Dr. Hannah F. Mark

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Education

2019 **PhD in Marine Geophysics**, MIT-WHOI Joint Program

2014 **BA Physics, BS Geophysical Sciences**, University of Chicago

Professional Appointments

2021 – on **Postdoctoral Investigator**, Woods Hole Oceanographic Institution

2019 – 2021 **Fossett Postdoctoral Fellow**, Washington University in St Louis

2013 **Summer Student Fellow**, Woods Hole Oceanographic Institution

2011 – 2014 **Undergraduate Research Assistant**, University of Chicago

Publications

2023 **Mark, HF**, Lizarralde, D, Wiens, DA. Constraints on bend-faulting and mantle hydration at the Marianas Trench from seismic anisotropy. *Geophysical Research Letters.* doi:10.1029/2023GL103331
Open data: scripts for anisotropy calculations

2022 Russell, JB, Gaherty, JB, **Mark, HF**, Hirth, G, Hansen, LN, Lizarralde, D, Collins, JA, Evans, RL. Seismological evidence for girdled olivine lattice-preferred orientation in oceanic lithosphere and implcations for mantle deformation processes during seafloor spreading. *Geochemistry, Geophysics, Geosystems.* doi:10.1029/2022GC010542

2022 Ben Mansour, W, Wiens, DA, **Mark, HF**, Russo, RM, Richter, A, Marderwald, E, Barrientos, S. Mantle flow pattern associated with the Patagonian slab window determined from azimuthal anisotropy. *Geophysical Research Letters.* doi:10.1029/2022GL099871

2022 **Mark, HF**, Wiens, DA, Ivins, ER, Richter, A, Ben Mansour, W, Magnani, MB, Marderwald, E, Adaros, R, Barrientos, S. Lithospheric erosion in the Patagonian slab window, and implications for glacial isostasy. *Geophysical Research Letters.* doi:10.1029/2021GL096863
Open data: velocity and viscosity models, and some cross-correlations

2021 **Mark, HF**, Collins, JA, Lizarralde, D, Hirth, G, Gaherty, JB, Evans, RL, Behn, MD. Constraints on the depth, thickness, and strength of the G discontinuity in the central Pacific from S receiver functions. *Journal of Geophysical Research: Solid Earth.* doi:10.1029/2019JB019256

2019 Shinevar, WJ, **Mark, HF**, Clerc, F, Codillo, EA, Gong, J, Olive, JA, Brown, SM, Smalls, PT, Liao, Y, Le Roux, V, Behn, MD. Causes of oceanic crustal thickness oscillations along a 74-Myr Mid-Atlantic Ridge flow line. *Geochemistry, Geophysics, Geosystems.* doi:10.1029/2019GC008711

2019 **Mark, HF**, Lizarralde, D, Collins, JA, Miller, NC, Hirth, G, Gaherty, JB, Evans, RL. Azimuthal seismic anisotropy of 70 Ma Pacific-plate upper mantle. *Journal of Geophysical Research: Solid Earth.* doi:10.1029/2018JB016451

2018 **Mark, HF**, Behn, MD, Olive, JA, Liu, Y. Azimuthal seismic anisotropy of 70 Ma Pacific-plate upper mantle. *Journal of Geophysical Research: Solid Earth.* doi:10.1029/2018JB016451

White papers

2022 Rowe, C, Agius, M, Convers, J, Funning, G, Galasso, C, Hicks, S, Huynh, T, Lange, J, Lecocq, T, **Mark, HF**, Okuwaki, R, Ragon, T, Rychert, C, Teplitzky, S, van den Ende, M. The launch of Seismica: a seismic shift in publishing. *Seismica.* doi:10.26443/seismica.v1i1.255

Funding

2023 – 2024 NSF-OCE: "An assessment of low-temperature, ductile lithospheric deformation using existing broadband seismic data from around South Island, New Zealand".
Award ID: 2316757. PI: **Mark, HF**.
$84k to HF Mark

2023 – 2025 NSF-OCE: "Collaborative Research: Resolving the Origin of the Jurassic Quiet Zone".
Award ID: 2221814. PI: Tominaga, M, co-PIs: **Mark, HF**; Sager, W.
$827k to WHOI including $192k to HF Mark

Awards

2019 **Fossett Postdoctoral Fellowship**, Washington University in St Louis

2019 **AGU Outstanding Student Paper Award (OSPA)**, Tectonophysics

2016 **AGU OSPA**, Tectonophysics

2016 **GeoPrisms OSPA**, honorable mention

2015 **National Science Foundation Graduate Research Fellowship**

2014 **Rosenblith Presidential Fellowship**, Massachusetts Institute of Technology

