AMY R. SMITH
Assistant Professor of Biology
Department of Science, Math, and Computing
Bard College at Simon's Rock
Great Barrington, MA
Phone: (503) 283-0843
Email: asmith@simons-rock.edu
smithastrobiolab.org
astro-mon.com
She/her

EDUCATION

Ph.D. Ocean, Earth, and Atmospheric Sciences
College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, 2018
"Microbial Ecology and Function of Mineral-Colonizing Communities in the Sub-oceanic Aquifer Ecosystem"
Advisors: Martin Fisk and Frederick Colwell

M.S. Biology
Portland State University, 2011
"*Subsurface Igneous Mineral Microbiology: Iron-Oxidizing Organotrophs on Olivine Surfaces and the Significance of Mineral Heterogeneity in Basalts"*
Advisor: Radu Popa

B.S. Biology
University of Texas at Arlington, 1995

A.A. Natural Science
Tyler Junior College, 1993

PROFESSIONAL EXPERIENCE

Current Positions

- ***Assistant Professor of Biology,*** **Bard College at Simon's Rock, 2021 - present**
- ***Guest Investigator*****, Woods Hole Oceanographic Institution, 2021 – present**
- ***NASA Science Explorer (SciX) Advisory Board,*** **Center for Astrophysics at Harvard & Smithsonian, Cambridge, MA, 2025 - 2028**
- ***Peerside Mentor,*** **Florida Institute of Oceanography, 2025 – 2026**
  "Microbiology of Methane Seeps in the Gulf of Mexico"

Former Positions

Research Scientist, Marine Biological Laboratory, 2021
- *Stable Isotope Probing of Coastal Marsh Microcosms*
- Advisors: Joe Vallino and Julie Huber

Postdoctoral Investigator, Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, 2018 – 2020
- *NASA PSTAR: Deep-Sea Hydrothermal Vents as Ocean World Analogues*
- Advisor: Julie Huber

Graduate Teaching Assistant, Functional Anatomy of the Human Muscular System, OSU, 2017

Graduate Teaching Assistant, Introduction to Human Anatomy and Physiology Lab, OSU, 2015 – 2017

C-DEBI *Graduate Fellow*, OSU, 2012 – 2014
Graduate Research Assistant, Fisk and Colwell Labs, OSU, 2011 – 2012
Graduate Teaching Assistant, Microbiology Lab, PSU, 2007 – 2011
Graduate Research Assistant, Popa Lab, PSU, 2007 – 2011
Research Associate, Biophysics and Molecular Genetics, UT Southwestern Medical Center, 1998 – 2007
Mammal Keeper, Dallas Zoo, 1996 – 1997

PUBLICATIONS

Stern, J.C., H.V.Graham, B. Burcar, E.S. Martin, A. Noell, K. Hand, J. Bowman, P. Doran, V. Edgcomb, J.F. Holden, A.E.G. Howells, T. Hurford, M.J. Malaska, B.L. Nunn, J. Radebaugh, L.E. Rodriguez, S. Borges, D. Bower, S. Courville, M. Diaz, B. Hockman, J. Huber, J. Lawrence, T. Vick-Majors, C. Nixon, J.R. Spear, A. Steckel, A. Solomonidou, N. Schmerr, B. Schmidt, M.O. Schrenk, L. Seyler, **A.R. Smith**, C.C. Walker, P. Whelley, N. Wolfenbarger, and S. Vance (in review), A Comprehensive Framework for Assessing Terrestrial Analogue Field Sites for Ocean Worlds, *Journal of Geophysical Research: Planets*.

Hu, S.K., **A.R. Smith**, R. Anderson, S.P. Sylva, M. Setzer, M. Steadmon, K. Frank, E. Chan, D. Lim, C.R. German, J. Brier, S.Q. Lang, D. Butterfield, C. Fortunato, J. Seewald, and J.A. Huber (2023), Globally-distributed microbial eukaryotes exhibit endemism at deep-sea hydrothermal vents, *Molecular Ecology* 32(23): 6580 – 6598. https://doi.org/10.1111/mec.16745.

