

Rachel L. Harris, Ph.D.

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Biolabs Room 3103, Harvard University Dept. of Organismic and Evolutionary Biology
16 Divinity Avenue, Cambridge, MA 02138 USA

EDUCATION

2014: **Wellesley College** – Wellesley, MA 02481 USA, **A.B.** Biological Sciences; Minor: Russian

2017: **Princeton University** – Princeton, NJ 08544 USA, **M.A.** Geosciences

2020: **Princeton University** – Princeton, NJ 08544 USA, **Ph.D.** Geosciences

PROFESSIONAL EXPERIENCE

July 2020 – Present: **Harvard University** – Dept. of Organismic and Evolutionary Biology, Cambridge, MA 02138 USA

Postdoctoral Fellow

Advisor: Dr. Peter Girguis (pgirguis@oeb.harvard.edu)

May 2020 – June 2020: **Princeton University** – Dept. of Geosciences, Princeton, NJ 08544 USA

Postdoctoral Researcher

Advisor: Dr. Tullis C. Onstott (Deceased)

August 2014 – May 2020: **Princeton University** – Dept. of Geosciences, Princeton, NJ 08544 USA

Ph.D. student

Advisor: Dr. Tullis C. Onstott (Deceased)

Dissertation: “[Life on the Fringe: Surveying the Ecophysiological Tenacity of Methanogens and Anaerobic Methanotrophs in the Oligotrophic Deep Subsurface Biosphere](#)”

January 2017 – July 2017: **Scripps Institution of Oceanography, UCSD** – Marine Biology Research Division, La Jolla, CA 92037 USA

Deep Carbon Observatory Deep Life Cultivation Internship

Advisor: Dr. Douglas Bartlett (dbartlett@ucsd.edu)

May 2014 – August 2014: **Centre National de la Recherche Scientifique (CNRS)** – Équipe Spectrométries et Dynamique Moléculaire, Laboratoire de Physique des Interactions Ioniques et Moléculaires, Aix Marseille Université - Campus St. Jérôme, Marseille, France;,
Research Scientist, Project VAHIA (Volatile Analyses from the Heating of Interstellar/cometary Ice Analogues)

Advisor: Dr. Grégoire Danger (gregoire.danger@univ-amu.fr)

May 2011 – August 2011, January 2014 – May 2014: **Massachusetts Institute of Technology** – Dept. of Earth, Atmospheric, and Planetary Sciences, Cambridge, MA 02139 USA

Undergraduate Research Opportunities Program (UROP)/Senior Thesis

Advisors: Dr. Tanja Bosak (tbosak@mit.edu)

Dr. Vanja Klepac-Ceraj (vklepacc@wellesley.edu)

Thesis: “Hydrodynamic Conditions in Marine Benthic Environments Affect Nutrient Uptake and Biomineralization in Cyanobacterial Mats”

June 2012 – August 2012, June 2013 – August 2013: **NASA Ames Research Center** – NASA
Astrobiology Institute, Moffett Field, CA 94035 USA,
SETI REU/Exobiology Branch (SSX) Intern
Advisor: Dr. David J. Des Marais (David.J.Desmarais@nasa.gov)

TEACHING EXPERIENCE

Harvard University Extension School – Cambridge, MA 02138, Arts & Humanities Division

Co-Instructor

Fall 2020: HUMA E-103 – Sea Monsters Throughout the Ages: Fables, Films, and Facts

Co-Instructor: Dr. Peter Girguis (pgirguis@oeb.harvard.edu)

Princeton University – Princeton, NJ 08544, Dept. of Geosciences

Assistant in Instruction

Spring 2018: GEO 428 – Biological Oceanography

Instructor: Dr. Bess B. Ward (bbw@princeton.edu)

Fall 2017, Fall 2018: GEO 255 – Life in the Universe

Instructor: Dr. Tullis C. Onstott

(tullis@princeton.edu)

Wellesley College – Wellesley, MA 02481, Dept. of Astronomy

Teaching Assistant

Fall 2012, Fall 2013, Spring 2014: ASTR 102 – Intro to Astronomy

Instructor: Dr. Stephen Slivan (sslivan@wellesley.edu)

STUDENTS ADVISED

Beck Saine. Harvard '22. (Chemistry, Earth & Planetary Sciences). Senior Thesis. 2021

Program for Research in Science and Engineering.