2014 **Phi Beta Kappa**, Beta of Illinois

2013 **John Crerar Science Writing Prize**, University of Chicago

Teaching Experience

2023 **WHOI Software Carpentries Python workshop**, Classroom assistant

2018 **Kaufman Teaching Certificate**, MIT Teaching and Learning Lab

2018 **WHOI Software Carpentries workshop**, Classroom assistant

2017 **WHOI Summer Math Review**, Lecturer

2017 **MS-3221: Oceanography**, Massachusetts Maritime Academy, Co-Instructor

2016 **12.710: Elements of Modern Oceanography**, MIT-WHOI Joint Program, TA

2016 **WHOI Summer Math Review**, Lecturer

Academic Service

Peer reviewer for: JGR Solid Earth, Nature Geoscience, Geophysical Research Letters, Science Advances, Nature Communications, Journal of Open Source Software, Geoscience Letters, Earth and Planetary Science Letters

2022 – on **Seismica** journal management committee, Co-chair, Standards and Copy Editing

2022 – on **WHOI Postdoc Association**, Department representative

2022 – on **WHOI Workplace Climate Committee**, Department representative

2022 – on **WHOI G&G Proposal Club**, Co-organizer

2022 **SSA Annual meeting**, session co-convener
Marine Seismology

2021 **WUSTL EPS Department URGE pod**, Pod leader

2021 **AGU Fall Meeting**, session co-convener
EP15: Coupling of the Cryosphere, Solid Earth, Surface, and Climate in Shaping Late Cenozoic Topography

2018 – 2019 **500 Women Scientists of Cape Cod**, Steering Committee member

2015 – 2019 **MIT-WHOI Joint Program Farrington Collection**, Librarian

2014 – 2016 **WHOI Summer Math Review**, Coordinator

Invited Seminars

2023 **McGill University**, EPS Department seminar

University of Arizona, Geosciences Colloquium

2022 **University of Washington School of Oceanography**

University of Wisconsin Madison, Weeks Seminar

Syracuse University, EES Department Colloquium

2021 **University of Hawai'i Manoa**, Earth Sciences Department seminar

2019 **University of Illinois Urbana-Champaign**, Brown bag seminar

2018 **Lamont-Doherty Earth Observatory**, MGG/SGT seminar

WHOI, Interdisciplinary Biology Seminar Series on Acoustics

Field Experience

2020 R/V *Marcus G. Langseth*, MGL2003.
Active-source reflection and refraction survey in the Central Aleutians

2017 R/V *Neil Armstrong*, AR23-02.
Collecting underway data along a ridge flowline in the Atlantic

2016 R/V *Neil Armstrong*, AR05.
Scientific validation cruise

2015 ENAM land seismic experiment, North Carolina.
RT-125 deployment and recovery for active-source seismic lines on the Eastern North American Margin

2014 PRIDE SeisORZ seismic experiment, Botswana.
RT-125 deployment and recovery for an active-source seismic line across the Okavango Delta

Selected Communication and Outreach

2020 – 2022 Contributing writer and peer editor at geobites.org
Blogging, general audience summaries of new research

2018 How is the seafloor made?
Magazine article, *Oceanus* Vol 53. No. 2

2017 (Way) under the sea: Imaging the rocks beneath the deep ocean
Public talk, Science Made Public lecture series, Woods Hole, MA

The lithosphere-asthenosphere boundary: What it is, where it is, and why you should care
Public talk, Woods Hole Public Library, Woods Hole, MA

2016 Under-under the sea: Imaging the rocks beneath the deep ocean
Public talk, Woods Hole Public Library, Woods Hole, MA

Conference Abstracts (*=invited)

2022 *__Mark, HF__, Collins, JA, Lizarralde, D, Gaherty, JB, Hirth, G, Evans, RL, Behn, MD. *Where is the G discontinuity, what does it represent, and how can we tell? A case study from the NoMelt experiment.* AGU Fall Meeting, Chicago, IL.

Mark, HF, Wiens, DA, Lizarralde, D. *Insights into bend-faulting and mantle hydration at the Marianas trench from seismic anisotropy.* SSA Annual Meeting, Belleview, WA (poster).

2021 **Mark, HF**, Wiens, DA, Ben Mansour, W, Ivins, ER, Richter, A, Magnani, MB, Marderwald, E, Adaros, R, Barrientos, S. *Thermal erosion of the lithosphere in the Patagonian slab window and implications for glacial isostatic adjustment.* AGU Fall Meeting, New Orleans, LA.