Smith, A.R., R. Mueller, M.R. Fisk, and F.S. Colwell (2021), Ancient metabolisms of a thermophilic subseafloor bacterium, *Frontiers in Microbiology* 12*;* https://doi.org/10.3389/fmicb.2021.764631

Hu, S.K., E.L. Herrera, **A.R. Smith**, M.G. Pachiadaki, V.P. Edgcomb, S.P. Sylva, E.W. Chan, J.S. Seewald, C.R. German, and J.A. Huber (2021), Protistan grazing impacts microbial communities and carbon cycling at deep-sea hydrothermal vents, *PNAS* 118 (29) e2102674118; https://doi.org/10.1073/pnas.2102674118.

Milesi, V., E. Shock,T. Ely, M. Lubetkin, S.P. Sylva, Z. Miramalek, J.A. Huber, **A.R. Smith**, S. Kobs Nawotniak, C.R. German, and D.S.S. Lim (2020), Forward geochemical modeling as a guiding tool during exploration of Sea Cliff Hydrothermal Field, Gorda Ridge, *Planetary and Space Exploration*.

Smith, A.R., B. Kieft, R. Mueller, M.R. Fisk, O.U. Mason, R. Popa, and F.S. Colwell (2019), Carbon fixation and energy metabolisms of a subseafloor olivine biofilm, *ISME J* 13(1737–1749), DOI: 10.1038/s41396-019-0385-0.

Smith, A.R., M.R. Fisk, A.R. Thurber, G.E. Flores, O.U. Mason, R. Popa, and F.S. Colwell (2017), Deep crustal communities of the Juan de Fuca Ridge are governed by mineralogy, *Geomicrobiology* 34:2(147 – 156), DOI: 10.1080/01490451.2016.1155001.

Popa, R., **A.R. Smith**, R. Popa, J. Boone, and M.R. Fisk (2012), Olivine-respiring bacteria living in Mars-Like conditions at the rock-ice interface in a lava tube ice cave, *Astrobiology* 12:1 (9-18).

Smith, A.R., R. Popa, M.R. Fisk, M. Nielsen, C.G. Wheat, H W. Jannasch, A.T. Fisher, K. Becker, S.M. Sievert, and G.E. Flores (2011), *In situ* enrichment of ocean crust microbes on igneous minerals and glasses using an osmotic flow-through device, *Geochemistry, Geophysics, Geosystems*, 12:6, Q06007, doi:10.1029/2010GC003424.

Cortés, V.A., D.E. Curtis, S. Sukumaran, X. Shao, V. Parameswara, S. Rashid, **A.R. Smith**, J. Ren, V. Esser, R.E. Hammer, A.K. Agarwal, J.D. Horton, and A. Garg (2009), Molecular mechanisms of hepatic steatosis and insulin resistance in the AGPAT2-deficient mouse model of congenital generalized lipodystrophy, *Cell Metabolism* 9:2 (165 – 176).

MANUSCRIPTS IN PREP

A.R. Smith, E. Trembath-Reichert, V. Milesi, E. Shock, T. Ely, J.S. Seewald, E. Chan, J. Brier, Z. Miramalek, M.J. Miller, T. Cohen, N.A. Raineault, B. Alanis, S. Kobs Nawotniak, C.R. German, D.S.S. Lim, and J.A. Huber (in preparation) Where Land Meets Sea: An Ephemeral Deep-Sea Hydrothermal System Supports Chemosynthetic Life on a Kīlauea Lava Delta.

