

# MEGHAN R GUILD

Arizona State University  
School of Earth and Space Exploration

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## EDUCATION

- 2020 Ph.D. in Geology  
Arizona State University  
Advised by Christy B. Till  
Dissertation title: "Interactions Between Fluids, Melts, and Rocks in Subduction Zones"
- 2014 M.S. in Geology  
Arizona State University  
Advised by Richard L. Hervig  
Thesis title: "Boron Isotopic Composition of the Subcontinental Lithospheric Mantle"
- 2011 B.A. in Geological Sciences  
State University of New York at Geneseo

## PROFESSIONAL EXPERIENCE

- 2023-Present *Assistant Research Scientist, National Secondary Ion Mass Spectrometry Facility Laboratory Manger, School of Earth and Space Exploration, Arizona State University*
- 2022-2023 *Postdoctoral Research Scholar, School of Molecular Sciences, Navrotsky Eyring Center for Materials of the Universe, Arizona State University*
- 2022-2023 *Adjunct Professor, School of Earth & Sustainability, Northern Arizona University*
- 2020-2022 *National Science Foundation GeoPRISMS Postdoctoral Scholar, Jackson School of Geosciences, University of Texas at Austin*
- 2014-2020 *Graduate Research Assistant, Experimental Petrology and Igneous Processes Center, Arizona State University*
- 2012-2014 *Graduate Research Assistant, National Secondary Ion Mass Spectrometry Facility at Arizona State University*

## PUBLICATIONS

**Guild, M.**, Till, C., Mizukami, T., Wallis, S. (2020). Petrogenesis of the Higashi-Akaishi Ultramafic Body: Implications for lower crustal foundering and mantle wedge processes, *Journal of Petrology*. 61 (9) doi: 10.1093/petrology/egaa089

**Guild, M.** and Shock, E.L. (2020). Predicted Speciation of Carbon in Subduction Zone Fluids. In Carbon in Earth's Interior (eds C.E. Manning, J.-F. Lin and W.L. Mao). doi:10.1002/9781119508229.ch24

Iacovino, K., **Guild, M.R.** & Till, C.B. (2020). Aqueous fluids are effective oxidizing agents of the mantle in subduction zones, *Contributions to Mineralogy and Petrology* 175, 36 <https://doi.org/10.1007/s00410-020-1673-4>

## Manuscripts in Preparation

Guild, M.R., Hervig, R.L., Bell, D.R., *in prep*, Boron Isotopic Composition of Phlogopites in Lithospheric Mantle Xenoliths. *Chemical Geology*.

Guild, M.R., Barnes, J.D., *in prep (Summer 2023 submission)*, Carbon in the mantle lithosphere beneath the Colorado Plateau.

## AWARDS, HONORS & FELLOWSHIPS

2020	NSF GeoPRISMS Postdoctoral Fellowship
2019	ASU Graduate & Professional Student Association Travel Grant
2019	Science Education Resource Center & National Association of Geoscience Teachers Earth Educators Rendezvous Travel Grant
2018	ASU College of Liberal Arts and Sciences Student Leader
2018	ASU School of Earth & Space Exploration Outstanding Teaching Assistant
2018	ASU Inspirational Mentor at Sun Devil Fitness Center
2017	ASU College of Liberal Arts and Sciences Student Leader
2016	ASU Graduate & Professional Student Association Travel Grant
2016	Goldschmidt 2016 Yokohama, Japan, Student Volunteer

## CONFERENCE & WORKSHOP ACTIVITY

### Oral Presentations

- 2021 **Guild, M.R.**, Barnes, J.D., (2021), *Carbon & Oxygen Isotope Composition of Mantle Carbonates from The Navajo Volcanic Field (Colorado Plateau, USA)*, Geological Society of America Fall Meeting, Abstract #232-12 (talk) Portland, OR
- 2019 **Guild, M.R.**, Till, C.B., Hervig, R.L., Shock, E.L., Mizukami, T., Wallis, S., (2019), *Linking hydrous mineral chemistry to fluid speciation in the subduction channel*, American Geophysical Union Fall Meeting, San Francisco, CA.
- 2019 **Guild, M. R.**, Till, C., Mizukami, T., Wallis, S., (2019), *Preservation of Foundered Lower Crustal Cumulates in the Higashi-Akaishi Ultramafic Body, Japan*. Geological Society of America, Phoenix, AZ
- 2016 **Guild, M. R.**, Shock, E. L. (2016), *Stability of Aqueous Carbon Species in Subduction Zone Fluids*, American Geophysical Union Fall Meeting Abstract #V24A-08 (talk), San Francisco, CA.
- 2014 **Guild, M. R.**, Bell, D. R., Hervig, R. L. (2014), *Determination of the boron concentration and isotopic composition of the subcontinental lithospheric mantle by secondary ion mass spectrometry*, 6<sup>th</sup> International Orogenic Lherzolite Conference (talk), Marrakech, Morocco.

