

Dr. Joshua M. Garber

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Professional Preparation

E-FIRE Postdoctoral Scholar (02/2018–07/2021) -- Penn State University

Focus: Petrology/geochemistry/geochronology of subducted metabasalts and metasediments in W. Alps/Corsica (Supervisors: M. Feineman, A. Smye)

Ph.D., Geology (01/2018) -- University of California, Santa Barbara

Dissertation: Multivariate Statistical Methods and Applications in Petrochronology and Geochemistry (Committee: B. Hacker [advisor], J. Cottle, M. Jackson)

M.S., Geology (09/2012) -- University of California, Davis

Thesis: Early Devonian shortening, exhumation, and strain localization in a collisional orogen: the Bajo Pequeño Shear Zone, NW Argentina (Advisor: S. Roeske)

B.S., Geology; Departmental and University Honors (05/2008) – UT Austin

Thesis: Impact of fluid evolution on garnet growth in pelitic rocks (Advisor: W. Carlson)

Appointments

04/2025 – present Research Technician: University of St Andrews (UK)

07/2021 – 03/2025 Assistant Research Professor: The Pennsylvania State University (US)

07/2020 – 03/2025 LA-ICPMS Laboratory Manager: The Pennsylvania State University (US)

02/2018 – 07/2021 Postdoctoral Scholar: Pennsylvania State University (US)

09/2012 – 12/2017 Graduate Researcher, Instructor, TA: UC Santa Barbara (US)

06/2015 – 08/2015 Intern: Chevron Energy Technology Company (ETC), Houston, TX (US)

06/2012 – 08/2012 Intern: Lunar and Planetary Institute, Houston, TX (US)

09/2009 – 09/2012 Graduate Researcher, TA: University of California, Davis (US)

05/2009 – 08/2009 Intern: NASA-Johnson Space Center, Houston, TX (US)

08/2006 – 03/2009 Research Assistant: University of Texas at Austin (US)

05/2008 – 09/2008 Intern: United States Geological Survey (USGS), Eastern Mass. (US)

05/2006 – 09/2006 Intern: Lunar and Planetary Institute/NASA-Johnson Space Center (US)

05–08/2004, 2005 Research Assistant: Rice University, Houston, TX (US)

Peer-Reviewed Publications (+ approx. 100 first- or co-authored conference abstracts)

Guevara, V.E., **Garber, J.M.**, Caddick, M.J., Smye, A.J., Han, A., Searle, M.P., Ali, A., Clarridge, S., and Ahmad, R. Tracking metamorphic recrystallization of a Pleistocene migmatite from Nanga Parbat, *in review at Geology*

Poulaki, E., Bickert, M., Vannucchi, P., Schuck, B.D., Azikawa, N., Pandey, A., Morishita, T., Sanfilippo, A., Cunningham, E.H., Barnes, J.D., **Garber, J.M.**, Nistor, C., Bernard, R., Tribuzio, R., Loocke, M., Abe, N., Di Stefano, A., Filina, I.Y., Fu, Q., Gontharet, S.B.L., Kearns, L.E., Koorapati, R.K., Lei, C., Loreto, M.F., Magri, L., Meanapace, W., Pavlovics, V.L., Pezard, P.A., Rodriguez-Pilco, M.A., Zhao, X., Pérez-Gussinyé, M., Garrido, C.J., Ranero, C.R., Estes, E.R., Malinverno, A.I., and Zitellini, N., Granitic intrusions facilitate rapid mantle exhumation along an oceanic detachment fault, *in review at Nature Communications*

Moser, A.C., **Garber, J.M.**, Chambers, M., Smye, A.J., Connop, C.H., Rosenthal-Guillot, A.M., and Kylander-Clark, A.R.C., Absence of Variscan Detrital Zircons in Ivrea-Verbano Metasedimentary Rocks Suggests Protracted Timescales of Formation for Felsic Lower Continental Crust, *in review at EPSL*

Searle, M.P., **Garber, J.M.**, and Rioux, M., Structure of the NE Oman Mountains: a review of robust geochronological constraints for tectonic models of ophiolite obduction and continental subduction, *in review at Tectonics*