NON-REFEREED PUBLICATIONS

Lim, Darlene S.S., N.A. Raineault, B. Alanis, J.A. Brier, E. Chan, D. Emerson, A. Garcia, C.R. German, J.A. Huber, S. Kobs Nawotniak, V.Milesi, A. Shields, E. Shock, **A.R. Smith**, J.S. Seewald, E. Trembath-Reichert, Z. Miramalek, M.J. Miller, T. Cohen, D. Lees, and M. Deans (2019), SUBSEA 2018 Expedition to the Lō`ihi Seamount, Hawai'i, *Oceanography.* 32(1), supplement. Pages 48 - 49.

Lim, Darlene S.S., N.A. Raineault, J.A. Brier, E. Chan, J. Chernov, T. Cohen, M. Deans, A. Garcia, C.R. German, M. Hauer, S. Hu, J.A. Huber, R. Kane, S. Kobs Nawotniak, D. Lees, J. Lowe, M. Lubetkin, L. Marsh, V. Milesi, M. Miller, Z. Miramalek, M. Saunders, K. Sharif, A. Shields, E. Shock, **A.R. Smith**, and S. Sylva (2020), SUBSEA 2019 Expedition to the Gorda Ridge, *Oceanography* 33(1), supplement Pages 36 – 37.

FUNDING

Peerside Mentorship ($3000), 2025 – 2026

Faculty Development Fund Award ($1250 each), Fall 2021, Spring 2022, Spring 2023, Fall 2023, Spring 2024, Winter 2025

Europa *In Situ* Science and Instrumentation Workshop for the Exploration of Europa and Ocean Worlds Travel Award, 2021

Graduate Student Travel Award, OSU ($5000), 2016

Oregon Lottery Graduate Scholarship ($2550), 2016

Chipman-Downs Memorial Fellowship ($2400), 2016

Training Grant Extension Fellowship, OSU Graduate School ($3969), 2014

Student Advisory Committee ($300), student travel funding for AGU Fall Meeting 2013

NASA Astrobiology Institute Scholarship for International Astrobiology Summer School, Santander, Spain, 2013

Census of Deep Life/Deep Carbon Observatory Supplementary Research Grant, "Metagenomic Sequencing of Low Diversity Microbial Communities Colonizing Olivine Incubated in the Oceanic Crust", Principal Investigators: A.R. Smith, O.U. Mason, M.R. Fisk, F.S. Colwell, and R. Popa, 2013.

Graduate Laurels Scholarship, OSU Graduate School ($5832), 2012

Student Advisory Committee ($500), student travel funding for DEBI RCN, 2012

Census of Deep Life/Deep Carbon Observatory Research Grant, "Proposal to apply 454-based tag sequencing technology to igneous minerals incubated for four years in the ocean crust", Principal Investigators: R. Popa, A. R. Smith, M. R. Fisk, and O. U. Mason, 2011.

Center for Dark Energy Biosphere Investigations (C-DEBI) Research Grant ($50,000), "Genetic diversity and distribution of microbes colonizing igneous minerals and glasses incubated in IODP Hole 1301A on the eastern flank of the Juan de Fuca Ridge", Principal Investigators: R. Popa, A. Smith, G. Flores, and M. Fisk, 2011

Cave Research Foundation Grant ($1500), "Mineral Weathering of Lava Tubes: Iron-Oxidizing Bacteria and the Search for Life on Mars", Principal Investigators: A. Smith and R. Popa, 2008.

HONORS, AWARDS, AND FELLOWSHIPS

Center for Dark Energy Biosphere Investigations Grad. Res. Fellow, 2012 – 2014

Outstanding Teacher Award, 2009

University Presidential Scholarship, 1991 – 1993
Honor Graduate, 1993
David Ross Memorial Scholarship, 1991

