN_Delta
http://dx.doi.org/10.5281/zenodo.15707

Published Software: Contributing Author

SLEPIAN_Alpha: *Computation of Spherical Harmonics, Slepian functions, and transforms*, version 1.0, 2014.
version 1.0.2, 2016.
version 1.0.3, 2017.
version 1.0.4, 2019.
version 1.0.5, 2020.
http://csdms.colorado.edu/wiki/Model:SLEPIAN_Alpha
http://dx.doi.org/10.5281/zenodo.15704

SLEPIAN_Bravo: *Linear inverse problems using Spherical Harmonics and spherical Slepian functions*, version 1.0, 2014.
http://csdms.colorado.edu/wiki/Model:SLEPIAN_Bravo
http://dx.doi.org/10.5281/zenodo.15705

SLEPIAN_Charlie: *Spectral estimation problems using Spherical Harmonics and spherical Slepian functions*, version 1.0, 2014.
http://csdms.colorado.edu/wiki/Model:SLEPIAN_Charlie
http://dx.doi.org/10.5281/zenodo.15706

Teaching Experience

2018, 2020, 2022, 2025	*Physics of the Earth*, University of Arizona GEOS 419/519. Students: 32 (S. 2018), 26 (S. 2020), 32 (S. 2022), 20 (S. 2025)
2017, 2019, 2021–2025	*Programming and Data Analysis in the Earth Sciences*, University of Arizona GEOS 280. Students: 22 (F. 2017), 35 (F. 2019), 27 (F. 2021), 27 (F. 2022), 37 (F. 2023), 40 (F. 2024), 40 (F. 2025)
2023	*Inverse Problems in Geophysics*, University of Arizona GEOS 567. Students: 9 (S. 2023)
2019, 2021, 2022, 2023	*Graduate Student Skills*, University of Arizona GEOS 596F. Students: 13 (S. 2019), 9 (F. 2019), 8 (S. 2021), 7 (S. 2022), 8 (S. 2023)
2017, 2021	*Geodynamics*, University of Arizona GEOS 440/540. Students: 8 (S. 2017), 8 (S. 2021)
2019	*Cryosphere Seminar*, University of Arizona GEOS 596F-002. Students: 6 (S. 2019)
2017 – 2019	*Topics in Geosciences*, with A. Cohen, University of Arizona GEOS 595a. Students: 14 (F. 2017), 12 (S. 2018), 21 (F. 2018), 19 (S. 2019)

2015	Instructor, *State of the Earth: Shifts and Cycles*, course by A. C. Maloof and F. J. Simons, Princeton FRS 135.
2015	Guest Instructor, *Data, Models, and Uncertainty in the Natural Sciences*, course by F. J. Simons, Princeton GEO 422.
2013	Guest Lecturer, *Global Geophysics*, course by F. J. Simons, Princeton GEO 371
2012	Instructor, *Origin and Evolution of the Continental Lithosphere*, with F. J. Simons and B. Schoene, Princeton GEO 556

2005 – 2006	Instructor, Geol 1030: *Introduction to Geology* Lab University of Colorado
2004	Instructor, Geol 3120 Lab: *Structural Geology* Lab University of Colorado

Research Funding

Total external funding since 2016: $1,216,075

2022	NSF, *CAREER: Inversion of Localized High-Resolution Polar Gravity Fields to Estimate Mass Change* [NSF–2142980], $638,155, 2022–2027, Sole-PI
2022	NSF FRES, *Collaborative Research: Revealing the hidden groundwater storage dynamics of the Great Lakes Basin by synthesizing geodesy, hydrologic modeling, and remote sensing* [NSF–2218049], UA Share: $117,414, 2022–2027, Co-I, Lead PI MSU.
2019	Earth Dynamics Observatory Mass Change Focus Group (PI, $50,292, Nov. 2019)
2016	NASA, *Determining Earth Structure from the Local Dynamic Geoid* [NASA–NNX17AE18G], $460,506, 2017–2019, Sole-PI
2014	NOAA GFDL, Princeton CICS Grant Awardee, *Terrestrial ice mass loss and the sea-level budget*, 6 months salary support. [NA08OAR4320752]
2012	NOAA GFDL, Princeton CICS Grant Awardee, *Mapping Antarctica's mass loss in space and time*, 6 months salary support. [NA08OAR4320752]