“Redox potential (Eh) as an agnostic biosignature for active microbial metabolisms at deep-sea hydrothermal vents in the East Pacific Rise and Guaymas Basin”

Sarah Crucilla. Caltech '20. (Geology). 2020 – 2021

Post-Baccalaureate Researcher, Girguis Lab, Harvard University.

“Goelectrochemical metal aggregation at hydrothermal vents: Implications for prebiotic chemistry”

Current position: PhD student at Harvard University, Department of Earth & Planetary Sciences

Yuri Tamama. Princeton '22. (Geosciences). 2019

Princeton Environmental Institute Summer Internship Program.

“Transcriptomics of Methanogens Under Simulated Subsurface Conditions of Mars”

Calvin Rusley. Princeton '20. (Geosciences). Junior Project. 2018 – 2019

“Exploring the Limits of Life in a South African Deep Subsurface Brine”

Current position: PhD student at Caltech, Division of Geological and Planetary Sciences

Olivia Guan. Princeton '21. (Economics). 2018

Princeton Environmental Institute Summer Internship Program.

“Abiotic Hydrogen and Methane Gas Production from Butyl Rubber Stoppers”.

Current position: Undergraduate Course Assistant for Econometrics at Princeton University

Andreia Cadar. Rochester Institute of Technology '20 (Biotechnology). 2017

“*De novo* metagenome assembly and annotation of a South African Subsurface Lithoautotrophic Microbial Ecosystem (SLiME)”

Current position: Ph.D. student at University of Connecticut Health Center

Jana M. Suriano. Princeton '17. (Geosciences). Senior Thesis. 2016 – 2017

“Survival and Metabolism of *Methanosarcina soligelidi* Under Simulated Martian Subsurface Conditions”.

Current position: MS student at University of Wisconsin – Stevens Point, Soil and Waste Resources Program

Anjali Taneja. Princeton '16. (Dept. of Geosciences). Junior Project. 2014

“Development of a Fluorescent Probing Protocol to Detect *in situ* Prokaryotic mRNA Transcription”.

Current position: Software Technical Architect Leader at IBM

PEER REVIEWED PUBLICATIONS (*undergraduate mentees underlined*)

Liu, J., **Harris, R. L.**, Ash, J. L., Ferry, J. G., Labidi, J., Krause, S. J. E., Prakash, D., Sherwood Lollar, B., Treude, T., Warr, O., and Young, E. D. Reversibility controls on extreme methane clumped isotope signatures from anaerobic oxidation of methane. *Science Advances*. *In Review*.

Harris, R. L., Lau, M. C. Y., van Heerden, H., Cason, E., Vermeulen, J., Taneja, A., Kieft, T. L., DeCoste, C., Laevsky, G., and Onstott, T. C. FISH-TAMB, a fixation-free mRNA fluorescent labeling technique to target transcriptionally active members in microbial communities. *Microbial Ecology*. 2021. doi: 10.1007/s00248-021-01809-5.

Harris, R. L., Schuerger, A. C., Tamama, Y., Garvin, Z., Wang, W., and Onstott, T. C. Regulatory responses of *Methanosarcina barkeri* to freezing temperatures and perchlorates: Transcriptional response to prolonged perchlorate exposure in the methanogen *Methanosarcina barkeri* and implications for Martian habitability. *Scientific Reports*. 2021. doi: 10.1038/s41598-021-91882-0.

Warr, O., Giunta, T., Onstott, T. C., Kieft, T. L., **Harris, R. L.**, Nisson, D. M., and Sherwood Lollar, B. The role of low-temperature ¹⁸O exchange in the isotopic evolution of deep subsurface fluids. *Chemical Geology*. 2021. doi: 10.1016/j.chemgeo.2020.120027 .