COURSES TAUGHT

College:
BIO 219 Astrobiology (2)
BIO 317 Life in Extreme Environments (1)
BIO 326 Microbiology with Lab (2)
BIO 201 Cell and Molecular Biology with Lab (4)
BIO 223 Marine Biology (2)
BIO 331 Neurobiology with Lab (2)
BIO 100 Introduction to Biology with Lab (2)
BIO 334 Genetics: Genes and Genomes (1)
Academy (High School College Prep):
BIO 01A Biology: Evolution of Life on Earth (2)
Lab-Assisted Courses:
Microbiology (200 and 400 level; 4)
Human Anatomy & Physiology (200 level; 11)
Functional Anatomy of the Human Muscular System (3-400 level; 1)

INVITED TALKS & SEMINARS

SUBSEA Analogs of Ocean Worlds, NASA Ames Astrobiology Group Seminar, CA, 2019.
Role of the Ancient Wood-Ljungdahl Pathway in a Subseafloor Olivine Biofilm, *MIT COG3 Seminar*, Cambridge, MA, 2019.
Microbial Ecology and Function of Igneous Mineral Biofilms in the Suboceanic Aquifer Ecosystem, *Marine Chemistry & Geochemistry Seminar*, Woods Hole Oceanographic Institution, Woods Hole, MA, 2019.
Role of the Ancient Wood-Ljungdahl Pathway in a Subseafloor Olivine Community, *C-DEBI Annual Meeting*, Marina, CA, 2018.
Functional metagenomes of minerals in the suboceanic aquifer ecosystem, *C-DEBI Annual Meeting*, Marina, CA, 2014.

CONTRIBUTED ORAL PRESENTATIONS

Where Land Meets Sea: An Ephemeral Microbial Community Supported by a Submarine Lava Flow, *Astrobiology Science Conference*, 2022.
Colonization of a freshly erupted submarine lava delta from Kilauea Volcano, Hawaii, *C-DEBI Annual Meeting*, virtual, 2020.
Analogs of Ocean Worlds in the Pacific, WHOI Postdoc Symposium, Woods Hole Oceanographic Institution, Woods Hole, MA, 2019.
Lo'ihi Seamount: A Window to Ocean Worlds, *Astrobiology Science Conference*, Bellevue, WA, 2019.
Prevalence of the ancient Wood-Ljungdahl pathway in a subseafloor olivine community, *Ocean Worlds*, Lunar and Planetary Institute, Houston, TX, 2018.
Genomic evidence for the WoodLjungdahl pathway for carbon fixation in warm basaltic ocean crust, *2016 AGU Fall Meeting*, San Francisco, CA, 2016.
Functional metagenomes of minerals in the suboceanic aquifer ecosystem, *International Symposium on Subsurface Microbiology,* Pacific Grove, CA, 2014.
A comparison of microbial communities from deep igneous crust*, 2013 AGU Fall Meeting*, San Francisco, CA, 2013.
Life in Deep Ocean Crust, *NSF STC Directors Meeting,* Portland, OR, 2013.

Inca City, Mars: Biosignatures and probe development for life detection*, NASA International Astrobiology Summer School*, Santander, Spain, 2013.

Microbial communities colonizing igneous phases in deep ocean crust, *Deep Carbon Observatory: Deep Life Meeting***,** Portland, OR, 2013.

Microbial Communities in Deep Ocean Crust, *CEOAS Student Seminar*, Corvallis, OR, 2012.

Microbial mediation of olivine dissolution: the role of iron-oxidizing bacteria in the formation of microchannels, *Astrobiology Graduate Conference*, SETI Institute, San Jose, CA, 2008.

POSTER PRESENTATIONS

Lo'ihi Seamount: A Window to Ocean Worlds, C-DEBI Annual Meeting, CA, 2019.

Carbon and energy metabolisms of an olivine biofilm community in a thermal suboceanic aquifer, *NE Geobiology Conference*, Woods Hole Oceanographic Institution, Woods Hole, MA, 2018.

Functional metagenomics of igneous minerals incubated in the suboceanic aquifer, *Deep Carbon Observatory Summer School*, Big Sky, MT, 2014.