### Posters Presentations

- 2021 Riley, M., Segee-Wright, G., Barnes, J., **Guild, M.R.**, (2021), *Chlorine and Fluorine Abundances of Hydrous Minerals in Colorado Plateau Mantle Xenoliths: A Step Towards Quantifying the Mantle Halogen Budget*, American Geophysical Union Fall Meeting Abstract (poster), New Orleans, LA
- 2018 **Guild, M. R.**, Till, C. B., Mizukami, T., Wallis, S. (2018), *Petrogenesis of the Higashi-Akaishi Peridotite*, American Geophysical Union Fall Meeting Abstract #T21G-0301 (poster), Washington D.C.
- 2017 **Guild, M. R.**, and Till, C. (2017), *Developing a Hygrometer for Water-Undersaturated Lherzolite Melts*, American Geophysical Union Fall Meeting Abstract, #V11B-0346 (poster), New Orleans, LA.
- 2017 Hu, Y., **Guild, M. R.**, Naif, S., Eimer, M. O., Evans, O., Fornash, K., Plank, T. A., Shillington, D. J., Vervelidou, F., Warren, J. M., Weins, D. (2017), *A multidisciplinary approach to constrain incoming plate hydration in the Central American Margin*, American Geophysical Union Fall Abstract #T23A-0586 (poster), New Orleans, LA.

- 2015 **Guild, M. R.**, Till, C., Hervig, R., Wallis, S. (2015), *Boron Isotopic Compositions of High-Pressure Hydrous Phases from the Slab-Mantle Wedge Interface*, American Geophysical Union Fall Abstract #V43A-3096, San Francisco, CA.
- 2013 **Guild, M. R.**, Bell, D. R., Hervig, R. L. (2013), *Boron Isotopic Variation in the Subcontinental Lithospheric Mantle*, American Geophysical Union Fall Meeting Abstract #V53B-2782 (poster), San Francisco, CA.
- 2011 **Guild, M. R.**, Farthing, D. (2011), *Importance of X-Ray Analyses in Slag Studies at Clintonville New York, USA*, International Union of Crystallography XXII Congress and General Assembly Abstract #MS46.P07(poster), Madrid, Spain.

### **Session Co-Chair**

- 2017 Crystals: Microscale Archives of Macroscale Igneous Processes, American Geophysical Union Fall Meeting

### **Workshops Attended**

- 2022 Volatiles from Source to Surface: A GeoPRISMS Workshop, Bozeman, MT (May 23-26)
- 2021 MAC Short Course: Fluid and Melt Inclusions: Applications to Geologic Processes, virtual (October 30-31)
- 2019 Earth Educators Rendezvous, Nashville, TN  
*Preparing for an Academic Career (3 day)*  
*Adapting Active Learning Strategies in Your Courses (2 day)*
- 2018 GeoPRISMS Mini Workshop on Exterra: Evolution of Arc Crust, Washington, D.C.
- 2017 Subduction Zone Dynamics, Cooperative Institute for Dynamic Earth Research (CIDER), Berkeley, CA (June 19-July 22)
- 2017 ENabling Knowledge Integration (ENKI), Friday Harbor, WA
- 2017 Deep Carbon Observatory, Extreme Physics and Chemistry, Tempe, AZ
- 2016 Deep Carbon Observatory, Extreme Physics and Chemistry, Stanford, CA
- 2016 FESD: The Dynamics of Earth System Oxygenation All Hands Meeting, Arizona State University, Tempe, AZ

- 2015 MELTS Workshop, Cal Tech, Pasadena, CA
- 2015 High Resolution Electron Microscopy Winter School, Eyring Materials Center, Arizona State University, Tempe, AZ (Jan. 5-8)

## **TEACHING EXPERIENCE**

### **Arizona State University**

Igneous Petrology (Teaching Assistant, Fall 2013 & 2017)

Igneous Petrology (Guest Lectures, Fall 2017 & 2019)

Science Communication (Guest Lecture, Spring 2019)

*Course Work:* Scientific Teaching (Fall 2018), Learning Theories and Instructional Strategies (Fall 2018), Science Communications (Fall 2015)

### **SUNY Geneseo**

Physical Geology (Teaching Assistant, Fall 2009, 2010)

Geological History of Life (Teaching Assistant, Spring 2010)

Introductory Geology Lab (Teaching Assistant, Spring 2011)

Petrology (Teaching Assistant, Spring 2011)

## **STUDENT ADVISING**

### **Undergraduate Students**

Laura Arnold UT Austin Jackson School of Geosciences Honors Student, B.S., spring 2023, Co-advised by D.O. Breecker: *"Examining thermodynamic equilibrium between saponites, carbonates, and aqueous SiO<sub>2</sub> to investigate P<sub>CO2</sub> on an ancient warm, wet Mars"*

Matthew Riley UT Austin Jackson School of Geosciences Honors Student, B.S., spring 2022, starting M.S. at Colorado School of Mines in fall 2022, Co-advised by J.D. Barnes: *"Chlorite and Fluorine Abundances of Hydrous Minerals in Colorado Plateau Mantle Xenoliths: A Step Towards Quantifying the Mantle Halogen Budget"*