Declined	University of Arizona, Arizona Institutes for Resilience (AIR) Resilience Grants January 2020 *Regional warming patterns of the United States and American Southwest*, (PI, $25,899, Jan. 2021)
	NASA, *21st century estimates of glacier mass loss rates constrained by GRACE/GRACE-FO gravimetry* (PI, $406,474, Jul. 2020)
	NASA, *Quantifying The Solid Earth's Response To Surface Water Loads Using Data From NASA Satellites* (Co-I, Jun. 2020)
	University of Arizona, Provost's Investment Fund (Spring 2020), *Climate, Weather, and Ice Evolution in Alaska.* (PI, $146,264, Jan. 2020)
	University of Arizona Foundation, *Regional warming patterns of the United States and American Southwest* (PI, $20,000, Sept. 2019)
	University of Arizona, Provost's Investment Fund (Fall 2019), *Climate, Weather, and Ice Evolution in Alaska.* (PI, $146,264, Sept. 2019)
	NASA, *Projections of High Mountain Asia glacier mass balance to 2100 using improved constraints on high elevation precipitation* (PI, $765,757, Jun. 2019)
	NASA, *Localized High-Resolution Inversion of GRACE-FO Level-1 Data in Polar Regions Using Slepian Functions (PI, $596,594, Jun. 2019)*
	NASA, *Quantifying The Solid Earth's Response To Surface Water Loads Using Data From NASA Satellites* (Co-I, Jun. 2019)
	NASA, *Climate driven deformation of the solid Earth using a suite of recent NASA satellites* (Co-I, Jun. 2018)

Awards

2022	NSF CAREER Award
2012, 2014	NOAA GFDL, Princeton CICS Grant Awardee
2010	University of Colorado Summer Graduate School Fellowship
2008 – 2009	CIRES Graduate Student Fellow
2008	W. O. Thompson Fund Awardee (University of Colorado)
2006 Fall AGU	Outstanding Student Paper Award

Invited Presentations

Lectures in Academic Departments:	2023: Johns Hopkins University (11/2023) 2016: University of Arizona (3/2016), University of Houston (1/2016) 2015: Lamont-Doherty Earth Observatory, NY (4/2015), Southwest Research Institute, Boulder, CO (1/2015) 2014: Carnegie Institution for Science, Department of Terrestrial Magnetism *Ice Caps Melting on a Deforming Earth: New Constraints from Satellite Gravity* `http://youtu.be/4GbcFsgFClA` (3/2014) 2013: Princeton University Solid Earth Brownbag (9/2013) 2010: Princeton University Solid Earth Brownbag (4/2010)
Invited Lectures at Workshops, and Outreach Activities:	2017: Osher Lifelong Learning Institute, Tucson, AZ (2/2017) 2016: Lindblad / National Geographic Expedition: Journey to Antarctica, the White Continent (3×) (12/2016) 2015: CIDER Summer Program, Berkeley, CA `http://youtu.be/Cq3w3a_NaRY` (short talk, open solicitation, 7/2015) 2014: The Center for Sea-Level Change Annual Workshop, NYU Abu Dhabi, UAE (4/2014) (2×), SIAM/AMS/MAA Joint Mathematics Meeting, Minisymposium on Frontiers in Geomathematics, Baltimore, MD (1/2014) 2013: Concordia Science Club, Princeton, NJ (9/2013) 2012: IAG–ICCT Regional Gravity and Geomagnetic Field Modeling Workshop, Bavarian Academy of Sciences & Humanities (BAdW) Munich, Germany (2/2012)
Meetings:	2019: 27th IUGG General Assembly, Montreal, QC (7/2019)