Olivine bioweathering in a simulated oceanic crustal aquifer, *C-DEBI Annual Meeting*, Marina, California, 2013.

Subsurface Life: What can DNA tell us?, *daVinci Days,* Corvallis, OR, 2012.

Assessing the Oceanic Crustal Biosphere, C-DEBI All-Hands Meeting, Marina, CA, 2012.

Microbial Diversity of Subseafloor Igneous Minerals and Glasses, DEBI RCN Meeting, Bremen, Germany, 2012.

Variability in microbial communities attached to igneous minerals and glasses incubated in deep ocean crust*, AGU Fall Meeting*, San Francisco, CA, 2012.

Basalt mineral oxidation by ocean crust bacteria, *National Ocean Sciences Bowl – OSU Salmon Bowl*, Corvallis, OR, 2012.

Microbial Diversity of Igneous Minerals in the Ocean Crust, *Astrobiology Graduate Conference (AbGradCon)*, CalTech, Pasadena, CA, 2012.

Microbial phylogeny of igneous minerals and glasses in deep ocean crust, *AGU Fall Meeting,* San Francisco, CA, 2011.

Basalt mineral oxidation by ocean crust bacteria, *Ridge 2000 Meeting,* Portland, OR, 2010.

Basalt mineral oxidation by ocean crust bacteria, *ISME Meeting*, Seattle, WA, 2010.

Differential bacterial colonization of volcanic minerals in deep thermal basalts, *Astrobiology Science Conference*, Houston, TX, 2010.

Sub-seafloor microbial colonization of igneous minerals and glasses, *AGU Fall Meeting* San Francisco, CA, 2008.

OTHER SCIENTIFIC MEETINGS, WORKSHOPS, and SUMMER SCHOOLS

Ocean Worlds Analog Field Site Assessment Workshop, 2022

Standards of Evidence for Life Detection Workshop, 2021

NOW Steering Committee Meeting, 2020

NASA Network for Ocean Worlds (NOW) Steering Committee Kickoff Meeting, 2019

EarthCube Oceanography and Geobiology Environmental 'Omics (ECOGEO): Introduction to Environmental 'Omics, Univ. Hawai'i, Manoa, 2016

C-DEBI All Hands Meeting, Bremen, Germany, 2014

Deep Carbon Observatory Summer School, 2014

C-DEBI NSF Science and Technology Center Meeting, Portland, OR, 2013

Deep Carbon Observatory Workshop, San-Francisco, CA, 2013

NASA Astrobiology Summer School, 2013

Mars Science Lander 5th Landing Site Meeting, CA, 2011

FIELD RESEARCH

PEERSIDE – Cold Seeps of the Gulf of Mexico with the Florida Institute of Oceanography, *R/V Western Flyer*, 2025
SUBSEA Gorda Ridge hydrothermal vent sampling cruise aboard *E/V Nautilus*, 2019
SUBSEA Lō`ihi Seamount hydrothermal vent sampling cruise aboard *E/V Nautilus*, 2018
Yaquina Bay and coastal shelf sampling, 2012
Cascadia field course in Oregon and Washington for push coring and water sampling, 2011
Olivine-rich basalt collection in Coos Bay, Oregon, 2008
Ice cave basalt collection in Eastern Oregon, 2008
AT 15-35 WHOI Atlantis/Alvin Expedition to Eastern Juan de Fuca Ridge for recovery and deployment of subseafloor microbial experiments at IODP Holes 1301A and 1026B, 2008
Field collection and natural history of the Green Lynx spider, 1993

COLLEGE SERVICE

Simon's Rock Farm 2023
DEI: Council for Inclusive Community 2022 – 2024
Student Conduct Committee 2023- 2024
Employee Enrichment Committee 2024 - 2025

PROFESSIONAL SERVICE

NSF Review Panel (2024)
NASA FINESST Review Panel (2022, 2023)
Peer Reviewer (*Environmental Microbiome, Journal of Geophysical Research, FEMS Microbial Ecology, MSphere, PLOS One, Environmental Microbiology, Frontiers in Microbiology*)