- Rodríguez-López, J.P., Fernández-Mendiola P.A., de Gea, G.A., Arz, J.A., Arenillas, I., Gilabert, V., Arlegui, L., Soria, A.R., Siver, P.A., Fernández, V., Villanova, J., Amidon, W., Kylander-Clark, A.R.C., Xiao, W., Li, Q., Wang, R., Frigola, J., Cerdà-Domènech, M., **Garber, J.**, López-Martínez, J., Murton, J., Liesa C.L., Low-latitude glaciation during the Mesozoic greenhouse climate optimum: reviewing the cryosphere reach during an archetypal hothouse Earth, in review at *Earth Science Reviews*
- Garber, J.M.**, Lau, K.V., Marshall, M., Meyer, F., Soares, G.G., and Felker, G., Depositional and diagenetic geochemistry of a massive phosphorite deposit: U-Pb and trace-element systematics of carbonate fluor-apatite from the Phosphoria Fm (Idaho, USA), in prep for *G-cubed* (25% complete)
36. Droubi, O.K., Bauer, A.M., Bonamici, C.E., Nachlas, W.O., **Garber, J.M.**, Tappa, M.J., and Reimink, J.R. (2025) Eoarchean-Paleoproterozoic tectonothermal history of the Acasta Gneiss Complex constrained by titanite and apatite petrochronology, *G-cubed*, 26, doi: 10.1029/2025GC012294.
 35. Walters, J.B., **Garber, J.M.**, Beranoaguirre, A., Millonig, L., Gerdes, A., Grützner, T., Marschall, H., The role of micro-inclusions for in situ garnet U-Pb geochronology: An example from the As Sifah eclogites, Oman, in press at *Geochronology*
 34. Reimink, J.R., Beckman, R., Schoonover, E., Lloyd, M., **Garber, J.M.**, Davies, J.H.F.L., Cerminaro, A., Perrot, M.G., and Smye, A.J. (2025) Discordance Dating: A New Approach for Dating Alteration Events, in press at *Geochronology*
 33. **Garber, J.M.**, Rioux, M., Cruz-Urbe, A.M., Smye, A.J., Baker, P.L., Vervoort, J.D., and Searle, M.P., and Feineman, M.D. (2025) Shear heating during rapid subduction initiation beneath the Samail Ophiolite, *Nature Geoscience*, doi:10.1038/s41561-025-01711-6.
 32. Schoonover, E., Ackerson, M., **Garber, J.M.**, Smye, A., Kylander-Clark, A.R.C., and Reimink, J., (2024) Snapshots of magmatic evolution revealed by zircon depth profiling, *EPSL*, 647, doi:10.1016/j.epsl.2024.118987
 31. Cipar, J.H., Smye, A.J., **Garber, J.M.**, Reimink, J.R., and Kylander-Clark, A.R.C. (2024) Thinning and heating of Laramide continental lower crust recorded by zircon petrochronology, *G-cubed*, doi:10.1029/2023GC011177
 30. Droubi, O.K., Cipar, J.H., Smye, A.J., **Garber, J.M.** (2024) Xenolith Petrochronology (San Luis Potosi, Mexico) Constrains Heat Sources for Cenozoic Ultrahigh-Temperature Metamorphism in the Lower Crust, *JGR:SE*, doi:10.1029/2024JB029138
 29. Connop, C., Smye, A.J., and **Garber, J.M.** (2024) Heat sources for Variscan high-temperature—low-pressure metamorphism: petrochronological constraints from the Trois Seigneurs Massif, French Pyrenees, *Journal of Metamorphic Geology*, doi:10.1111/jmg.12775
 28. Connop, C., Smye, A.J., **Garber, J.M.**, Moser, A.C., Caddick, M.J., and Vervoort, J.D. (2024) Assembly of Lower Continental Crust: a Garnet Lu-Hf Petrochronological Investigation of the Ivrea-Verbano Zone, Italy, *EPSL*, 634, doi:10.1016/j.epsl.2024.118677
 27. Soares, G.G., **Garber, J.M.**, House, C.H., and Reimink, J.R. (2024) Extracting meaningful environmental and age information from a c. 2.4-2.2 Ga peritidal phosphorite: the Turee Creek Group, Western Australia, *G-cubed*, 25, doi:10.1029/2023GC011216
 26. Smye, A.J., and **Garber, J.M.** (2023) Petrochronology: micron-scale links between mineral dates, P-T conditions, and petrogenesis, *Treatise on Geochemistry*
 25. Cruz-Urbe, A.M., Craig, G., **Garber, J.M.**, Paul, B., Arkula, C., and Bouman, C. (2023) Single spot Rb-Sr isochron dating of biotite by LA-MC-ICP-MS/MS, *Geostandards and Geoanalytical Research*, doi:10.1111/ggr.12518.
 24. Moser, A.C., Lusk, A.D., Attia, S., **Garber, J.M.**, Seward, G.E., and Kylander-Clark, A.R.C. (2023) Titanite petrochronology reveals secular temperature and fluid evolution during ductile deformation: an example from Cretaceous shear zones in the Eastern

Transverse Ranges, G-cubed, 24, doi:10.1029/2022GC010855.

