

EMMA (MICKEY) MACKIE

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ACADEMIC APPOINTMENTS

University of Florida, Gainesville FL

2021 - Present

Assistant Professor

Department of Geological Sciences

EDUCATION

Stanford University, Stanford CA

2017 - 2021

Ph.D. in Geophysics

Advised by Dustin Schroeder

Thesis title: *Modeling the Subglacial Environment with Geostatistics*

Harvard University, Cambridge MA

2013 - 2017

B.A. in Earth and Planetary Sciences, with High Honors

Advised by Francis Macdonald

Senior Thesis: *Cryogenian Stratigraphy of Northeastern Washington: A Glacial and Tectonic History*

MANUSCRIPTS IN REVIEW

- [1] **MacKie, E.J.**, D.M. Schroeder, G. Steinbrügge, R. Culberg. Quantifying Spatial Relationships in Ice Penetrating Radar Measurement Uncertainty through Clutter Simulation.
- [2] Teiesberg, T.O., D.M. Schroeder, **E.J. MacKie**. A Machine Learning Approach to Mass-Conserving Ice Thickness Interpolation.
- [3] Schroeder, D.M., N.L. Bienert, R. Culberg, **E.J. MacKie**, T.O. Teisberg, W. Chu, D.A. Young. Glaciological Constraints on Link Budgets for Orbital Radar Sounding of Earth's Ice Sheets.
- [4] Bienert, N.L., D.M. Schroeder, S.T. Peters, **E.J. MacKie**, E.J. Dawson, M.R. Siegfried, P. Christofferson. Direct Path Synchronized Bistatic Radar for Long Offset Glacial Temperature Tomography.

PUBLICATIONS

- [1] **MacKie, E.J.**, D.M. Schroeder. Geostatistically simulating subglacial topography with synthetic training data. *IGARSS 2020-2020 IEEE International Geoscience and Remote Sensing Symposium*. 10.1109/IGARSS39084.2020.9324563.
- [2] **MacKie, E.J.**, D.M. Schroeder., C. Zuo, Z. Yin, J. Caers (2020). Stochastic Modeling of Subglacial Topography Exposes Uncertainty in Water Routing at Jakobshavn Glacier. *Journal of Glaciology*. <https://doi.org/10.1017/jog.2020.84>.
- [3] Bartlett, O.T., S.J. Palmer, D.M. Schroeder, **E.J. MacKie**, T.T. Barrows, A.G. Graham (2020). Geospatial simulations of airborne ice-penetrating radar surveying reveal elevation under-measurement bias for ice-sheet bed topography. *Annals of Glaciology*. <https://doi.org/10.1017/aog.2020.35>.
- [4] **MacKie, E.J.**, D.M. Schroeder, J. Caers, M.R. Siegfried and C. Scheidt (2020). Antarctic Topographic Realizations and Geostatistical Modeling Used to Map Subglacial Lakes, *Journal of Geophysical Research: Earth Surface*. <https://doi.org/10.1029/2019JF005420>.

- [5] Zuo, C., Z. Yin, Z. Pan, **E.J. MacKie**, J. Caers (2020). A tree-based direct sampling method for stochastic surface and subsurface hydrological modeling, *Water Resources Research*. <https://doi.org/10.1029/2019WR026130>.
- [6] Schroeder, D.M., **E.J. MacKie**, T.T. Creyts, J.B. Anderson (2019). A subglacial hydrologic drainage hypothesis for silt sorting and deposition during retreat in Pine Island Bay, *Annals of Glaciology*. <https://doi.org/10.1017/aog.2019.44>.
- [7] Schroeder, D.M., J. Dowdeswell, M. Siegert, R. Bingham, W. Chu, **E.J. MacKie**, M.R. Siegfried, K. Vega, J. Emmons and K. Winstein (2019). Multi-Decadal Observations of the Antarctic Ice Sheet from Archival Radar Film, *Proceedings of the National Academy of Sciences*. <https://doi.org/10.1073/pnas.1821646116>.

HONORS AND AWARDS

Achievement Rewards for College Scientists (ARCS) Scholarship Award	2020
Best Student Oral Presentation at IGS Symposium on Glacial Erosion and Sedimentation	2019
Flash Freeze Cryosphere Innovation Award (oral presentation)	2018
Harvard College Research Program grant awarded for senior thesis research	2016

TEACHING EXPERIENCE

Arctic Seismology, University Center in Svalbard, Norway (Teaching Assistant)	2020
Introduction to the Foundations of Contemporary Geophysics, Stanford (Teaching Assistant)	2019, 2020

INVITED TALKS

Stanford Geophysics Brown Bag Seminar	2020
Data Science Keynote, International Thwaites Glacier Collaboration Meeting	2019
Aarhus Department of Geoscience	2019

PROFESSIONAL SERVICE

Steering Committee: Women in Data Science Conference	2019
Steering Committee: International Thwaites Glacier Collaboration Early Career Meeting	2019

