

## RACHEL ELEANOR BERNARD

Curriculum Vitae  
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### Academic Appointments

2021-present      **Assistant Professor**, Amherst College, Department of Geology  
2019-2021      **Visiting Assistant Professor and Postdoctoral Fellow**, Amherst College,  
Department of Geology  
2018-2019      **Scripps Institutional Postdoctoral Scholar**, Scripps Institution of  
Oceanography, UC San Diego

### Education

August 2018      **Ph.D. The University of Texas at Austin**, Department of Geological Sciences  
*Dissertation: Rheology and fabric in the continental lithospheric mantle from  
naturally deformed peridotites*  
May 2009      **B.S.E. Princeton University**, Department of Civil and Environmental  
Engineering  
*Thesis: The risks and behavior of carbon dioxide leakage from geologic  
reservoirs*

### Pre-Doctoral Employment

2011-2013      **National Science Foundation, Arlington, VA**  
Science Assistant for the Division of Earth Sciences (EAR)  
Duties include assisting with the processing of proposals, communicating with  
investigators and grantees, drafting solicitations, and reporting on NSF-funded  
research and findings for a general audience.  
2009-2011      **Schlumberger Drilling and Measurements, Youngsville, LA**  
Field Engineer on offshore and onshore oil and gas rigs, monitoring subsurface  
conditions and acquiring downhole measurements while drilling.

### List of publications

#### Peer-reviewed Publications

†Student

**Bernard, R. E.**, Chin, E. J., Murphy, C.† (2022) Melt-assisted deformation in the lower crust of an active plate boundary, Baja California. *LITHOS*. <https://doi.org/10.1016/j.lithos.2022.106975>

**Bernard, R. E.**, Schulte-Pelkum, V., and W.M. Behr (2021) The competing effects of olivine and orthopyroxene CPO on seismic anisotropy. *Tectonophysics*, 814. <https://doi.org/10.1016/j.tecto.2021.228954>.

**Bernard, R. E.**, Behr, W. M., Becker, T. W., and D. J. Young (2019), Relationships between olivine CPO and deformation parameters in naturally deformed rocks and implications for mantle seismic anisotropy. *Geochemistry, Geophysics, Geosystems*, 20. <https://doi.org/10.1029/2019GC008289>.

Dygert, N., **Bernard, R. E.**, and W.M. Behr (2019) Great Basin mantle xenoliths record active lithospheric downwelling beneath central Nevada. *Geochemistry, Geophysics, Geosystems*, 20, <https://doi.org/10.1029/2018GC007834>.

**Bernard, R. E.** and E. H. G. Cooperdock (2018) No progress on diversity in 40 years, *Nature Geoscience*, 11, 292–295. doi:10.1038/s41561-018-0116-6.

**Bernard, R. E.** and C. Henegan (2018) A Polarizing View, *The Science Teacher*, 85 (1), 33-41. (The Science Teacher is a peer-reviewed education journal by the National Science Teachers Association).

**Bernard, R. E.** and W. M. Behr (2017), Fabric heterogeneity in the Mojave lower crust and lithospheric mantle in Southern California, *J. Geophys. Res. Solid Earth*, 122, 5000–5025, doi:10.1002/2017JB014280.

#### *In Review Publications*

Ott, J., Condit, C., Schulte-Pelkum, V., **Bernard, R.** and M. Pec (Submitted Spring 2023) Seismic Anisotropy of Mafic Blueschists: constraints from the exhumed rock record.

Gruber, B. Nicklas, R., Day, J., Chin, E., Ren, M., and **R. Bernard** (Submitted Spring 2023) Fabrics and Olivine Chemical Variations Preserved in Ferrous Oxide-Rich Achondrites.