23. Rioux, M., **Garber, J.M.**, Searle, M.P., Crowley, J.L., Stevens, S., Schmitz, M., Kylander-Clark, A.R.C., Leal, K., Ambrose, T., Smye, A.J. (2023) The temporal evolution of subduction initiation in the Samail ophiolite: High-precision U-Pb zircon petrochronology of the metamorphic sole, *Journal of Metamorphic Geology*, doi:10.1002/jmg.12719
22. Droubi, O.K., Bauer, A.M., Bonamici, C., Nachlas, W.O., Tappa, M.J., **Garber, J.M.**, and Reimink, J.R. (2023) U-Th-Pb and trace-element evaluation of existing titanite and apatite LA-ICP-MS reference materials and determination of $^{208}\text{Pb}/^{232}\text{Th}$ - $^{206}\text{Pb}/^{238}\text{U}$ date discordance in Archean accessory phases, *Geostandards and Geoanalytical Research*, doi:10.1111/ggr.12488
21. Searle, M.P., Rioux, M., **Garber, J.M.**, (2022) One Line on the Map: Geological history of the Semail Thrust, Oman-UAE Mountains, *Journal of Structural Geology*, 158, doi:10.1016/j.jsg.2022.104594
20. Wyatt, D.M., Smye, A.J., **Garber, J.M.**, Hacker, B.R. (2022) Assembly and tectonic evolution of continental lower crust: Monazite petrochronology of the Ivrea-Verbano Zone (Val Strona di Omegna), *Tectonics*, 41(3), doi:10.1029/2021TC006841
19. Moser, A.C., Hacker, B.R., Gehrels, G.E., Seward, G.G.E., Kylander-Clark, A.R.C., **Garber, J.M.** (2022) Linking Titanite U-Pb Dates to Coupled Deformation and Dissolution-Reprecipitation, *Contributions to Mineralogy and Petrology*, 177(42), doi:10.1007/s00410-022-01906-9
18. **Garber, J.M.**, Rioux, M., Searle, M.P., Kylander-Clark, A.R.C., Hacker, B.R., Vervoort, J.D., Warren, C., Smye, A.J. (2021) Dating continental subduction beneath the Samail Ophiolite: garnet, zircon, and rutile petrochronology of the As Sifah eclogites, NE Oman, *JGR:SE*, 126, doi:10.1029/2021JB022715
[AGU Eos Highlight: "Radiometric Dating Sheds Light on Tectonic Debate,"
<https://bit.ly/33F3Vx5>]
17. Rioux, M., **Garber, J.M.**, Searle, M.P., Kelemen, P., Miyashita, S., Adachi, Y., Bowring, S. (2021) High-precision U-Pb zircon dating of late magmatism in the Samail ophiolite: A record of subduction initiation, *JGR:SE*, 126(5), doi:10.1029/2020JB020758
16. Rioux, M., Amri, I., Benoit, M., Ceuleneer, G., **Garber, J.M.**, Searle, M.P. (2021) The origin of felsic intrusions in the mantle section of the Semail ophiolite: Melting of underthrust amphibolite and metasediment and differentiation of mantle derived magmas, *JGR:SE*, 126(5), doi:10.1029/2020JB020760
15. **Garber, J.M.**, Rioux, M., Kylander-Clark, A.R.C., Hacker, B.R., Vervoort, J., Searle, M.P. (2020) Multi-phase petrochronology of Wadi Tayin metamorphic sole metasediment, with implications for the thermal and tectonic evolution of the young Semail subduction zone, *Tectonics*, 39, doi:10.1029/2020TC006135
14. Cipar, J.H., **Garber, J.M.**, Kylander-Clark, A.R.C., Smye, A.J. (2020) Active crustal differentiation beneath the Rio Grande Rift, *Nature Geoscience*, 13, doi:10.1038/s41561-020-0640-z
13. Rutte, D., **Garber, J.M.**, Kylander-Clark, A.R.C., Renne, P.R. (2020) An exhumation pulse from the nascent Franciscan subduction zone (California, USA), *Tectonics*, 39, doi:10.1029/2020TC006305
12. Bralower, T., Cosmidis, J., ..., **Garber, J.**, ..., Tikoo, S. (2020) The habitat of the nascent Chicxulub crater, *AGU Advances*, 3, doi:10.1029/2020AV000208
11. **Garber, J.M.**, Smye, A.J., Feineman, M.D., Kylander-Clark, A.R.C., Matthews, S. (2020) Decoupling of zircon U-Pb and trace-element systematics driven by U diffusion in eclogite-facies zircon (Monviso meta-ophiolite, W. Alps), *Contributions to Mineralogy and Petrology*, 175, doi:10.1007/s00410-020-01692-2
10. Searle, M.P., **Garber, J.M.**, Hacker, B.R., Htun, K., Gardiner, N.J., Waters, D.J., Robb, L.J. (2020), Timing of syenite-charnockite magmatism and ruby- and sapphire