UNIVERSITY SERVICE

Officer for Stanford Women in Mathematics, Statistics and Computational Engineering	2018 - 2021
Founder of Ice Break, a glaciology paper discussion group at Stanford	2018 - 2021
Officer for Stanford Women in Earth Sciences	2018 - 2020
Member of Stanford Geophysics Graduate Student Advisory Committee	2018 - 2019
Harvard Undergraduate Geological Society, president and social chair	2015 - 2017

FIELD EXPERIENCE

Greenland - Radar	2019
Svalbard - Seismology	2019
Washington, Idaho, and British Columbia - Geology	2016
Juneau Icefield - Glaciology	2015
Death Valley - Geology	2015

SELECTED CONFERENCE ABSTRACTS

- [1] **MacKie, E.J.**, D.M. Schroeder., C. Zuo, Z. Yin, J. Caers 2020. Quantifying Subglacial Hydrologic Uncertainty with Stochastic Simulation. *AGU Fall Meeting*.
- [2] Teisberg, T., D.M. Schroeder, **E.J. MacKie**, 2020. Dynamically Optimizing Radar Sounder Sampling Based on Estimated Uncertainty in Bed Topography. *AGU Fall Meeting*.
- [3] **MacKie, E.J.**, D.M. Schroeder, C. Zuo, Z. Yin, J. Caers, 2020. Geostatistical Simulations of Subglacial Topography: Implications for Water Routing at Jakobshavn Glacier. *WAIS Workshop*.
- [4] **MacKie, E.J.**, D.M. Schroeder, 2019. Paleo Observations Used to Geostatistically Simulate the Subglacial Geology of Thwaites Glacier. *AGU Fall Meeting*.
- [5] Conger, A., D.M. Schroeder, **E.J. MacKie**, 2019. Radiometric Characterization of Subglacial Lake Floors from Archival Radar Data. *AGU Fall Meeting*.
- [6] Schroeder, D.M., **E.J. MacKie**, A. Conger, 2019. Radiometric signature of subglacial conditions in archival radar sounding data recovered from optical film. *AGU Fall Meeting*.
- [7] **MacKie, E.J.**, D.M. Schroeder, 2019. Geostatistically Simulating the Topography and Geology of the Amundsen Sea Embayment. *WAIS Workshop*.
- [8] **MacKie, E.J.**, D.M. Schroeder, 2019. Geostatistical simulations of subglacial topography used to study paleo and modern bed conditions in the Amundsen Sea sector. *IGS Symposium on Five Decades of Radioglaciology*.
- [9] **MacKie, E.J.**, M. Murray, A. Pollack, D.M. Schroeder, 2019. Producing multi-decadal observations of grounding line change in East Antarctica with archival radar data, *IGS Symposium on Five Decades of Radioglaciology*.
- [10] **MacKie, E.J.**, D.M. Schroeder, 2019. Using radar and geostatistical simulations to compare paleo and modern bed morphology in Pine Island Bay *IGS Symposium on Glacial Erosion and Sedimentation*.
- [11] Schroeder, D.M., **E.J. MacKie**, T.T. Creyts, J.B. Anderson, 2019. A subglacial hydrologic switching hypothesis for silt sorting and deposition during ice sheet retreat in the Amundsen Sea Embayment. *IGS Symposium on Glacial Erosion and Sedimentation*.
- [12] **MacKie, E.J.**, C. Scheidt, J. Caers, D.M. Schroeder, 2018. A new model for Antarctic Subglacial Lakes, *AGU Fall Meeting*.
- [13] **MacKie, E.J.**, C. Scheidt, J. Caers, D.M. Schroeder, 2018. Simulating Antarctic bed topography to quantify uncertainty in subglacial water storage, *WAIS Workshop*.
- [14] **MacKie, E.J.**, D.M. Schroeder, J.A. Dowdeswell, K.I. Vega, M.R. Siegfried, W. Chu, R.G. Bingham, 2018. Digitization and Analysis of the SPRI-NSF-TUD Radar Data Archive, *SCAR/IASC Open Science Conference*.

MENTORING

Franklyn Dunbar, University of Montana	2020 - Present
Annabel Conger, Stanford University	2019 - Present
Angelo Tarzona, Dickinson College	2020
Ha Tran, Stanford University	2020
Connery Wood, Stanford University	2019
Kathy Vega, Fullerton Community College	2017 - 2018

OUTREACH

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Stanford Ask A Scientist	<i>2018 - 2019</i>
GeoKids instructor. Taught geology to second graders	<i>2018</i>
Stanford Splash teacher. Educational outreach for local high school students	<i>2018</i>

PROFESSIONAL AFFILIATIONS

Institute of Electrical and Electronics Engineers, Member	<i>2020 - Present</i>
International Glaciological Society, Member	<i>2019 - Present</i>
American Geophysical Union, Member	<i>2017 - Present</i>