Service

Refereeing	National Science Foundation (BCS-GSS, EAR-Earthscope, EAR-GLD, EAR-PH), National Aeronautics and Space Administration panel (NASA), Annals of Glaciology, The Cryosphere, Earth and Planetary Science Letters, Frontiers in Earth Science, Geophysical Journal International, Geophysical Research Letters, Journal of Geodesy, Journal of Geophysical Research – Solid Earth, Journal of Geophysical Research – Earth's Surface, Monthly Weather Review, PLOS One, Science
Community	GAGE/SAGE Community Science Workshop Session Organizer (2023) AGU Fall Meeting Session Convener: G - *Geodetic and Magnetic Investigations of Crust and Mantle of Earth and Other Planetary Bodies* (2018) GP - *Magnetic and Geodetic Investigations of Crust and Mantle of Earth and Other Planets and Moons* (2017) SEDI - *Constraints on Heterogeneities in Earth's Mantle* (2015) NAGT - *Early Career Geoscience Faculty Workshop* (2017) *Expert Witness Training Academy*, Mitchell Hamline School of Law (2017) *Teaching Geoscience with MATLAB* workshop, by SERC at Carleton College. (2015) NASA Program for Arctic Regional Climate Assessment (PARCA) meeting participant (2012–2016) National Academy of Sciences (NAS), Antarctica Science Priorities Committee, Community outreach meeting participant (2014) Member, American Geophysical Union (2006–2022) Member, American Mathematical Society (2014–2016) Member, National Association of Geoscience Teachers (2017–2019) Member Representative for Univ. Arizona, Computational Infrastructure for Geodynamics (CIG) (2016–)
Arizona	*Doctoral Exam Committees:* [10] Rebecca Beadling (Climate Dynamics, *2020), Dani DellaGuistina (Seismology, *2021), Katherine Guns (Geodesy, *2020), Catherine Hanagan (Geodesy, *2023), Haiyang Kehoe (Seismology, *2023), Tyler Meng (Glaciology, *2024), Daniel Portner (Seismology, *2019), Emily Rodriguez (Seismology, *2023), Chayan Roychoudhury (Atmospheric Science, *2025), Brandon Tober (Geodesy, *2023) *Masters Exam Committees:* [4] Boe Ericksen (Seismology, *2023), Kenneth Gourley (Geodesy/Geodynamics, *2020), Lisa Jose (Geodesy, *2021), Natalie Wagner (Geodesy, *2022) *Comprehensive Exam Committees:* [14] Rebecca Beadling (Climate Dynamics, *2020), Aburey Bennett (Geodesy, *2024), Rocio Jacobo Bojorquez (Planetary Science, *2027), Eric Cicero (Geodesy, *2026), Daniella DellaGiustina (Seismology, *2021), Kenneth Gourley (Geodesy/Geodynamics, *2024), Lisa Jose (Geodesy, *2021), Haiyang Kehoe (Seismology, *2023), John McKinnon (Atmospheric Science, *2026), Tyler Meng (Glaciology, *2024), Samantha Moruzzi (Planetary Science, *2026), Emily Rodriguez (Seismology, *2023), Chayan Roychoudhury (Atmospheric Science, *2025), Brandon Tober (Geodesy, *2023)

Ph.D. Diagnostic Exam Committees: [6]
Aburey Bennett (Geodesy, *2024), Eric Cicero (Geodesy, *2026), Dani DellaGuistina (Seismology, *2021), Kenneth Gourley (Geodesy/Geodynamics, *2024), Lisa Jose (Geodesy, *2021), Emily Rodriguez (Seismology, *2023)

Other committees:
Earth Dynamics Observatory *Executive Committee* (2017–);
Earth Dynamics Observatory *Chair, Mass Change Focus Group* (2017–2022);
Earth Dynamics Observatory *Search Advisory Committee* (2017);
Geosciences *Diversity, Equity, and Inclusion Committee* (2022–2025);
Geosciences *Graduate Admissions Committee* (2017–2018, 2020, 2023–2025);
Geosciences *Annual Performance Evaluation Committee* (2022);
Geosciences *Geophysics Faculty Search Committee* (2022);
Geosciences *Outreach/Community Engagement Committee* (2021–2022);
Geosciences *Undergraduate Research and Fellowship Committee* (2021–2022);
Geosciences *Department Vision Committee* (2018–2019);
Geosciences *Arizona Computational Geosci. Center (ACGC) Committee* (2017–2020);
Geosciences *Colloquium Organizer* (2017–2019);

Other activities:
Geosciences *Lead author, Graduate Admissions Policy Updates* (Spring–Fall 2023);
Geosciences *Contributing author, AGU Bridge Program resubmission* (Summer 2023);
Geosciences *Lead author, Junior Faculty Mentoring Plan* (Summer 2020);
Geosciences *Contributing author, Dept. Guidelines for Successful Searches* (Summer 2020);
Geosciences *GEOS Freshman Colloquium Guest Speaker* (Fall 2019);
Geosciences *Association for Women Geoscientists (AWG) Mentoring Program Instructor* (Fall 2019);
Geosciences *Developed Grad Student Skills Class* (Spring 2019);
Geosciences *GeoDaze Symposium judge* (2017–);
Geosciences *Grad student proposal writing workshop*, with K. Flessa (Fall 2017, 2018)

