Michelle Muth

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EDUCATION

2021	*Ph.D. Earth Science*, University of Oregon, Eugene, OR Research advisor: Paul Wallace Dissertation: Sulfur Cycling in the Southern Cascade Arc: Implications for the Sulfur Content, Metal Content, and Oxidation State of Arc Magmas
2015	*B.S. Earth Science*, Rice University, Houston, TX Research advisor: Rajdeep Dasgupta Distinction in Research and Creative Work Thesis: The effect of variable Na/K on CO_2 solubility in slab-derived rhyolitic melts

PROFESSIONAL APPOINTMENTS

Beginning 2023	*Assistant Professor,* University of Washington
2021- present	*Peter Buck Postdoctoral Fellow*, Smithsonian National Museum of Natural History
2016- 2021	*Graduate Researcher*, University of Oregon
2020	*GRIP Fellow,* Smithsonian National Museum of Natural History
2019	*Lead Instructor*, Sternberg Museum of Natural History Science
2015- 2016	*Geoscientist*, AECOM Philadelphia Area Remediation Services Group
2013- 2015	*Undergraduate Researcher*, Rice University Experimental Petrology Group
2013	*NSF-REU Intern*, University of Minnesota Institute for Rock Magnetism

PUBLICATIONS

In Review	**Muth, M.J.,** Cottrell, E. No detectable redox exchange between sulfur and iron during rapid cooling of basalts. *Earth and Planetary Science Letters.*

2022 **Muth, M.J.,** Wallace, P.J. Sulfur recycling in subduction zones and the oxygen fugacity of mafic arc magmas. *Earth and Planetary Science Letters.*

2021 Lerner, A.H., **Muth, M.J.,** Wallace, P.J., Lanzirotti, A., Newville, M., Gaetani, G. A., Chowdhury, P., Dasgupta, R. Improving the reliability of Fe- and S-XANES measurements in silicate glasses: correcting beam damage and identifying Fe-oxide nanolites in hydrous and anhydrous melt inclusions. *Chemical Geology,* 586, 120610.

2021 **Muth, M.J.,** Wallace, P. J. Slab-derived sulfate generates oxidized basaltic magmas in the southern Cascade arc (California, USA). *Geology,* 49, 1177-1181.

2021 Rose-Koga, E.F., Bouvier, A.-S., Gaetani, G.A., Wallace, P.J., Allison, C.M., Andrys, J.A., Angeles de la Torre, C.A., Barth, A., Bodnar, R.J., Bracco Gartner, A.J.J., Butters, D., Castillejo, A., Chilson-Parks, B., Choudhary, B.R., Cluzel, N., Cole, M., Cottrell, E., Daly, A., Danyushevsky, L.V., DeVitre, C.L., Drignon, M.J., France, L., Gaborieau, M., Garcia, M.O., Gatti, E., Genske, F.S., Hartley, M.E., Hughes, E.C., Iveson, A.A., Johnson, E.R., Jones, M., Kagoshima, T., Katzir, Y., Kawaguchi, M., Kawamoto, T., Kelley, K.A., Koornneef, J.M., Kurz, M.D., Laubier, M., Layne, G.D., Lerner, A., Lin, K.-Y., Liu, P.-P., Lorenzo-Merino, A., Luciani, N., Magalhães, N., Marschall, H.R., Michael, P.J., Monteleone, B.D., Moore, L.R., Moussallam, Y., **Muth, M.,** Myers, M.L., Narváez, D.F., Navon, O., Newcombe, M.E., Nichols, A.R.L., Nielsen, R.L., Pamukcu, A., Plank, T., Rasmussen, D.J., Roberge, J., Schiavi, F., Schwartz D., Shimizu, K., Shimizu, K., Shimizu, N., Thomas, J.B., Thompson, G.T., Tucker, J.M., Ustunisik, G., Waelkens, C., Zhang, Y., Zhou, T. Silicate melt inclusions in the new millennium: A review of recommended practices for preparation, analysis, and data presentation. *Chemical Geology*, 570, 120145.

2020 **Muth, M.,** Duncan M.S., Dasgupta, R. The Effect of Variable Na/K on CO_2 Solubility in Slab-Derived Rhyolitic Melts. *Carbon in Earth's Interior AGU Monograph,* 195-208*.*

2014 Frahm, E., Feinberg, J. M., Schmidt-Magee, B.A., Wilkinson, K., Gasparyan, B., Yeritsyan, B., Karapetian, S., Meliksetian, K., **Muth, M.,** and Adler D.S. Sourcing geochemically identical obsidian: multiscalar magnetic variations in the Gutansar volcanic complex and implications for Palaeolithic research in Armenia, *Journal of Archaeological Science,* 47, 164-178.