Conference leads: Carrier, B. L., Beaty D. W., Meyer M. A., Sub-Team leads: Blank, J. G., Chou L., DasSarma S., Des Marais D. J., Eigenbrode, J. L., Grefenstette N., Lanza, N. L., Schuerger, A. C., Schwendner, P., Smith, H. D., Stoker, C. R., Tarnas, J. D., Webster, K. D., and Sub-Team

contributors: Bakermans, C., Baxter, B. K., Bell, M-S., Benner, S. A., Bolivar Torres, H. H., Boston, P. J., Bruner, R., Clark, B. C., DasSarma, P., Engelhart, A. E., Gallegos, Z. E., Garvin, Z. K., Gasda, P. J., Green, J. H., **Harris, R. L.**, Hoffman, M. E., Kieft, T., Koepfel, A. H. D., Lee, P. A., Li, X., Lynch, K. L., Mackelprang, R., Mahaffy, P. R., Matthies, L. H., Nellesen, M. A., Newsom, H. E., Northup, D. E., O'Connor, B. R. W., Perl, S. M., Quinn, R. C., Rowe, L. A., Sauterey, B., Schneegurt, M. A., Schulze-Makuch, D., Scuderi, L. A., Spilde, M. N., Stamenković, V., Torres Celis, J. A., Viola, D., Wade, B. D., Walker, C. J., Wiens, R. C., Williams, A. J., Williams, J. M., and Xu, J. Mars Extant Life: What's Next? Conference Report. *Astrobiology*. 2020. doi: 10.1089/ast.2020.2237.

Harris, R. L., Lau, M. C. Y., Cadar, A., Bartlett, D. H., Cason, E., van Heerden, E., and Onstott, T.C. Draft Genome Sequence of “*Candidatus* Bathyarchaeota” Archaeon BE326-BA-RLH, an Uncultured Denitrifier and Putative Anaerobic Methanotroph from South Africa’s Deep Continental Biosphere. *Microbiology Resource Announcements*. 2018. doi: 10.1128/MRA.01295-18.

Lau, M.C.Y., **Harris, R. L.**, Oh, Y. Yi, M. J. and Onstott, T.C. Taxonomic and functional compositions impacted by the quality of metatranscriptomic assemblies. *Frontiers in Microbiology*. 2018. doi:10.3389/fmicb.2018.01235.

Huang, J., Salvatore, M., Edwards, C. S., **Harris, R. L.**, and Christensen, P. C. A complex fluviolacustrine environment on early Mars and its astrobiological potentials. *Astrobiology* 18(8). 2018. doi:10.1089/ast.2017.1757.

Lau, M.C.Y., Kieft, T.L., Kuloyo, O., Linage-Alvarez, B., van Heerden, E., Lindsay, M.R., Magnabosco, C., Wang, W., Wiggins, J.B., Guo, L., Perlman, D.H., Kyin, S., Shwe, H.H., **Harris, R.L.**, Oh, Y., Yi, M.J., Purtschert, R., Slater, G.F., Ono, S., Wei, S., Li, L., Sherwood Lollar, B., and Onstott, T.C. An oligotrophic deep-subsurface community dependent on syntrophy is dominated by sulfur driven autotrophic denitrifiers. *PNAS*. 2016. doi: 10.1073/pnas.1612244113

WHITE PAPERS

Edwards, C D. et al. [including **Harris, R. L.**] Deep Trek: Mission Concepts for Exploring Subsurface Habitability & Life on Mars – A Window into Subsurface Life in the Solar System. *Submitted to the National Academies Planetary Science and Astrobiology Decadal Survey, 2023-2033*. 2020.

Garvin, Z. K., et al. [including **Harris, R. L.**] Mars Trace Gas Fluxes: Critical Strategies and Implications for the Upcoming Decade. *Submitted to the National Academies Planetary Science and Astrobiology Decadal Survey, 2023-2033*. 2020.