Mark, HF, Lizarralde, D, Shillington, D, Cortes Rivas, V, Estep, JD. *Crustal structure along-strike in the Andreanof segment of the Aleutian Arc from wide-angle seismic refraction data.* AGU Fall Meeting, virtual (poster).

Wiens, DA, Ben Mansour, W, **Mark, HF**, Shore, P, Richter, A, Barrientos, S. *Geodynamics of the Patagonian Slab Window Constrained by Shear Wave Splitting and Seismic Imaging.* AGU Fall Meeting, New Orleans, LA.

Mark, HF, Wiens, DA, Lizarralde, D. *Estimating bend-faulting and mantle hydration at the Marianas trench from seismic anisotropy.* EGU General Assembly, virtual.

*__Mark, HF__. *Anisotropy in slightly more than one dimension.* Marine Seismology Symposium, virtual.

Mark, HF, Wiens, DA, Lizarralde, D. *Estimating bend-faulting and mantle hydration at the Marianas trench from seismic anisotropy.* Marine Seismology Symposium, virtual (poster).

2020 **Mark, HF**, Wiens, DA, Pourpoint, M, Magnani, MB, Ivins, ER, Richter, A, Barrientos, S. *Seismic structure and the extent of the slab window beneath the Northern and Southern Patagonian Icefields.* AGU Fall Meeting, virtual (poster).

2019 **Mark, HF**, Collins, JA, Lizarralde, D, Hirth, G, Gaherty, JB, Evans, RL. *The depth, sharpness, and strength of the G discontinuity from S-to-p receiver functions at the NoMelt site in the central Pacific.* AGU Fall Meeting, San Francisco, CA.

2018 **Mark, HF**, Collins, JA, Lizarralde, D, Hirth, G, Gaherty, JB, Evans, RL. *S-to-p receiver functions for the central Pacific from NoMelt.* AGU Fall Meeting, Washington, D. C.

Shinevar, WJ, **Mark, HF**, Clerc, F, Codillo, EA, Olive, JA, Gong, J, Brown, SM, Smalls, PT, Liao, Y, Le Roux, V, Behn, MD. *Temporal variability of seafloor spreading processes documented along an 80-Myr geophysical transect across the Mid-Atlantic Ridge.* AGU Fall Meeting, Washington, D.C.

Gaherty, JB, Russell, JB, **Mark, HF**, Lin, PP, Sarafian, EK, Ma, Z, Lizarralde, D, Collins, JA, Hirth, G, Evans, RL, Dalton, CA. *A comprehensive portrait of the central Pacific lithosphere-asthenosphere system from NoMelt seafloor geophysical observations.* AGU Fall Meeting, Washington, D.C.

2017 *__Mark, HF__, Behn, MD, Liu, Y, Olive, JA. *Geometric and thermal controls on normal fault seismicity.* AGU Fall Meeting, New Orleans, LA.

Mark, HF, Lizarralde, D, Collins, JA, Miller, NC, Hirth, G, Gaherty, JB, Evans, RL. *Seismic anisotropy of 70 Ma Pacific-plate upper mantle.* AGU Fall Meeting, New Orleans, LA.

*__Mark, HF__, Behn, MD, Liu, Y, Olive, JA. *Seismic coupling at divergent plate boundaries from rate-and-state friction.* GeoPrisms TEI on Rift Initiation and Evolution, Albuquerque, NM.

2016 **Mark, HF**, Behn, MD, Liu, Y, Olive, JA. *Seismic coupling at divergent plate boundaries from rate-and-state friction.* AGU Fall Meeting, San Francisco, CA.

Mark, HF, Behn, MD, Liu, Y, Olive, JA. *Rate-and-state friction models of seismic cycles on oceanic normal faults.* GRC on Rock Deformation, Andover, NH (poster).

Mark, HF, Lizarralde, D, Gaherty, JB, Collins, JA, Hirth, G, Evans, RL, Lin, PP. *Seismic anisotropy in the Pacific upper mantle.* Seismology Student Workshop, Lamont Doherty Earth Observatory.

2014 **Mark, HF**, Lizarralde, D, Gaherty, JB, Collins, JA, Hirth, G, Evans, RL. *Pacific upper mantle seismic anisotropy from the active-source component of the NoMelt experiment.* AGU Fall Meeting, San Francisco, CA (poster).

2012 Heinz, DL, **Mark, HF**. *The Effect of Wavelength-Dependent Emissivity on the Melting Temperature of Iron from Shock Wave Measurements.* AGU Fall Meeting, San Francisco, CA (poster).