metamorphism in the Mogok valley region, Myanmar, *Tectonics*, 39,
doi:10.1029/2019TC005998

9. Aulbach, S., Massuyeau, M., **Garber, J.M.**, Gerdes, A., Heaman, L.M., Viljoen, K.S. (2020), Ultramafic melt- and auto-metasomatism in mantle eclogites: Compositional effects and geophysical consequences, *G-cubed*, 21, doi:10.1029/2019GC008774
8. Smye, A.J., Marsh, J.J., Vermeesch, P., **Garber, J.M.**, Stockli, D.F. (2018), Applications and Limitations of U-Pb Thermochronology to Middle and Lower Crustal Thermal Histories, *Chemical Geology*, doi:10.1016/j.chemgeo.2018.07.003
7. **Garber, J.M.**, Maurya, S., Hernandez, J.-A., Duncan, M.S., Zeng, L., Zhang, H.L., Faul, U., McCammon, C., Montagner, J.-P., Moresi, L., Romanowicz, B.A., Rudnick, R.L., Stixrude, L. (2018), Multidisciplinary constraints on the abundance of diamond and eclogite in the cratonic lithosphere, *G-cubed*, 19, doi: 10.1029/2018GC007534
[Altmetric: #2 in press attention of any G-cubed paper; ACS "Reactions" Video: Are We Standing on a Quadrillion Tons of Diamonds? <https://bit.ly/3DAEh8U>]
6. **Garber, J.M.**, Hacker, B.R., Kylander-Clark, A.R.C., Stearns, M., Seward, G. (2017), Controls on trace-element uptake in metamorphic titanite: implications for petrochronology, *Journal of Petrology*, 58, 1031–1057, doi:10.1093/petrology/egx046
5. Rioux, M., **Garber, J.M.**, Bauer, A., Bowring, S., Searle, M., Kelemen, P., Hacker, B. (2016), Synchronous formation of the metamorphic sole and igneous crust of the Semail ophiolite: New constraints on the tectonic evolution during ophiolite formation from high-precision U-Pb zircon geochronology, *EPSL*, 451, 185–195, doi:10.1016/j.epsl.2016.06.051
4. Searle, M.P., Waters, D.J., **Garber, J.M.**, Rioux, M., Cherry, A.G., Ambrose, T.K. (2015), Structure and metamorphism beneath the obducting Oman ophiolite: evidence from the Bani Hamid granulites, northern Oman Mountains, *Geosphere*, 11(6), doi:10.1130/GES01199.1
3. Carlson, W.D., Hixon, J., **Garber, J.M.**, Bodnar, R.J. (2014), Controls on metamorphic equilibration: the importance of intergranular solubilities mediated by fluid composition, *JMG*, 32, doi:10.1111/jmg.12113
2. **Garber, J.M.**, Roeske, S.M., Warren, J., Mulcahy, S.R., McClelland, W.C., Austin, L.J., Renne, P.R., Vujovich, G.I. (2014), Crustal Shortening, Exhumation, and Strain Localization in a Collisional Orogen: The Bajo Pequeño Shear Zone, Sierra de Pie de Palo, Argentina, *Tectonics* 33, doi:10.1002/2013TC003477
1. Fong, T., Bualat, M., Deans, M., ..., **Garber, J.**, ..., Kobayashi, L. (2011), Robotic Follow-up for Human Exploration, AIAA 2010 Conference & Exposition, AIAA SPACE Forum, doi:10.2514/6.2010-8605.