#### *Awards and Distinctions*

2021	PI, <i>NSF Award 2136010: EAGER: Scaling Necessary Change, Coalitions and Community (SNC): brave leadership for better geoscience</i>
2020	co-PI, <i>NSF Award 2018087: Diversifying geochemistry – travel support for students from under-represented constituencies to attend the Goldschmidt Conference</i>
2019	Bernard <i>et al.</i> (2019) in top 10% downloaded from <i>Geochemistry, Geophysics, Geosystems</i>
2019	Bernard and Cooperdock (2018) in top 5% of all research ever tracked by Altmetric
2018	UCSD Scripps Institute of Oceanography Postdoctoral Scholarship
2018	Best Late-Career PhD poster at JSG Symposium, Honorable Mention
2017	Geological Society of America Research Grant (\$2,500)
2016	Graduate Research Internship Program at the Smithsonian NMNH (\$5,000)
2015-2017	NSF Graduate Research Fellowship (\$34,000 + tuition and benefits x 3 years)
2015-2017	UT JSG supplement to NSF GRFP (\$2,000 per year x 3)
2015	Marathon Oil Diversity Scholarship (\$10,000)
2015	UT JSG Off-Campus Research Award (\$885)
2014	Microanalysis Society Student Travel Grant for EBSD 2014 conference (\$500)
2014	Ford Foundation Fellowship, Honorable Mention and Alternate Status
2014	Geological Society of America Research Grant (\$1,500)

2014

UT JSG Off-Campus Research Award (\$600)

### **Invited Department Talks**

April 2023 – Yale University (Keynote, Women in EPS Day)  
April 2023 – MIT  
November 2022 – Purdue University  
October 2022 – University of Arizona  
September 2022 – University of Massachusetts at Amherst (Dept of Civil and Environ. Engineering)  
April 2022 – Smith College  
January 2022 – Lamont-Doherty Earth Observatory, Columbia University  
April 2021 – Wesleyan University  
April 2021 – University of Minnesota - Twin Cities  
March 2021 – UCLA  
February 2021 – Texas A&M  
February 2021 – University of Vermont  
December 2020 – Penn State  
December 2020 – Macalester College  
November 2020 – University of Washington  
November 2020 – Caltech  
October 2020 – University of California Davis  
October 2020 – Wellesley College

### **Conference Presentations**

\* *Invited* † *Student*

Bryant, R., Keisling, B., and **R.E. Bernard**. Issues of scale: Program design and preliminary outcomes from the Second National Conference, 2022 GSA Annual Meeting. Denver, Colorado. Oral Presentation.

\***Bernard, R.E.** and W.M. Behr. A global compilation of olivine and orthopyroxene crystallographic preferred orientations and their relationship to deformation conditions in the lithospheric mantle, 2022 Structural Geology and Tectonics Forum. Brunswick, Maine. Oral Presentation.

\***Bernard, R.E.** and E.J. Chin. Deformation and melt infiltration beneath an active strike-slip boundary: Evidence from lower crustal xenoliths, San Quintin, Baja California, 2021 AGU Annual Meeting. New Orleans, LA. Oral Presentation.

Caban, I. †, Seymour, N.M., and **R.E. Bernard**. Characterization of quartz deformation in the Orocopia Schist, Northern Plomosa Mountains using EBSD and microstructural analyses, 2021 GSA Annual Meeting. Poster Presentation.

\***Bernard, R.E.** Risks and rewards of doing DEI work in grad school. Speaker and panelist in the Pardee Keynote Symposium: *The Next Generation of Geoscience Leaders: Strategies for Excellence in Diversity and Inclusion*, 2020 GSA Annual Meeting. Virtual conference.

**Bernard, R.E.** and E.J. Chin. Microstructural and geochemical investigation of igneous textures and coronas in San Quintin lower crustal xenoliths. 2019 GSA Annual Meeting. Phoenix, AZ. Poster Presentation.

**Bernard, R.E.**, Day, J.M.D., and E.J. Chin. Strong Olivine Lattice Preferred Orientation in Brachinite-like Achondrites [#1432]. 2019 Lunar and Planetary Science Conference. The

Woodlands, TX. Poster Presentation.

(<https://www.hou.usra.edu/meetings/lpsc2019/pdf/1432.pdf>)

**Bernard, R.E.**, Behr, W.M, Becker, T., and D. Young. Relationships between olivine LPO and deformation conditions in naturally deformed rocks and implications for mantle seismic anisotropy. 2018 AGU Annual Meeting. Washington, DC. Oral Presentation.