Princeton

Co-Founder, Princeton Department of Geosciences Post-doc council (2015);
Princeton Department of Geosciences, Advisory Council Post-doc rep. (2014);
Organizer, Princeton Solid Earth Brownbag Seminar series (2011);

Advising

Postdocs	Lavanya Ashokkumar (2018–2021) (Ph. D. 2017, University of Swansea) Anthony Osei Tutu (2018–2022) (Ph. D. 2017, GFZ Potsdam)
Graduate Students	Eric Cicero (2022–) (B.S. 2022, SUNY Buffalo) Kenneth Gourley (2018–) (B.S. 2018, U.C. Berkeley) Lisa Jose (2016–2021) (co-advisor Rick Bennett) (B.S. 2016, U.M.B.C.)
Graduate Theses Geos Minor Advisor	Rocio Jacobo Bojorquez (2022–2025) (main advisor Lynn Carter, LPL) John McKinnon (2024–2025) (main advisor Ave Arellano, HAS) Tyler Meng (2020–2024) (main advisor Jack Holt, LPL) Samantha Moruzzi (2021–2025) (main advisor Jeffrey Andrew-Hanna, LPL) Chayan Roychoudhury (2023–2025) (main advisor Ave Arellano, HAS)
NASA Space Grant Undergraduates	Mateo De La Torre (2024–2025) (Univ. of Arizona, Planetary Science & Mechanical Engineering, '27) Mila Ann Lubeck (2019–2020) (Univ. of Arizona, Geoscience, '20 Dec. Now at MIT EAPS Ph.D. program.) Max Von Hippel (2017–2018) (Univ. of Arizona, Mathematics and Computer Science, '19. Now at Northeastern University Ph.D. program)
Undergraduates	Mateo De La Torre (2024–2026) (Univ. of Arizona, Planetary Science & Mechanical Engineering, '27) En-Chi (William) Lee (2024–2026) (Univ. of Arizona, Geophysics & Planetary Science, '26) Mila Ann Lubeck (2018–2020) (Univ. of Arizona, Geoscience, '20 Dec. Now at MIT EAPS Ph.D. program.) Maria Pascoal (2019) (Univ. of Arizona, Geoscience, '19)
Senior Theses	Alyson Beveridge (Princeton, Geosciences, '16): *Mass balance of glaciers in high–mountain Asia using time–variable gravity* (2016)

Classes

In the following pages I provide short descriptions of the classes that I have developed and/or taught since joining the Arizona faculty. A complete list was found on page 7 of this document.

Physics of the Earth GEOS 419/519
Offered in 2018 [32 enrolled], 2020 [26], 2022 [32], 2025 [20]
`https://polarice.geo.arizona.edu/GEOS419519_Feedback.html`

An advanced consideration of the fundamental principles of global geophysics and geodynamics. Three parts, taught over four weeks each in an order allowing the material to build up to form a final coherent picture of (how we know) the evolution of the solid Earth: *Heat Flow*: the transport of heat within the Earth. *Fluid Flow*: the physical transport of material within the Earth. *Gravity*: description and study of the Earth's gravitational field. The emphasis is on physical principles including the mathematical derivation and solution of the governing equations.

Programming and Data Analysis in the Earth Sciences GEOS 280
Offered in 2017 [22 enrolled], 2019 [35], 2021 [27], 2022 [27], 2023 [37], 2024 [40], 2025 [40].
`https://polarice.geo.arizona.edu/GEOS280_Feedback.html`

Many Earth and environmental scientists face challenges that are more easily addressed using computational techniques. This course provides students with a computational skill set relevant to processing, analyzing, visualizing, and interpreting data from a variety of Earth and environmental science disciplines. No prior programming experience is required. Students design and implement code to analyze data and communicate results through technical reports. Course material is drawn from problems in geomorphology, geophysics, hydrology, atmospheric science, and planetary science.

Cryosphere Seminar GEOS 596F-002
Offered in 2019 [6 enrolled]
`https://polarice.geo.arizona.edu/GEOS596F002_Feedback.html`

Approximately 10% of Earth's surface is covered by ice. This course surveys Earth's cryosphere, through a combination of contemporary and classical research literature. We discuss the physical properties, observational techniques, temporal evolution, and role that ice plays on the Earth.

Graduate Student Skills GEOS 596F
Offered in 2019 S [13 enrolled], 2019 F [9], 2021 S [8], 2022 [7], 2023 [8].
`https://polarice.geo.arizona.edu/GEOSGradSkills_Feedback.html`

A class for incoming graduate students during their first year, to familiarize students with skills they will find useful during their studies. The class covers best research practices, professional development, writing skills, mentoring, scientific presentations, teaching skills, proposal/fellowship writing, research strategic planning, etc.

