

# EMMA J. MACKIE

mackie3@stanford.edu ◊ (415) · 233 · 2298 ◊ MacKieGlaciology.com

Department of Geophysics, Stanford University

397 Panama Mall, Mitchell 461, Stanford, CA 94305 USA

## EDUCATION

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**Stanford University, Stanford CA**

2017 - Present

PhD Candidate in Geophysics

Advised by Dustin Schroeder

Expected Graduation: Summer 2022

Thesis title: *Geologic Realism in the Subglacial Environment and Implications for Ice Sheet Dynamics*

**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

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- [1] **E.J. MacKie**, D.M. Schroeder. Geostatistically simulating subglacial topography with synthetic training data.

## PUBLICATIONS

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- [1] **E.J. MacKie**, 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*.
- [2] O. T. Bartlett, 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*.
- [3] **E. J. MacKie**, 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*.
- [4] C. Zuo, 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*.
- [5] D. M. Schroeder, **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*.
- [6] D. M. Schroeder, 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*.

## HONORS AND AWARDS

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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

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

## INVITED TALKS

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

## PROFESSIONAL SERVICE

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Steering Committee: International Thwaites Glacier Collaboration Early Career Meeting	2019
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## UNIVERSITY SERVICE

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

## FIELD EXPERIENCE

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

## CONFERENCE PARTICIPATION

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- [1] **E.J. MacKie**, D.M. Schroeder, C. Zuo, Z. Yin, J. Caers, 2020. Geostatistical Simulations of Subglacial Topography: Implications for Water Routing at Jakobshavn Glacier. *WAIS Workshop*.
- [2] **E.J. MacKie**, D.M. Schroeder, 2019. Paleo Observations Used to Geostatistically Simulate the Subglacial Geology of Thwaites Glacier. *AGU Fall Meeting*.
- [3] A. Conger, D.M. Schroeder, **E.J. MacKie**, 2019. Radiometric Characterization of Subglacial Lake Floors from Archival Radar Data. *AGU Fall Meeting*.
- [4] D.M. Schroeder, **E.J. MacKie**, A. Conger, 2019. Radiometric signature of subglacial conditions in archival radar sounding data recovered from optical film. *AGU Fall Meeting*.
- [5] N.L. Bienert, D.M. Schroeder, S.T. Peters, E. Dawson, **E.J. MacKie**, M.R. Siegfried, 2019. Inferring Temperature Distribution in Shear Margins from Large-Offset Bistatic Radar Sounding. *AGU Fall Meeting*.
- [6] **E.J. MacKie**, D.M. Schroeder, 2019. Geostatistically Simulating the Topography and Geology of the Amundsen Sea Embayment. *WAIS Workshop*.
- [7] N. Bienert, D.M. Schroeder, S.T. Peters, M.R. Siegfried, **E.J. MacKie**, E. Dawson, 2019. Inferring Temperature Distribution in Shear Margins using an ApRES and Software Defined Radio in a Bistatic Configuration. *WAIS Workshop*.
- [8] **E.J. MacKie**, 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] **E.J. MacKie**, 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] O. Bartlett, S. Palmer, D.M. Schroeder, **E.J. MacKie**, T. Barrow, A. Graham, 2019. Geospatial simulations of airborne ice-penetrating radar survey reveals elevation under-measurement bias for ice sheet bed topography. *IGS Symposium on Five Decades of Radioglaciology*.
- [11] **E.J. MacKie**, 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*.
- [12] D.M. Schroeder, **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 in the Amundsen Sea Embayment. *IGS Symposium on Glacial Erosion and Sedimentation*.
- [13] **E. J. MacKie**, C. Scheidt, J. Caers, D. M. Schroeder, 2018. A new model for Antarctic Subglacial Lakes, *AGU Fall Meeting*.
- [14] **E. J. MacKie**, C. Scheidt, J. Caers, D. M. Schroeder, 2018. Simulating Antarctic bed topography to quantify uncertainty in subglacial water storage, *WAIS Workshop*.
- [15] Schroeder, D. M., J. A. Dowdeswell, M. J. Siegert, R. G. Bingham, W. Chu, **E. J. MacKie**, M. R. Siegfried, K. I. Vega, J. R. Emmons, K. Winstein, 2018. Multi-Decadal Observations of the Antarctic Ice Sheet from Archival Radar Film, *WAIS Workshop*.
- [16] **E.J. MacKie**, 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*.
- [17] D.M. Schroeder, A.M. Hildger, **E.J. MacKie**, H.F.J. Corr, D.D. Blankenship, J.D. Paden, J.A. Dowdeswell, 2018. Multi-System, Multi-Decadal Radar Sounding of Thwaites and Pine Island Glaciers. *SCAR/IASC Open Science Conference*.
- [18] Schroeder, D. M., J. A. Dowdeswell, **E. J. MacKie**, K. I. Vega, J. R. Simmons, K. Winstein, R. G. Bingham, T. J. Benham, 2017. High-Resolution Digitization of the Film Archive of SPRI/NSF/TUD Radar Sounding of the Antarctic Ice Sheet, *AGU Fall Meeting*.
- [19] Schroeder, D. M., A. K. Kendrick, K. I. Vega, **E. J. MacKie**, A. M. Hilger, S. T. Peters, W. Chu, 2017. Observing the Temporal Evolution of Subglacial Conditions Using Radar Sounding Data, *WAIS Workshop*.

## MENTORING

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

## OUTREACH

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

## MISCELLANEOUS

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Harvard Radio Broadcasting DJ for punk department  
Varsity rower for Harvard-Radcliffe crew  
Dual citizenship with USA and Denmark

*2015 - 2017*

*2013 - 2015*