\*Dygart, N., **Bernard, R.E.**, and W.M. Behr. Xenolith constraints on deformation conditions and mechanisms in the lower mantle lithosphere. 2018 AGU Annual Meeting. Washington, DC. Oral Presentation.

Ibarra, D.E., Lau, K.V., **Bernard, R.E.**, and E.H.G. Cooperdock. Improvements in gender parity but not representation among Asian American geoscience PhD graduates. 2018 AGU Annual Meeting. Washington, DC. Poster Presentation.

E.H.G. Cooperdock and **R.E. Bernard**. Who has benefitted from outreach in the geosciences? 2018 AGU Annual Meeting. Washington, DC. Poster Presentation.

Behr, W.M. and **R.E. Bernard**. Does olivine LPO systematically scale with water and stress in naturally deformed rocks? 2018 Japan Geoscience Union Meeting. Oral Presentation.

Dygart, N.J., **Bernard, R.E.**, Behr, W.M. Mantle xenoliths record deformation associated with active lithospheric downwelling beneath Central Nevada. 2018 GSA Southeastern Section Meeting, Knoxville, TN. Oral.

**Bernard, R.E.** and W.M. Behr. Plagioclase-dominated seismic anisotropy in the Basin and Range lower crust. 2017 AGU Annual Meeting, New Orleans, LA. Oral.

\***Bernard, R.E.** and K.K. Mayfield. Doctoral programs need changes to attract and retain underrepresented groups. 2017 AGU Annual Meeting, New Orleans, LA. Oral.

Dygart, N.J., **Bernard, R.E.**, Behr, W.M. Great Basin mantle xenoliths record deformation associated with active lithospheric downwelling. 2017 AGU Annual Meeting, San Francisco, CA. Oral.

**Bernard, R.E.** and W.M. Behr. Constraints from naturally deformed peridotites on controls on olivine lattice preferred orientation. 2016 AGU Annual Meeting, San Francisco, CA. Oral.

**Bernard, R.E.** and W.M. Behr. Rheology of the Mojave lower crust and lithospheric mantle as revealed by xenoliths. 2016 SACNAS Annual Meeting, Long Beach, CA. Oral.

\*Behr, W.M., Smith, D. **Bernard, R.E.** Constraints from xenoliths on Cenozoic deformation and rheology of the western US mantle lithosphere. 2015 AGU Annual Meeting, San Francisco, CA. Oral.

**Bernard, R.E.** and W.M. Behr. Constraints from xenoliths on the rheology of the Mojave lower crust and lithospheric mantle. 2015 AGU Annual Meeting, San Francisco, CA. Poster.

**Bernard, R.E.** and W.M. Behr. Constraints from xenoliths on the rheology of the Mojave lower crust and lithospheric mantle. 2015 Southern California Earthquake Center (SCEC) Annual Meeting, Palm Springs, CA. Poster.

**Bernard, R.E.** and W.M. Behr. Fabrics and rheology of the Mojave lower crust and lithospheric mantle. 2014 AGU Annual Meeting, San Francisco, CA. Poster.

### **Teaching and Geoscience Education Experience**

2019-present Instructor for *GEO291: Structural Geology*, *GEO111: Principles of Geology*, *FYSE-105 Ring of Fire*, *GEO271: Mineralogy* at Amherst College