Other Publications

- Garber, J.M.** (2012). Chapter 1: Precambrian Rocks of the Grand Canyon: UC Davis Ecogeomorphology Field Guide to the Grand Canyon [<https://bit.ly/3robWyd>]
- Barnes, J., French, R., **Garber, J.**, Poole, W., Smith, P., Tian, Y. (2012), Science concept 2: The structure and composition of the lunar interior provide fundamental information on the evolution of a differentiated planetary body, in: Kring, D., and Durda, D., eds., *A Global Lunar Landing Site Study to Provide the Scientific Context for Exploration of the Moon*, LPI Contribution No. 1694, Houston, TX: LPI, pp. 47–131
- Garber, J.M.** (2011) Chapter 1: Tectonic History of British Columbia: Historical and Current Influences on the Chilko-Chilcotin-Fraser River System, in *Chilko-Chilcotin River Network: A Lakes and Rivers Ecosystem [field guide]*, eds. J. Mount and P. Moyle [<https://bit.ly/46FRv2A>]
- Righter, K., **Garber, J.M.** (2011), HED [Howardite-Eucrite-Diogenite] Compendium. [<https://go.nasa.gov/3nytS8l>]

Research Interests

broadly: geochronology (especially U-Pb), trace-element geochemistry (especially REE), metamorphic petrology, plate tectonics, statistical methods

specifically: subduction initiation preserved in ophiolites; long-term tectonic and chemical evolution of continental crust; paleoenvironmental conditions preserved in sedimentary apatite and carbonate; geochemistry of iron ores and blast furnace slags

Summary of Relevant Skills

- ♦ Diverse research portfolio, at the intersection of several interdisciplinary research themes
- ♦ Well-rounded teaching experience as lead instructor and TA, covering a diverse range of subjects in both classroom and field instruction
- ♦ Excellent scientific communication skills, to both technical and non-technical audiences
- ♦ Broad lab experience, including (LA-, ICP-)MS, SEM/CL/EBSD, EPMA, optical microscopy, wet chemistry, Raman spectroscopy, and fluid-inclusion work
- ♦ Hard-working, professional, diplomatic, and productive, both independently and in groups
- ♦ Statistical proficiency in geologic data reduction, processing, and interpretation
- ♦ Extensive and diverse field experience, including geological field mapping (at multiple scales), stratigraphy/measured sections, and various sampling campaigns
- ♦ Experience in Adobe Suite, Iolite, MATLAB, THERMOCALC/Perple_X, ArcGIS/ENVI

Grants and Fellowships

2025: St Andrews Interdisciplinary Research Support (STAIRS) Nascent Partnership Seed Grant (£5000)

2023: Penn State Center for Critical Minerals Research Seed Grant (\$5669)

Penn State College of EMS Wilson Research and Travel Support Grant (\$3000)

2022: NSF EAR-2233868, "In situ Rb-Sr mica petrochronology: a transformative approach to characterizing tectonic processes", 01/2023-12/2025, \$391,286 (PI: Cruz-Urbe, co-I: Garber)

2021: NSF EAR-2120931, "Determining the rates and conditions of subduction initiation beneath the Samail Ophiolite", 08/2021-08/2024, \$199,802 (PI: Garber, co-I: Smye)

2018: E-FIRE European Training Funds Grant (\$4000)

2016: NSF CIDER Research Grant (\$4500 to collaborative group)

UCSB Earth Research Institute Fellowship (\$1500)

UCSB Tanya Atwater Field Studies Grant (\$3000 between 5 co-authors)

2014: ExxonMobil/Geological Society of America Graduate Research Grant (\$7500)

GSA Mineralogy, Geochemistry, Petrology, and Volcanology Research Grant (\$2000)

Graduate Opportunity Research Grant (UCSB) (\$3000)

2012-2014: University of California Regents Special Fellowship (\$53000)

2011: Geological Society of America Graduate Research Grant (\$4000)

2010-2011: UC-Davis Cordell Durrell Fund Grant (\$1000 in 2010, \$2800 in 2011)

2009-2010: NSF S-STEM Fellowship (through UC-Davis) (\$10000)

2007: University Co-op (UT) Undergraduate Research Fellowship (\$1000)

Teaching Experience

Instructor of Record (overall student rating = 4.57/5.00)

- Physical Geology (Summer 2014, Spring 2016)
 - o Lecture/laboratory-based course; 33 students in 2014 and 168 students in 2016
 - o Developed syllabus and lectures, and revamped lab materials
 - o Supervised one TA in 2014 and four TAs in 2016
- Structural Geology (Winter 2015, Winter 2017)
 - o Upper division lecture/laboratory-based course; 20 students in 2015; 30 students in 2017
 - o Co-taught with other structural geologists (P Gans, MK Fidler); focused on ductile