GRANTS AND FELLOWSHIPS

2021 Peter Buck Postdoctoral Fellowship, *Smithsonian NMNH*

2021 User Beamtime Award*, Argonne National Laboratory*

2020 Graduate Research Intern Program Award, *National Science Foundation*

2019	User Beamtime Award, *Argonne National Laboratory*
2018	Graduate Research Fellowship, *National Science Foundation*
2016	First Year Graduate Student Fellowship, *University of Oregon*

HONORS

2021	Research Recognition Award, *University of Oregon*
2021	Smith Scholarship, *University of Oregon*
2019	Warren DuPre Smith Research Award, *University of Oregon*
2018	Geology Emeritus Research Award, *University of Oregon*
2015	Torkild Rieber Award in Earth Science, *Rice University*
2013	Eugen Merten Memorial Prize in Geology and Geophysics, *Rice University*
2013	Chevron Earth Science Minority Scholarship, *Rice University*

INVITED PRESENTATIONS

2023	Lamont-Doherty Earth Observatory; Princeton University
2022	SZ4D Community Meeting; University of Wisconsin; Johns Hopkins University; GeoPrisms Volatiles Source to Surface Workshop; USGS Volcano Science Center; University of Wisconsin Madison
2021	University of Pittsburgh
2020	Carnegie Science Earth and Planets Laboratory; Smithsonian National Museum of Natural History, Dept. of Mineral Sciences; International Volcanology Seminar *(Collaborative Virtual Seminar Series)*

CONFERENCE PRESENTATIONS

2022	**Muth, M.**, Wallace, P.J. The effect of slab-derived sulfate on the sulfur content and oxygen fugacity of basaltic magmas in the southern Cascade arc. *Goldschmidt 2022 Conference, Honolulu, HI, 10-15 July.* **(*invited*).**
2021	**Muth, M.**, Wallace, P.J. The Influence of Slab-Derived Sulfur on the Metal Contents of Arc Magmas in the Southern Cascades. *AGU 2021 Fall Meeting, New Orleans, LA, 13-17 December.*

2021 **Muth, M.**, Wallace, P.J. Slab-Derived Sulfate and Oxidized Magmas in the Southern Cascade Arc. *AGU 2021 Fall Meeting, New Orleans, LA, 13-17 December.*

2020 **Muth, M.**, Wallace, P.J. Insights into global sulfur cycling from the melt inclusion record. *AGU 2020 Fall Meeting, Virtual, 1-17 December.* **(*invited*).**

2020 **Muth, M.**, Wallace, P.J. The influence of slab-derived sulfur on the sulfur content and oxidation state of arc magmas in the Southern Cascades. *AGU 2020 Fall Meeting, Virtual, 1-17 December.*

2020 Lerner, A., **Muth, M.**, Wallace, P.J., Lanzirotti A., Newville, M., Gaetani, G., Chowdhury, P., Dasgupta, R. Correcting Fe- and S-XANES Beam Damage and Recognizing Rapid Redox Equilibration of Olivine-Hosted Melt Inclusions. *Goldschmidt Conference, Virtual, 21-26 June.*

2020 **Muth, M.**, Wallace, P.J. Tracking Slab-Derived Sulfur and its Effect on Magma Oxidation State in the Southern Cascades. *Goldschmidt Conference, Virtual, 21-26 June.*

2019 **Muth, M.**, Wallace, P.J., Gaetani, G.A. Drawing connections between slab-derived sulfur, mantle melting, and arc magma oxidation state: A case study in the southern Cascades. *AGU 2019 Fall Meeting, San Francisco, CA, 9-13 December.*

2019 **Muth, M.,** Wallace, P.J. How does slab-derived sulfur affect magma redox in the southern Cascades? Insights from the melt inclusion record. GSA *Cordilleran Section-115th Annual Meeting, Portland, OR, 15-17 May.*

2018 **Muth, M.**, Wallace, P.J. Insights into Arc Magma Volatile Cycling and Oxidation State from Global Sulfur Trends. *AGU 2018 Fall Meeting, Washington, DC, 10-14 December.*

2017 **Muth, M.**, Wallace, P.J., Walowski, K.J. The Role of Hydrous Slab Melts in the Sulfur Content, Metal Content, and Oxidation State of Primitive Arc Magmas in the Southern Cascades. *AGU 2017 Fall Meeting, New Orleans, LA, 11-15 December.*

2017 Harvey, K.M., Perry-Houts J., Domino J., **Muth M**., Carruthers S., Kotowski A.J., DeGrandpre K., Faul, U., Kent, A.J., Abers, G.A., Krawczynksi, M. The ins and outs of mélange diapirs: a multidisciplinary approach to formation, ascent, and observation. *AGU 2017 Fall Meeting, New Orleans, LA, 11-15 December.*

2014 **Muth, M.**, Duncan, M. S., Dasgupta, R. Effect of variable Na/K ratio on CO_2 solubility in slab-derived rhyolitic melts- An experimental study. *AGU 2014 Fall Meeting, San Francisco, CA, 15-19 December.*