2022 Guest co-host for *Every Rock Has a Story* YouTube channel (Episode 69 “Squishing Mantle Rocks”)

- 2022 Guest instructor for Amherst STEM Incubator summer program for first generation and underrepresented Amherst College students
- 2020 Course Design Seminar for Flexible Teaching, a 6-week summer program on remote teaching practices. Association of College and University Educators.
- 2017 IODP workshop: Expanding the Geoscience Pipeline by Connecting Educators with Early Career IODP Scientists. On board the *JOIDES Resolution*.
- 2017 Created RockKits, educational kits that allow middle and high school students to study thin sections on classroom microscopes. These kits supplement a lesson plan on the rock cycle recently accepted by peer-reviewed education journal (below), and are available for loan on personal website.
- 2017 Mentored a freshman undergraduate on a 4-week geology research project
- 2017 Volunteered as visiting geologist at local nursery/preschool (Goddard School, Round Rock, TX). Presented on color, texture, and density of rocks in 8 10-minute sessions for children aged 18 months to 5 years.
- 2017 Volunteered to help facilitate Explore Citizen Science, a professional development workshop teaching 5-12 teachers how to incorporate citizen science into the classroom
- 2016-2017 Worked with a local K-12 science teacher through UT-Austin's Scientist-in-Residence (SciRes) program (formerly GK-12), both in and out of the classroom (3 hrs/week). Duties included incorporating my research into AP Environmental Science curriculum at KIPP Austin Collegiate (98% URM student population)
- 2016-2017 Volunteered as judge at the Austin Regional Science Fair (elementary, middle and high school divisions)
- 2016 Visiting expert in the "Scientist-Is-In" outreach program at the Smithsonian National Museum of Natural History (NMNH). Demonstrated looking at mantle xenoliths under polarized light.
- 2015-2016 Led tours and demonstration of electron microprobe facility during UT's largest public outreach event, Explore UT.
- 2014 Teaching Assistant, Introduction to Field Methods, UT Austin
- 2013 Teaching Assistant, Earth Materials, UT Austin
- 2012 Volunteer as judge at the Barnard Elementary School Science Fair

**Professional and Synergistic Activities**

- 2023 Panelist for Earth Science Women's Network (ESWN) webinar on Academic Interviewing
- 2022 Co-organizer of AGU Chapman Conference, "Second National Conference: Justice in Geoscience." August 2022 in Washington, DC. Over 300 in person and 50 online attendees.
- 2022-present Created and manage Black Women in Geoscience (BWIG), a crowdsourced database of every Black woman who has received a US doctorate in the geosciences, found here: <https://www.rachel-bernard.com/bwig-list>
- 2022 Convenor, AGU Town Hall "The Second National Conference: Community Reflections on Past, Present, and Future", AGU Fall Meeting 2022
- 2021-present Member-at-Large, GSA Diversity in the Geosciences Committee (until 2024)
- 2022 Consultant/presenter at Alliance-Building Offshore to Achieve Resilience and Diversity (All-ABOARD) retreat, Tennessee, March 2022.

- 2020 Panelist, *Diversity and Inclusion in the Geosciences: Pitfalls, Unconscious Bias and Practical Solutions*, Goldschmidt Annual Meeting, June 22-26
- 2020 Invited guest, University of Chicago, Geophysical Sciences departmental discussion about racism in academia and the field of Earth and Planetary Sciences, June 22
- 2019-present Ex-officio member, Diversity Equity and Inclusion Committee for the Geochemical Society
- 2018-present Reviewer for NSF Division of Earth Science (EAR) programs: Petrology and Geochemistry, Education and Human Resources, Geoinformatics, Tectonics, Geophysics
- 2018-present Reviewer for peer reviewed journals: Geochemistry, Geophysics, Geosystems; Journal of Geophysical Research - Solid Earth; The Geological Society (UK); Tectonophysics
- 2018 Member of JSG Geoscience Empowerment Network (GEN), a group started in 2018 with the goals of increasing departmental graduate student diversity and well-being
- 2018 Was one of 66 community contributors for the Tectonics Community Vision Document submitted to the National Science Foundation, <https://doi.org/10.6069/H52R3PQ5>.
- 2017 Mentor for Catalyst, a JSG undergraduate honors program geared towards first generation college student and underrepresented minority students
- 2016-2017 Student member of UT Lithosphere Dynamics Assistant Professor search committee
- 2016 Co-founder, editor, and writer for *Science Y'all!*, an official blog for graduate students in the Jackson School of Geosciences (JSG) to share educational and research experiences with a broad audience ([www.jsg.utexas.edu/science-yall/](http://www.jsg.utexas.edu/science-yall/))
- 2016 Lead organizer for the JSG Annual Research Symposium (over 130 graduate student participants)
- 2015-2017 Founder and member of the UT Austin JSG *PhD Dissertation Talk Award Committee*
- 2015-2016 President of the Graduate Student Executive Committee (representing 250+ JSG graduate students)
- 2014-2015 Research Assistant, NSF Grant EAR-1251621, Rheology of the Lithospheric Mantle Beneath the Mojave Region from Naturally Deformed Peridotite Xenoliths
- 2014 Attended *Fundamentals of 3D Quantitative Analysis of Geological Materials Using CT* workshop at University of Texas at Austin, TX. June 23-25.
- 2014 Attended *EBSD 2014: The Science, The Tools, The Method* workshop at Carnegie Mellon University, Pittsburgh, PA. June 17-19.
- 2013-2015 Mentor coordinator for JSG GeoFORCE program, an outreach program for students from disadvantaged areas in inner-city and rural Texas
- 2013 Graduate Student Representative, Department of Geological Sciences, UT Austin, acted as liaison between faculty and graduate students
- 2013 Attended Oxford Instruments HKL/EBSD training course in Concord, MA. December 10-12.
- 2012 Served on internal NSF panel for EAPSI program
- 2012 Attended *Workshop on Advancing Experimental Rock Deformation Research: Scientific and Technical Needs* at Harvard University. August 16-19.
- 2011-2013 Assisted in facilitating NSF panels for the following programs: Geobiology and Low-Temperature Geochemistry (GG), Geomorphology and Land Use Dynamics (GLD), Hydrologic Sciences (HS), and Sedimentary Geology and Paleobiology (SGP)