Stamenković, V. et al. [including **Harris, R. L.**] Deep Trek: Science of Subsurface Habitability & Life on Mars – A Window into Subsurface Life in the Solar System. *Submitted to the National Academies Planetary Science and Astrobiology Decadal Survey, 2023-2033*. 2020.

PATENTS

Harris, R. L., Lau-Vetter, M. C. Y., Onstott, T. C. Fluorescent *in situ* Hybridization of Transcript-Annealing Molecular Beacons (FISH-TAMB). US Provisional Patent (63/093,347). 2020

INVITED TALKS

- Archaea Power Hour 2022
 “Methanogens, perchlorates, transcriptomics, and Mars: Adaptive strategies of *Methanosarcina* *Barkeri* to combat extreme oxidative stress”
Archaea Power Hour Virtual Seminar Series
- Harvard University Microbial Sciences Initiative 2021
 “FISH-TAMB: The First Live-Cell Imaging Technique to Target Gene-Specific mRNA in Prokaryotes”
Friday Chalk Talk Series
 Cambridge, MA USA
- Wellesley College. Dept. of Biological Sciences 2019, 2020
 “Fantastic niches and where to find them: Exploring the thermodynamic limits of microbial habitability”
Guest Lecturer, BISC 201 – Microbiology
 Wellesley, MA USA
- Princeton University. Dept. of Geosciences 2019
 “Hiding in plain sight? Tracing cryptic anaerobic methane oxidation to the cosmopolitan deep biosphere phylum *Candidatus* Bathyarchaeota”
Environmental Geology and Geochemistry Seminar Series
 Princeton, NJ USA
- Princeton University. Dept. of Molecular Biology 2018
 “Canaries in a gold mine: How biogeochemistry and genomics revealed a novel anaerobic methanotroph in Candidate Phylum Bathyarchaeota”
Prokaryotes Seminar Series
 Princeton, NJ USA

PANELS

- Wellesley College. Science Center Summer Research Program. 2021
 Alumnae panel on graduate school admissions in STEM.
 Wellesley, MA USA

CONFERENCE PRESENTATIONS

- Liu, J., **Harris, R. L.**, Ash, J. L., Ferry, J. G., Labidi, J., Krause, S. J. E., Prakash, D., Sherwood Lollar, B., Treude, T., Warr, O., and Young, E. D. Reversibility controls on extreme methane clumped isotope signatures from anaerobic oxidation of methane. Goldschmidt. Honolulu, HI. 2022
- Liu, J., **Harris, R. L.**, Ash, J. L., Ferry, J. G., Labidi, J., Krause, S. J. E., Prakash, D., Sherwood Lollar, B., Treude, T., Warr, O., and Young, E. D. Methane clumped isotope signature of anaerobic oxidation of methane. EGU General Assembly. Vienna, Austria. 2022.

Harris, R. L., Schuerger, A. C., Hartmann Reardon, C., Wang, W., Tamama, Y., Garvin, Z. K., Onstott, T. C., and Girguis, P. R. Is Martian methane a biosignature? New insights from transcriptomics into the ecophysiology of methanogens under simulated Martian temperatures, pressures, atmospheric composition, and perchlorates. AbSciCon. Atlanta, GA. 2022.

Harris, R. L., Mitchell, J., Hwang, Y., Travis, B., and Girguis, P. FISH-TAMB – A Rapid, Fixation-Free Tool for Real-Time, Nanoscale Imaging of Microbial Transcription. Ocean Sciences Meeting. Virtual. Oral presentation. 2022.

Crucilla, S., **Harris, R. L.**, and Girguis, P. Geochemical aggregation of molybdenum and tungsten at hydrothermal vents: Implications for prebiotic chemistry. AGU Fall Meeting. New Orleans, LA. Oral presentation. 2021.