Media

General Media Appearances:

As glaciers melt faster, freshwater sources dwindle and sea-level rise accelerates, by ESA and Daniel Stolte *UA News*, https://news.arizona.edu/news/glaciers-melt-faster-freshwater-sources-dwindle-and-sea-level-rise-accelerates, 02/19/2025 (web)

The rate of glacier melt globally is accelerating, study shows, by Greg Hahne, *KJZZ*, https://www.kjzz.org/science/2025-02-21/the-rate-of-glacier-melt-globally-is-accelerating-study-shows, 02/21/2025 (web)

Studying Arctic glaciers with airborne radar: UArizona project attracts $30M from NASA, by Daniel Stolte,
UA News, https://news.arizona.edu/news/studying-arctic-glaciers-airborne-radar-uarizona-project-attracts-30m-nasa 06/10/2024 (web)

Greenland Ice Melt Matches Worst IPCC Predictions, by Nicholas Gerbis,
KJZZ, 91.5 FM
https://science.kjzz.org/content/1351481/greenland-ice-melt-matches-worst-ipcc-predictions 12/16/2019 (radio)

Greenland's Southwest Ice Sheet Particularly Sensitive to Warming, by Mari Jensen, *UA News*,
https://uanews.arizona.edu/story/greenland-s-southwest-ice-sheet-particularly-sensitive-warming 1/28/2019 (web)

Episode 139: How Satellites Measuring Polar Ice Can Help Predict Rising Sea Levels, *Arizona Science, AZPM*, with Tim Swindle. 7/19/2018 (radio)
https://radio.azpm.org/p/radio-azscience/2018/7/19/133489-episode-139-how-satellites-measuring-polar-ice-can-help-predict-rising-sea-levels-on-earths-coastal-areas/

For once, scientists found good news about West Antarctica, by Chris Mooney, *Washington Post*, 6/22/2018 (web)
https://www.washingtonpost.com/news/energy-environment/wp/2018/06/21/for-once-scientists-found-some-good-news-about-west-antarctica/

Antarctic Ice Loss Ramps Up, Speeding Sea Level Rise, by University of Leeds, NASA/Jet Propulsion Laboratory and UA College of Science
UA News, https://uanews.arizona.edu/story/antarctic-ice-loss-ramps-speeding-sea-level-rise 06/13/2018 (web)

Sea level rise isn't just happening, it's getting faster, by Chris Mooney, *Washington Post*, 6/26/2017 (web)

Global sea levels are rising faster and faster, a new study finds,
by Alexa Liautaud,
Vice News, 6/26/2017 (web)

Sea level rise is accelerating as Greenland ice melt increases, by Andrew Freeman, *Mashable*, 6/26/2017 (web)

Greenland's huge annual ice loss is even worse than thought,
by Damian Carrington
The Guardian, 9/21/2016 (web)

Mackenzie, Dana. "Climate Past, Present, and Future" in *What's Happening in the Mathematical Sciences*, Providence: Sergei Gelfand, American Mathematical Society, 2016. 36-51. Print.

A controversial NASA study says Antarctica is gaining ice. Here's why you should be skeptical, by Chris Mooney
Washington Post, 11/05/2015 (web)

'Stable' region of Antarctica is melting; Radar data from Cryosat-2 probe show sudden ice loss on southern Antarctic Peninsula, by Jeff Tollefson
Nature, 05/21/2015 `http://dx.doi.org/10.1038/nature.2015.17606`

On "*Ice mass loss in Greenland, the Gulf of Alaska, and the Canadian Archipegalo: Seasonal cycles and decadal trends*":

Satellites detect both steady and accelerated ice loss, by Christina Langone
Glacier Hub, 05/24/2016 (web)

Scientists use gravity to measure Arctic glacier loss, by Lisa Gregoire
Nunatsiaq Online, 04/05/2016 (web)

The vast, shrinking northern glaciers that we never even talk about, by Chris Mooney
Washington Post, 03/17/2016 (web)
Also reported in,
Guelph Mercury, 03/17/2016 (web)
News Miner, 03/17/2016 (web)
Hamilton Spectator, 03/17/2016 (web)

On "*Accelerated West Antarctic ice mass loss continues to outpace East Antarctic gains*":

Ice loss in west Antarctica is speeding up, by John Abraham
The Guardian, 05/11/2015 (web)