Field Experience

2019	*Lassen Volcanic Area, CA* Field sampling of tephra deposits with high school students during a two-week volcanology field course.
2018	*Trinity Ophiolite, CA* Field trip with the University of Delaware Mantle Processes group for 3 days in the Trinity Ophiolite.
2018	*Santorini, Greece* Field trip focusing on the volcanic deposits on the island of Santorini and deformation structures associated with the neotectonics of the surrounding region.
2017	*Lassen Volcanic Area, CA* Sample collection of tephra deposits at selected cinder cones, targeting deposits likely to contain rapidly quenched primitive melt inclusions.
2017	*Long Valley Caldera, CA* Sample collection of inter-layered ignimbrite and fall deposits.

Teaching Experience

2019	*Lead Instructor, Fort Hays State University Museum of Natural History* Designed the curriculum for a newly introduced two-week field volcanology course for high school based in the Pacific Northwest. Lead instructor for the field course, assisted by an undergraduate student TA.
2017-2018	*Teaching Assistant, University of Oregon* GEOL 202: Earth Surface and Environment Primary responsibilities included facilitating lab section activities, grading lab section homework assignments and quizzes. GEOL 331: Mineralogy Primary responsibilities included teaching and facilitating lab section, grading, and designing laboratory section midterm and final exams.

Research Techniques

Fourier Transform Infrared Spectroscopy (FTIR)
Electron Microprobe (EPMA)
X-Ray Absorption Near Edge Structure (XANES)
Laser Ablation ICP-MS
Secondary Ion Mass Spectrometry (SIMS)
End-loaded Piston Cylinder Apparatus
MATLAB, Python

Melt inclusion preparation and analysis

Professional Activities

2022	SZ4D Community Workshop *Houston, TX*
2022	GeoPrisms Volatiles Source to Surface Workshop *Bozeman, MT*
2019	GeoPrisms Synthesis and Integration Theoretical and Experimental Institute *San Antonio, TX*
2018	Thermodynamic modeling with alphaMELTS and other MELTS software Workshop *Caltech, CA*
2018	Annual Workshop in Secondary Ion Mass Spectrometry *University of Arizona, AZ*
2018	Mineral-Hosted Melt Inclusions Workshop *Woods Hole Oceanographic Institution, MA*
2017	CIDER (Cooperative Institute for Dynamic Earth Research) *University of California Berkeley, CA* Participated in collaborative research effort: "The ins and outs of mélange diapirs: a multidisciplinary approach to formation, ascent, and observation". Presented results at 2017 AGU Fall meeting.

Outreach Activities

2022	*Newsletter Feature, Smithsonian National Museum of Natural History* Wrote a description of mantle xenolith research for the volunteer newsletter for the museum's Hall of Geology, Gems, and Minerals.
2020	*"Expert Is In", Smithsonian National Museum of Natural History* Led a 2-hour interactive public discussion on museum floor around the theme "The Many Faces of Sulfur".
2016-2019	*"Mad Duck" Science Outreach Program, University of Oregon* Organized and lead several 4-hour long science outreach modules for local middle school students through NSF-funded 'Mad Duck' program. Facilitated module design collaborations between Mad Duck and other graduate student organizations. Module design for Oregon paleontology is still in use.

PROFESSIONAL SERVICE

2022	*Session Convener, AGU Fall Meeting* "Volatile Cycling in Subduction Zones: A Holistic Approach from Slab to Surface"
2022	*Eos Science Advisor, Volcanology Petrology Geochemistry*
2022	*Member, Unlearning Racism in Geoscience (URGE) pod* *Smithsonian National Museum of Natural History*
2020	*Session Convener, AGU Fall Meeting* "Constraining Petrological and Geochemical Variations in Magmas to Capture the Evolution of Volcanoes over Space and Time"
2019	*Session Convener, Cordilleran Section GSA Annual Meeting* "Crystal Windows into Igneous Processes"
2017-2021	*Board Member, CMiS (Community for Minorities in STEM)* *University of Oregon* UO CMiS is a graduate student organization dedicated to helping minority graduate students in STEM succeed through professional workshops, social and networking events, and community building activities. Elected Social and Outreach Chair 2017-2018, Seminar Chair 2018-2019 and Vice President 2019-2021.
2018-2021	*Organizing Team, IgDEAS (Inclusivity and Gender Diversity in Earth and Atmospheric Science)* *University of Oregon* The mission of IgDEAS is to provide geoscience-specific professional and social support to women and non-binary researchers and students at the University of Oregon. Co-founded in 2018.

Volunteer Reviewer for manuscript contributions to *Geology, Nature Communications, American Mineralogist, Journal of Petrology, Earth and Planetary Science Letters, Contributions to Mineralogy and Petrology*