Saine, B., **Harris, R. L.**, and Girguis, P. Cooking up chemolithoautotrophy: Monitoring redox conditions during the incubation of a microbial consortium from a hydrothermal sulfide chimney in the East Pacific Rise. AGU Fall Meeting. New Orleans, LA. Poster presentation. 2021.

Harris, R. L., Ferry, J. G., Labidi, J., Treude, T., Sherwood Lollar, B., Onstott, T. C., and Young, E. Predicting thermodynamic disequilibrium of $^{13}\text{CH}_3\text{D}$ processed by AOM. C-DEBI Annual Meeting. Virtual. Oral presentation. 2020.

Warr, O., Giunta, T., Onstott, T. C., Kieft, T. L., **Harris, R. L.**, Nisson, D. M., and Sherwood Lollar, B. Geochemical Signatures of Fluid-Rock Interaction: Earth Surface Weathering to Hydrothermal Systems. GSA Annual Meeting. Virtual. Oral presentation. 2020.

Harris, R. L., Tamama, Y., Suriano, J., Wang, W., Schuerger, A., and Onstott, T. C. Follow the Methane: Pushing Methanogens to the Extreme to Understand the Limits of Biological Methanogenesis Under Simulated Martian Subsurface Conditions. AGU Fall Meeting. San Francisco, CA. Oral presentation. 2019.

Harris, R. L., Bartlett, D. H., Lau, M. C. Y., Onstott, T. C., and the Scientific Team of IODP 370. *In vivo* visualization of methyl coenzyme M reductase transcriptional activity in deep biosphere anaerobic methanotrophs (ANMEs). Deep Carbon Science 2019: Launching the Next Decade of Deep Carbon Science. Washington, D.C. Poster presentation. 2019.

Harris, R. L., Ehlmann, B. L., Bhartia, R., and Onstott, T. C. Biologically Mediated Anaerobic Methane Oxidation – The Missing Sink in an Active Martian Methane Cycle? Mars Extant Life: What's Next? Carlsbad, NM. Oral presentation. 2019.

Harris, R. L., Lau, M. C. Y., Labidi, J., Hu, D., Hoyt, A., Liu, X., Cobb, A., Zhuang, G., Cason, E., Vermeulen, J., van Heerden E., Kieft, T., Sherwood Lollar, B., Young, E., Harvey, C., Cliff, J., Bartlett, D. H., Onstott, T. C., and the Scientific Team of IODP 370. Hiding in plain sight? Tracing cryptic anaerobic methane oxidation to the cosmopolitan deep biosphere phylum *Candidatus* "Bathyarchaeota". Gordon Research Seminar on Archaea: Ecology, Metabolism, and Molecular Biology. Les Diablerets, Switzerland. Oral presentation. 2019.

Harris, R. L., Lau, M. C. Y., Cadar, A., Bartlett, D., Cason, E., van Heerden, E., and Onstott, T. C. Metabolic Potential of an Uncultured, Putatively Denitrifying Anaerobic Methanotroph from South Africa's Deep Biosphere Belonging to Candidate Phylum Bathyarchaeota. AGU Fall Meeting. Washington, D. C. eLightning presentation. 2018.

Onstott, T. C., Ehlmann, B. L., Sapers, H. M., Magnabosco, C., Lau, M. C. Y., Kieft, T. L., **Harris, R. L.**, Marlow, J. J., Ivarsson, M., and Neubeck, A. A Review of The Continental Subsurface Biomass and Biodiversity: Implications for Exploring a Potential Martian Subsurface Biosphere. AGU Fall Meeting. Washington, D. C. Oral presentation. 2018.

Onstott, T. C., Ehlmann, B. L., Sapers, H., Marlow, J., Ivarsson, M., Neubeck, A., Nisson, D. **Harris, R. L.**, Garvin, Z., Niles, P., and Coleman, M. How Mars 2020 Could Look for Life in the Noachian Stratigraphy at NE Syrtis or Midway. Fourth Landing Site Workshop for the Mars 2020 Rover Mission. Glendale, CA. Oral presentation. 2018.