- portion of lithosphere
- Co-developed syllabus, developed own lectures, combined existing field trip with new field sites and exercises in SE California
- Supervised three TAs in each course

Teaching Assistant (avg. 2013-2014 rating = 4.91/5.00)

- Field Camp (2x at UC-Davis, 1x at UCSB), Earth Materials (2x at UC-Davis, 1x at UCSB), Metamorphic Petrology (2x at UC-Davis), Igneous Petrology (1x at UC-Davis), Structural Geology (1x at UC-Davis), Field Geology (2x at UC-Davis), Introductory Geology (1x at UC-Davis, 1x at UCSB)

Informal Teaching

- Designed “Stories Trapped Underfoot” museum exhibit in Earth and Mineral Science Museum and Art Gallery (Penn State) with undergraduate advisee (2023-2024)
- Guest Lecturer for GEOSC303: Environmental Geology (Instructor: Isabel Fendley) – 2024
- Guest Lecturer for GEOSC413W: Techniques in Environmental Geochemistry (Instructor: Isabel Fendley) – 2023, 2024
- Guest Lecturer for GEOSC201: Earth Materials (Instructor: Maureen Feineman) – 2023
- Trained ≈ 10 undergraduate students on LA-ICPMS sample preparation, data collection, data interpretation – 2021-present
- Trained ≈ 15 undergraduate students on LA-ICPMS affiliated instruments, e.g., optical microscopy, Axioscan, SEM-EDS/CL – 2021-present
- Guest Lecturer for Dept of Chemistry, Penn State (“How to present to a general audience”) – 2020
- Co-developed virtual field exercise on Pennsylvania structural cross-sections (with Matt Rioux, UCSB) – 2020
- Weekly Volunteer Docent at Santa Barbara Museum of Natural History, discussing geology with first-fifth graders – 2014-2017
- Led field trip for high schoolers to Eastern Sierra; led field trip for retirees to Santa Ynez Mountains and Joshua Tree National Park – 2017

Students Mentored (*undergraduate, **graduate)

- **2025-present: Andrew Exequiel Tabilog (University of the Philippines MS student, advisor: G. Theophilus Valera): petrology/geochemistry of western Philippine ophiolites
- **2024–2025: Luis Rivera-Gabriel (Penn State PhD student, co-advised with T. Mittal): development of diabase-related (“Cornwall-type”) magnetite skarns in SE PA
- *2023–2025: Sarah Ambrozak (Penn State senior thesis + RA): trace-element measurements of iron slags as potential REE sources
- **2023–present: Cemil Arkula (U. Maine PhD student, advisor: A. Cruz-Urbe): resolving deep-crustal thermal histories in W. Maine using coupled LA-ICPMS Rb-Sr/U-Pb
- **2023–2025: Frances Meyer (Penn State PhD student, advisor: K. Lau): U speciation in marine rocks and modern sediments, including LASS U-Pb + trace-elements on sedimentary apatite
- *2023–2024: Noah Sheldon (Penn State senior thesis, co-supervised w/ M. Feineman): trace-element measurements of iron slags, ores, and country rocks as potential REE sources
- *2022–2023: Gabriel Felker (Penn State senior thesis, co-supervised with K. Lau): LASS U-Pb + trace elements of sedimentary apatite (Phosphoria Fm., USA)
- *2022–2023: Gianna Greger (Lafayette College senior thesis, advisor: T. Carley): LASS U-Pb + trace elements of zircon from Ordovician bentonites (PA, USA)
- *2021–2023: Alexander Nikitin (Penn State senior thesis + RA): LASS U-Pb + trace elements of detrital and metamorphic zircons from the Samail Ophiolite (Oman/UAE)
- *2021–2022: Abigail Mensch (Penn State summer REU): LASS U-Pb + trace elements of

apatite from the Molopo Farms intrusive complex (S. Africa)

*2021–2022: Kathryn Cordeiro (UCSB senior thesis, co-supervised with M. Rioux):
Thermodynamic modelling of the metamorphic sole of the Samail Ophiolite
(Oman/UAE)

*2019–2020: Nancy Weinheimer (Penn State summer REU): whole-rock major-element,
trace-element, and Sr isotopic work on subducted metabasalts (Corsica)