2011-2013 Represented NSF at Geological Society of America and American Geophysical Union annual meeting booths  
 2007-2009 Wilderness backpacking leader for Princeton freshman orientation  
 2007-2009 Vice President of the Princeton Union of Multiracial/Multicultural Students  
 2005-2006 Staff writer for *The Daily Princetonian*

**Internships**

Spring 2017 **Texas House Committee, Austin, TX**  
 Policy intern for Representative Lyle Larson, chair of the House Committee on Natural Resources

Summer 2016 **Smithsonian National Museum of Natural History, DC**  
 Received an NSF Graduate Research Internship Program (GRIP) award to conduct research at the NMNH, supervised by Dr. Liz Cottrell.

Summer 2008 **University of Minnesota Twin Cities Geology REU**  
 Ten-week research program, including ten days spent in the field using LIDAR equipment in Mystery Cave in southeast Minnesota. Used MATLAB to analyze data and create three-dimensional images of the cave for future fluid flow modeling.

2007-2008 **Environmental Engineering and Water Resources Program, Princeton University**  
 Performed data analysis for the Mid-Infrared Technologies for Health and the Environment (MIRTHE) program as an on-campus job during the academic year.

Summer 2007 **U.S. Environmental Protection Agency, DC**  
 Worked within the EPA's Office of Research and Development summarizing research grant proposals for non-technical readers and performing general administrative duties. Time also spent aboard the Ocean Survey Vessel Bold collecting and organizing sediment samples, as well as monitoring ocean floor side scan sonar images.

Summer 2006 **NASA Goddard Space Flight Center, Greenbelt, MD**  
 Performed data analysis and programming using Excel and MATLAB for the GOES-N weather satellite.

**Research Skills**

Computing

- Numerical modeling and data analysis using Matlab
- Post-processing of EBSD data using MTEX and Channel5 software
- Post-processing and textural analysis of CT data using Avizo, Quant3D and Blob3D
- Drafting using Adobe Illustrator and Photoshop
- LaTeX

Analytical/Laboratory Experience

- Electron microprobe analysis (EMPA)
- Electron backscatter diffraction (EBSD)
- Energy Dispersive Spectrometry (EDS)
- Fourier Transform Infrared Spectroscopy (FTIR)

- Secondary ion mass spectrometry (SIMS)
- X-ray CT scanning
- Paleopiezometry
- Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS)

**Professional Affiliations**

- American Geophysical Union (AGU)
- National Association of Geoscience Teachers (NAGT)
- Earth Science Women's Network (ESWN)
- Geological Society of America (GSA)
- National Association of Black Geoscientists (NABG)
- Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)