Harris, R. L., Bartlett, D., Hoshino, T., Brynes, A. W., Walsh, K. M., Lau, M. C. Y., and Onstott, T. C. Stable isotopic evidence of high-pressure, high-temperature anaerobic methane oxidation in sub-seafloor sediments from IODP 370 site C0023A: insights and investigations from a one-year incubation experiment. IODP Expedition 370 2nd Post-Cruise Meeting – University of Aberdeen. Aberdeen, UK. Oral presentation. 2018.

Harris, R. L., Bartlett, D., Hoshino, T., Byrnes, A. W., Walsh, K. M., Lau, M. C. Y., Onstott, T. C. and the Scientific Team of IODP Expedition 370. Revisiting the potential role of Bathyarchaeota in deep biosphere methane oxidation. A study of sub-seafloor sediments from IODP 370 site C0023A in the Nankai Trough. Northeast Geobiology Symposium. Woods Hole, MA. Poster presentation. 2018.

Harris, R. L., Bartlett, D., Byrnes, A. W., Walsh, K. M., Lau, M. C. Y., Onstott, T. C., and the Scientific Team of IODP Expedition 370. Assessing the High Temperature, High Pressure Subsurface for Anaerobic Methane Oxidation. AGU Fall Meeting. New Orleans, LA. Poster presentation. 2017.

Harris, R. L., Lau, M. C. Y., van Heerden, E., Cason, E. B., Vermeulen, J., Taneja, A., Kieft, T. L., DeCoste, C., Laevsky, G., and Onstott, T. C. Labeling of prokaryotic mRNA in living cells using fluorescent *in situ* hybridization of transcript-annealing molecular beacons (FISH-TAMB). Sigma Xi Student Research Conference. Raleigh, NC USA. Poster presentation. 2017.

Harris, R. L., Huang, J., Salvatore, M., Edwards, C., Christensen, P., Xiao, L., and Xu, Y. Assessing the astrobiological potential of a unique Martian Evaporitic Fluviolacustrine Environment. AbSciCon. Mesa, AZ USA. Poster presentation. 2017.

Harris, R. L., Lau, M. C. Y., Onstott, T. C. Elucidation of active players in biogeochemical cycling via fluorescent in situ hybridization of transcript-annealing molecular beacons (FISH-TAMB). ISME-16. Montréal, Canada. Oral presentation. 2016.

Harris, R. L., Onstott, T. C., van Heerden, E., Cason, E., and Kieft, T. Technical considerations for deep life drilling. International Continental Drilling Program DSeis Workshop. Potchefstroom, South Africa. Oral presentation. 2015.

PUBLIC OUTREACH

Rotary International Foundation “From <i>Viking</i> to <i>Perseverance</i> : 45 years of reimagining life detection on Mars” <i>Guest Speaker, Rotary Club of Mount Airy</i> Mount Airy, NC USA	2021
Lawrence High School. STEM Day. Lawrenceville, NJ USA. <i>Invited scientist.</i>	2019
Lawrence High School STEM Academy. Career Exploration Coffee House. Lawrenceville, NJ USA. <i>Invited speaker.</i>	2018
QUEST – Questioning Underlies Effective Scientific Teaching. “Searching for Life on Other Worlds”. Princeton, NJ USA. <i>Course organizer. Workshop leader.</i>	2018
Lawrence High School STEM Academy. Geology Seminar Series. “Applications and Careers in Geosciences”. Lawrenceville, NJ USA. <i>Invited speaker.</i>	2018
Princeton University Science Olympiad Invitational. “Microbe Mission”. Princeton, NJ USA. <i>Biology/Life Sciences Judge.</i>	2018
QUEST – Questioning Underlies Effective Scientific Teaching. “Life in Extreme Environments”. Princeton, NJ USA. <i>Course organizer. Workshop leader.</i>	2016
Dark Sky Festival – Lassen Volcanic National Park. NASA Astrobiology Institute. “Mars Analog Environments”. Mineral, CA USA. <i>Participating scientist.</i>	2013