## LABORATORY EXPERIENCE

### I. Analytical & Experimental

- 2012-Present National Secondary Ion Mass Spectrometry (SIMS) Facility, Arizona State University (*trained on Cameca 6f use & maintenance, research assistant 2012-2014, occasional user 2015-2020, laboratory manager 2023*)
- 2022-2023 TherMotU Laboratory: Calorimetry, FTIR, XRD, Arizona State University, (*trained user of AlexSYS, Bruker Vertex FTIR ATR, Bruker D2 X-ray Diffractometer, training to use Micromeritics ASAP2020*)
- 2021- 2022 Visible Spectroscopy Laboratory at Virginia Tech, Visible Raman system (*trained user of JY Horiba LabRam HR800*)
- 2021- 2022 Fluid Inclusion Microscopy and Microthermometry Lab at Bureau of Economic Geology, University of Texas at Austin (*training for fluid inclusion analysis with heating/cooling stage*)
- 2021- 2022 Electron Microbeam Laboratories at University of Texas at Austin (*trained user of JEOL JXA-8200 with Probe for EPMA, occasional user of JEOL 6490 Low Vacuum SEM, occasional user of Bruker D8 Advance X-Ray Diffractometer*)
- 2021-2022 Mineral Physics Lab at University of Texas at Austin (*trained user of Renishaw inVia micro-Raman*)
- 2020-2022 Light Isotope Laboratory at University of Texas at Austin (*trained user of GasBench coupled to a Thermo MAT253 isotope ratio mass spectrometer, trained user of laser fluorination oxygen extraction line, training for thermal conversion elemental analysis*)
- 2014-2020 Experimental Petrology and Igneous Processes Center at Arizona State University (*trained in calibration, operation, & maintenance of Kennedy-style + Boyd-England-style end-loaded piston cylinder apparatuses and 1-atm gas-mixing furnace, trained in capsule fabrication using TIG-welder, quick press*)
- 2014-2020 Electron Microprobe Analyzer, Eyring Materials Center at Arizona State University (*trained user on JEOL JXA-8530F*)
- 2009-2011 XRF + XRD Lab, SUNY Geneseo (*trained user of Panalytical X-Pert Pro Powder X-ray Diffractometer and Panalytical Axios X-ray Fluorescence Spectrometer*)

### II. Sample-Based & Mechanical Skills

- 2020-Present microdrilling & dremel use, fluid inclusion analysis (use of petrologic microscope with heating/cooling stage, preparation of

thick sections, removal of thick section from glass slide, Raman analysis of fluid inclusions), foil capsule preparation for TC/EA analysis

- 2014-2020 rock crushing & mineral separation (tile saw, jaw crusher, wet sieve, Frantz magnetic separation), diamond wire saw (use & maintenance), slow speed saw (use & maintenance), mounting and polishing experimental run products (making epoxy mounts, use & maintenance of automatic polisher), limited experience with TEM mount preparation
- 2012-2014 machining (milling, lathe, drill press, band saw, sandblaster), epoxy mount making and polishing, limited experience with indium mount preparation
- 2009-2011 tile saw, thin section preparation, ball mill, pellet press, Katanax K1 fluxer, microbalance

### **III. Software-Based Skills**

*Interfacing with experimental apparatuses:* iTools, Eurotherm Temperature Controller, Rockland Research Pressure Holding System

*Interfacing with analytical instruments:* Probe for EPMA, JEOL EPMA Software, ISODAT, Topas, Windows®-based Raman Environment (WiRE), LabSpec

*Modeling geologic systems:* EQ3/6, CHNOSZ, Deep Earth Water Model (DEW), Perple\_X, WORM Portal, ENKI Portal, MELTS

*Programming languages:* R, bash/shell scripting, Python, MatLab

*Other Software:* Microsoft Suite, Adobe Suite, OriginPro, ImageJ, Aabel, KaleidaGraph, Nikon & Zeiss Imaging Software

## **PROFESSIONAL SERVICE**

### **I. At Arizona State University**

- 2017-2020 Volunteer Group Fitness Instructor, Sun Devil Fitness Center
- 2014-2018 School of Earth and Space Exploration Graduate Council, Positions held: Recruitment Co-Chair, Vice President, President (2 years)
- 2016 Graduate & Professional Student Association (GPSA), Office of Wellness Volunteer

2015-2016 Sun Devil Fitness Center Board of Governors, GPSA Representative

## II. Public Engagement

2015, 2016, 2018 ASU Earth and Space Exploration Day—*department-wide event designed for participants of all ages. Helped facilitate a variety of demonstrations to teach about volcanoes and Earth's interior.*

2018, 2019 ASU Open Door—*campus-wide event designed for participants of all ages. Helped facilitate a variety of demonstrations to teach about volcanoes and Earth's interior.*

## III. Editorial & Review

2019-Present Manuscripts reviewed for: *Contributions to Mineralogy and Petrology • Frontiers in Earth Sciences • Geochimica et Cosmochimica Acta • Geochemistry, Geophysics, Geosystems • International Geology Review • Journal of Geophysical Research • Journal of Petrology • Earth and Planetary Science Letters*  
Proposals reviewed for: NASA ROSES

## IV. Professional Society Membership

2019-Present National Association of Geoscience Teachers

2019-Present Geological Society of America

2012-Present American Geophysical Union