COMMUNITY SERVICE, MEDIA, AND OUTREACH

Flying Cloud Institute – DNA Extraction & Meet A Scientist, Lee Elementary 2023
Magazine Article - Secrets of the Deep, *OSU Oregon Stater*, Winter 2022, pp 26 – 28.
Simon's Rock Farm Club - Raising Chickens
OSU Oregon Stater - *Novel microbes provide clues to the origins of life on early Earth…and beyond?*
Leader of Girl Scout Troops 70909 & 69154, 2018 - present
North Falmouth Elementary School – presentation on hydrothermal vents and animal adaptations for student art projects, 2019
Student poster judge, 2019 & 2012
Radio interview, "On the Island with Gregor Craigie" CBC Radio, Vancouver Island, BC, 2019
Oregon State University: "Ancient community of undersea microbes may resemble early life on Earth, other planets", 2019
Vancouver Island Free Daily article: "Ancient microbes discovered off the Juan de Fuca Ridge potentially offers glimpse into alien life", 2019
Live Science article:" Life on Icy Alien Worlds May Resemble Creatures Under Submerged Hawaiian Volcano", 2019
https://www.livescience.com/65800-underwater-volcano-life-enceladus.html
E/V Nautilus ship-to-shore communication outreach with the Exploratorium, Oak Ridge School, Girl Scout Troop 69154, and La Academia de Estrellas, 2018
Blog for scientists and moms: The Intra-and Extraterrestrial Microbe, 2018 - present
Space.com article on Ocean Worlds, 2018
Science Fair Judge, 2008, 2018
"Science week" at OSU Beaver Beginnings Preschool, 2017
Developed and implemented curricular materials for Kindergarten – 2nd Grade: "A Subseafloor Journey: Exploring the Ocean Crust", 2015
Girl Scout Troop 20059 Co-leader, 2014 – 2018

"Life in the Crust: The Earth's Biggest Ecosystem and Its Implications" *Corvallis Advocate,* commentary, 2013
daVinci Days – Subsurface microbiology interactive table "Strawberry DNA extraction", 2013 – 201
OSU Discovery Days volunteer, 2012
National Ocean Sciences Bowl - OSU Salmon Bowl, 2012
"Martian Life Might Thrive in Lava Tubes, Study Suggests" – Space.com article https://www.space.com/14086-mars-alien-life-lava-tubes.html, 2011
"Better" TV segment: "The Five Second Rule and Double Dipping", 2008

B.A. THESIS STUDENTS:

Cyrus Blake 2025 – 2026
Tiaje Bennett 2024 - 2025
Shaahi Kanamuri 2023 - 2024
Tyler Farnsworth 2022 - 2023
Allie Marcin 2022 - 2023
Dusty Ammann 2022 - 2023

PEERSIDE MENTEES

Cyrus Blake 2025 – 2026
Anna Mae Ullman 2025 – 2026
Solomiia Cherednikova 2025 – 2026

UNDERGRADUATE Massachusetts Space Grant Consortium INTERNS:

Sarah Wang 2023 – 2024
Harlan Abrams 2023 – 2024
Shaahi Kanamuri - Fall Intern 2022
Takamaro Kajino - Summer Intern 2022
Justin Nakamura - Summer Intern 2022
Tyler Farnsworth - Summer Intern 2022

OTHER UNDERGRADUATE MENTORING

Sarah Wang 2023
Harlan Abrams 2023
Shaahi Kanamuri 2023
Takamaro Kajino 2023
Coco Deng 2022
Elena Engelhart 2022
Patrick Carter, 2018 – 2019
Sarah Myklebust, 2018
Teague Green, 2012 – 2013
Dijana Karanovich, 2009
Hien Nguyen, 2008
Susan Holmes, 2007 – 2009