*2018–2019: Yihua Li (Penn State senior thesis): LASS U-Pb + trace elements of W. Alps
titanite

Selected Awards and Honors

Penn State Earth and Mineral Sciences Postdoctoral Excellence in Research Award (2021)

1st Judges Prize + 1st Audience Prize, Lightning Talk, Penn State Postdoc Research
Exhibition (2020)

UCSB Earth Science Alumni Graduate Award for Research Excellence (2016, 2017)

UCSB Earth Science “Most Helpful Graduate Student” (2016, 2017)

UCSB Earth Science Undergraduates “Lifetime Achievement Award” (2017)

UCSB George Tunnell Award (2015)

UCSB Earth Sci. Award for Commitment to Excellence in Undergraduate Education (2014)

LPI Career Development Award (2011)

USGS/Dept. of Interior Star Award (2008)

UT/JSG Estwing Hammer Award (2008)

UT/JSG Dept. Honors, Senior Thesis (2008)

UT Folk/McBride Petrography Award (2006)

Ozarka Earth Science Scholarship (2005)

National Merit Scholarship (Finalist) (2004)

Chevron REACH Scholarship (2004-08)

Invited Talks/Field Trips

External

2025: Lafayette College, Easton, PA, USA

2024: Smithsonian Institution, Washington, DC, USA

Nittany Mineralogical Society, State College, PA, USA

2023: Department of Geosciences, Princeton University, USA

Centro de Geociencias, Universidad Nacional Autónoma de México, Queretaro, Mexico

2022: Department of Geological Sciences, University of Texas at Austin, USA

2021: Department of Earth and Environmental Sciences, University of Michigan, USA

Department of Geosciences, Boise State University, USA

Department of Earth and Space Sciences, University of Washington, USA

2020: Department of Geosciences, University of Arizona, USA

2019: Department of Earth and Environmental Sciences, University of Michigan, USA

Department of Earth and Planetary Science, Johns Hopkins University, USA

2018: Institut des Sciences de la Terre de Paris, Paris, France

Institute for Geosciences, Johannes Gutenberg Universität, Mainz, Germany

2017: Santa Barbara Museum of Natural History, Field Trip Leader or Co-Leader for 3 Field
Trips (Santa Ynez Mountains; Owens Valley; Joshua Tree NP)

Santa Barbara Museum of Natural History “Science Pub” Seminar

Santa Barbara Astronomical Unit, Monthly Meeting

2016: Department of Geology, Pomona College, USA

Internal

2024: Department of Geosciences, Penn State, USA (Geochemistry Forum)

2022: Department of Geosciences, Penn State, USA (Geochemistry Forum)

2021: Office of Postdoc Affairs, Penn State, USA (“How to give a lightning talk”)

2020: Department of Geosciences, Penn State, USA (Department Colloquium)

Department of Chemistry, Penn State, USA (“How to present to a general audience”)

2019: Office of Postdoctoral Affairs, Penn State, USA (Science Café Seminar)

2018: Department of Geosciences, Penn State, USA (Geochemistry Forum)

Service and Outreach

Journal Peer Reviewer: American Mineralogist, Chemical Geology, Contributions to Mineralogy and Petrology, EPSL, European Journal of Mineralogy, G-Cubed, GSA Bulletin, Geology, Geological Magazine, Geoscience Frontiers, Geosphere, Geostandards and Geoanalytical Research, Journal of Metamorphic Geology, JGR: Solid Earth, JPet, Lithos, Lithosphere, PNAS, Revista Mexicana de Ciencias Geológicas, Springer Nature Applied Sciences, Tectonics (n=43)

Ad-Hoc Proposal Reviewer: NSF EAR (n=4), Deutsche Forschungsgemeinschaft (n=1), American Chemical Society (n=1)

Session Convener: (*co-convener, **lead convener)

*Probing the continental lower crust using multidisciplinary approaches (2024 AGU)

*Secular changes in magmatism, metamorphism, and tectonics (2022 Goldschmidt)

*The Metamorphic Kitchen Sink (2021 AGU)

*Advances and Applications of In-situ Petrochronology and Thermochronology (2021 AGU)

**Multidisciplinary insights into tectonic and metamorphic processes at convergent margins (2020 AGU)

*Multidisciplinary insights into subduction zone processes (2018 Goldschmidt)

Department of Geosciences Representative for Earth and Mineral Sciences College Non-Tenure-Line Faculty Committee, Penn State (2023-2025)

