Michelle Muth

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Department of Earth Sciences

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Professional Experience

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| 2016- Present | *Graduate Researcher*, University of Oregon |
| 2020 | *GRIP Fellow,* Smithsonian National Museum of Natural History |
| 2019 | *Lead Instructor*, Sternberg Museum of Natural History Science Camps |
| 2015- 2016 | *Geoscientist*, AECOM, Philadelphia Area Remediation Services Group |
| 2014 | *Outdoor Education Instructor,* Texas Parks and Wildlife Department |
| 2013- 2015 | *Undergraduate Researcher*, Rice University Experimental Petrology Group |
| 2012- 2015 | *Student Consultant*, Rice University Center for Communication |
| 2013 | *NSF-REU Intern*, University of Minnesota Institute for Rock Magnetism |

Education

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| 2021 *(expected)* | *Ph.D. Earth Science*, University of Oregon, Eugene, OR  Research advisor: Paul Wallace |
| 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 CO2 solubility in slab-derived rhyolitic melts |
| 2013 | Sea Education Association, Woods Hole, MA  6 weeks oceanography coursework, 6 weeks at sea in Eastern Pacific  Research Project: Effect of Low pH on the Growth of Phytoplankton in the Eastern Pacific Ocean |

Publications

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| In Revision | 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.* |
| In Press | **Muth, M. J.**, Wallace, P.J. Slab-derived sulfate generates oxidized basaltic magmas in the Southern Cascades arc. *Geology.* |
| 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 CO2 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. |
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Honors and Awards

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| 2019 | Argonne National Laboratory User Beamtime Award |
| 2019 | Warren DuPre Smith Research Award |
| 2018 | Geology Emeritus Research Award |
| 2017 | NSF Graduate Research Fellowship |
| 2017 | Geology Emeritus Tribute Award |
| 2016 | University of Oregon First Year Graduate Student Fellowship |
| 2016 | Eugene Cota-Robles Fellowship *(Declined)* |
| 2015 | Torkild Rieber Award in Earth Science |
| 2013 | Eugen Merten Memorial Prize in Geology and Geophysics |
| 2013 | Chevron Earth Science Minority Scholarship |

Invited Seminar Presentations

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| 2020 | Carnegie Science Earth and Planets Laboratory |
| 2020 | Smithsonian National Museum of Natural History, Dept. of Mineral Sciences |
| 2020 | International Volcanology Seminar *(Collaborative Virtual Seminar Series)* |

Conference Presentations

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| 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, Washington D. C., 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. *Cordilleran Section-115th Annual Meeting, 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 D. C., 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.* |
| 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 CO2 solubility in slab-derived rhyolitic melts- An experimental study. *AGU 2014 Fall Meeting, San Francisco, CA, 15-19 December.* |

Field Experience

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| 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. |

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

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| 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) Summer Program  *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

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| 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

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| 2017-current | *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-current. |
| 2018-current | *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 at the University of Oregon. Co-founded in 2018. |
| 2020 | *Manuscript Reviewer, Geology* |
| 2019 | *Session Convener, Cordilleran Section GSA Annual Meeting*  “Crystal Windows into Igneous Processes” |