Melting Antarctic: Failure to act now on emissions could raise oceans by metres, by Graham Readfearn
The Guardian, 05/05/2015 (web)

Scientists horrified by speed of glaciers melting, by Russell Jackson
The Scotsman, 05/04/2015 (web)

Gravity data shows Antarctic ice sheet is melting much faster
Delhi Daily News, 05/02/2015 (web)

Antarctica is melting ever faster, by Jenna Iacurci
Nature World News, 05/01/2015 (web)

Satellite data helps pinpoint Antarctic ice loss, by Bob Berwyn
Summit County Voice, 05/01/2015 (web)

Gravity data show that Antarctic ice sheet is melting increasingly faster, by M. Kelly, *News@Princeton*, 04/30/2015 (web)
Also reported in,
Phys.org, 04/30/2015 (web)
Science 2.0, 05/01/2015 (web)
e Science News, 05/01/2015 (web)
Daily News and Analysis, 05/01/2015 (web)
ENCmag.com, 05/01/2015 (web)
R & D Magazine, 05/01/2015 (web)
Sierra Leone Times, 05/01/2015 (web)
Web India, 05/01/2015 (web)
Deccan Herald, 05/01/2015 (web)
Reporting Climate Science.com, 05/03/2015 (web)
Noticiasdelaciencia.com, 05/04/2015 (web, in Spanish)

Climat : la Terre perd son congélateur, by Sylvestre Huet
Libération, 04/02/2015 (web and print, in French)

On "*Mapping Greenland's mass loss in space and time*":

Climate Change 2013: The Physical Science Basis,
Intergovernmental Panel on Climate Change, Fifth Assessment Report (AR5-WG1), 2013

New science upsets calculations on sea level rise, climate change,
by Lewis Page,
The Register, 11/28/2012 (web)

El hielo de Groenlandia no se derrite tan rápidamente como se había estimado,
cienciaaldia.com, 11/28/2012 (in Spanish)

Embracing data 'noise' bring Greenland's complex ice melt into focus, by M. Kelly,
News@Princeton, 11/27/2012 (web)

Änderungen in der Schwerkraft verraten Eisschmelze,
derStandard.at, 11/24/2012 (in German)

Le Groenland fond avec gravité, by Sylvestre Huet,
Libération, 11/22/2012 (in French)

De rafelranden van de ijskap, by Elmar Veerman,
Wetenschap24.nl, 11/21/2012 (In Dutch)

Eisschild schrumpft jährlich um 200 Mrd. Tonnen,
Science@ORF.at, 11/20/2012 (in German)

Schwerkraft-Messung zeigt massive Eisschmelze,
Die Welt, 11/20/2012 (In German)

Greenland ice loss is accelerating, by Sunanda Creagh,
TheConversation.edu.au, 11/20/2012 (web)

Greenland ice is melting at ever faster rates, by Laura Sinpetru,
Softpedia.com, 11/20/2012 (web)

Geoscientists report Greenland ice sheet melting rate is increasing,
by Bob Yirka,
Phys.org, 11/20/2012 (web)

Greenland ice melt accelerating, by Larry O'Hanlon,
ABC.net.au, 11/20/2012 (web)

Coste della Groenlandia sempre più povere di ghiacci, Sciolti 200 miliardi di tonnellate in 10 anni,
Meteoleontinoi, 11/20/2012 (in Italian)

Degelo na Gronelåndia mapeado,
CienciaHoje, 11/20/2012 (in Portuguese)

Groenlandia ha perdido 200.000 millones de toneladas de hielo en la última década,
ABC.es, 11/20/2012 (in Spanish)

Wechselnde Schwerkraft zeigt Schmelzen des Grönlandeises,
Focus.de, 11/19/2012 (in German)

Eispanzer Grönlands schmilzt ungleichmässig ab,
Südostschweiz.ch, 11/19/2012 (in German)
Blick.ch, 11/19/2012 (in German)

Greenland ice melt is accelerating, by Douglas Main,
CBSNews.com, 11/19/2012 (web)
OurAmazingPlanet.com, 11/19/2012 (web)

Greenland is losing 200 billion tons of ice every year, by Randy Astaiza,
BusinessInsider.com, 11/19/2012 (web)

Greenland loses 200 billion tons ice per year, by Larry O'Hanlon,
MSNBC.msn.com, 12/03/2012 (web)
Discovery.com, 11/19/2012 (web)
LiveScience.com, 11/19/2012 (web)