Designed "Stories Trapped Underfoot" museum exhibit in Earth and Mineral Science Museum and Art Gallery (Penn State) (2023-2024)

Featured on NPR's All Things Considered ("Meet the mineral known as the time lord", 12/28/2022) and Shortwave ("Zircon: The Keeper Of Earth's Time", 01/10/2023)

Postdoc Representative on the Assessment of the Living, Learning, and Working Environment (ALLWE) Implementation Steering Committee for the College of EMS, Penn State (2019-20)

Search and Rescue Technician Level II Certification (NASAR) (2019-2022)

Wilderness First Aid (WFA) Certification (NOLS) (2022-2024)

Penn State Postdoc Society Hiking Coordinator (2018-2019), Council Member (2018-2021)

Penn State Postdoctoral Virtual Research Exhibition Co-Organizer (2020)

Frequent judge for student research presentations (e.g., Department, College, and University-Level Undergraduate and Graduate Research Exhibitions)

Weekly Volunteer Docent at Santa Barbara Museum of Natural History (2014-2017)

Member of UCSB Earth Science Graduate Program Committee (2015-2016)

Co-Organizer for UCSB Earth Science Graduate Alumni Career Panel (2014-2015)

Geology Representative for the UC-Davis Graduate Student Assembly (2009-2010)

UT Senate of College Councils Jackson School of Geosciences Representative (2006-2007)

UT Undergraduate Geological Society President (2006-2007) and Secretary (2005-2006)

Field Experience

San Salvador Island, Bahamas (1 week, 2005; carbonate sedimentology)

UT Austin Field Camp, western US (6 weeks, 2007; mapping, stratigraphy, volcanology, structural geology, met. petrology)

Harpwell Neck, Maine, US (1 week, 2007; metamorphic petrology)

Puna-Altiplano, Chile (1 week, 2008; structural geology, volcanology)

Sierra Madre Oriental, Mexico (3 months, 2008–2009; carbonate stratigraphy and mapping)

Otis Air Force Base, MA, US (3 months, 2009; hydrogeology)

Sierra de Pie de Palo, Argentina (6 weeks, 2010; metamorphic petrology, structural geology)

Death Valley, CA, US (1 week, 2010/1 week, 2011; carbonate stratigraphy, structure/tectonics)

Meteor Crater, AZ, US (1 week, 2010/1 week, 2011; impact crater structure)

UC-Davis Field Camp, Owens Valley, CA, US (3 weeks, 2011/3 weeks, 2012; carbonate strat., structure, mapping, volcanology)
Chilko-Chilcotin-Fraser River, BC, Canada (10 days, 2011; ecogeomorphology)
Grand Canyon, AZ, US (3 weeks, 2012; ecogeomorphology)
Semail Ophiolite, Oman/UAE (3 months total in 2013, 2017–2018; igneous/metamorphic petrology, geodynamics)
Western Gneiss Region, Norway (1 month, 2013; igneous/metamorphic petrology, structural geology, tectonics)
Myanmar (1 month, 2014; structural geology, metamorphic petrology, tectonics)
UCSB Field Camp, E. Nevada, USA (3 weeks, 2014; stratigraphy, structural geology, volcanology, tectonics)
various metamorphic core complexes, western US (1 week, 2014; volcanology, metamorphic petrology, structure, tectonics)
Bohemian Massif, Austria/Czech Republic (2 weeks, 2017; metamorphic petrology, tectonics)
Western Alps, France/Italy (3.5 weeks total in 2017–2019; metamorphic petrology, tectonics, geochemistry)
Schistes Lustrés, Corsica, France (2.5 weeks total in 2017–2018; metamorphic petrology, geochemistry, tectonics)
Ivrea-Verbano Zone, Italy (4 weeks total in 2018-19; igneous/metamorphic petrology, geochemistry, tectonics)
Central Alps, Austria/Switzerland/Italy (0.5 weeks in 2019 and 1 week in 2022; tectonics, metamorphic petrology, geochemistry)
Syros, Greece (1 week, 2019; metamorphic petrology, geochemistry, tectonics)
Trois Seigneurs Massif, French Pyrenees (1 week, 2019; metamorphic petrology, geochemistry, tectonics)
Bay of Islands Ophiolite, Newfoundland, Canada (2 weeks, 2023; metamorphic petrology, geochemistry, geochronology, tectonics)
+ numerous other single- to multi-day field trips around US and internationally

Languages

English: Fluent

Spanish: Intermediate Proficiency