SYNERGISTIC ACTIVITIES

<i>Co-chair.</i> Gordan Research Seminar on Deep Carbon Science “Carbon at the Intersection of the Biosphere and Geosphere” Bates College, Lewiston, ME USA	2022
<i>Session Convener.</i> AGU Fall Meeting “The New Mars Underground: Astrobiology, Planetary Science, and Space Resources At the Dawn of Mars Sample Return” New Orleans, LA USA	2021
<i>Sandbox Team.</i> MIT Sandbox Innovation Fund Program Team Syntrophia	2021-2022

Massachusetts Institute of Technology
Cambridge, MA USA

- Advocacy Committee.* Harvard FAS Postdoctoral Association 2021 - present
Harvard University Faculty of Arts and Sciences
Cambridge, MA USA
- Co-Proprietor.* Harvard FAS Postdoctoral Association twitter account 2021 - present
Twitter handle: [@faspsda](https://twitter.com/faspsda)
- “Ocean-Shot” Cohort 2 Member.* National Academies of Sciences, Engineering, and Medicine 2021
“FISH-TAMB for a healthier ocean: A novel, scalable tool by Syntrophia
to sustainably harness microbial power and supercharge bioindustrial processes”
Authors: Rachel L. Harris
Nicholas Lyons
Hiroko Muraki-Gottlieb
- Finalist Cohort.* Activate Eco Life Sciences Venture Program 2020 - 2021
[Syntrophia](https://www.syntrophia.com)
Co-founder: Nicholas Lyons. MIT Sloan '22. E: njlyons@mit.edu
Sustainability advisor: Hiroko Muraki Gottlieb, J.D. E: hmurakigottlieb@fas.harvard.edu
Sponsored by Harvard University Biotech Club
Harvard Business School
MIT Sloan School of Management
- Member.* Future Leaders of Ocean Worlds (FLOW) 2020 - present
- Proprietor.* Network for Ocean Worlds (NOW) twitter account 2020 - present
Twitter handle: [@Ocean_Worlds](https://twitter.com/Ocean_Worlds)
NOW is a NASA Astrobiology-funded Research Coordination Network (RCN)
investigating science and technology of ocean worlds exploration
- Primary Session Convener.* AGU Fall Meeting 2020
“The New Mars Underground 3.0”
San Francisco, CA USA
- Member.* Harvard OEB Anti-Racism Reading Group 2020 - present
- Session co-chair.* “Potential Martian Extant Life Environments III – Subsurface” 2019
Mars Extant Life: What’s Next? Carlsbad, NM USA.
- Organizer and co-founder.* Princeton Geomicrobiology Journal Club 2016 - 2020

HONORS AND AWARDS

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- Jet Propulsion Laboratory Mars Student Travel Grant 2019
Arnold T. Guyot Teaching Award 2018

Sigma Xi Superior Presentation Award	2017
Deep Carbon Observatory Deep Life Cultivation Internship	2016-2017
ISME-16 Travel Grant	2016
National Science Foundation Graduate Research Fellow	2015-2020
Three Generations Prize for Writing in the Sciences – Wellesley College	2014
Edward M. Armfield Scholar – Northwestern North Carolina	2010-2014
Frances Meaker Colville Scholar – Wellesley College	2013
Office of the Provost Student Research Grant – Wellesley College	2013
Dr. Gerald A. Soffen Memorial Travel Grant	2013

FIELD WORK

Guaymas Basin hydrothermal field, Gulf of California	2021
Moab Khotsong Gold Mine, Gauteng Province, South Africa	2015, 2016
Beatrix Gold Mine, Free State, South Africa	2015, 2016
Fjaðrárgljúfur (Feather River Canyon), Iceland	2016
Western Cape Province hot springs, South Africa	2015
Limpopo Province hot springs, South Africa	2015
Death Valley springs, Nevada USA	2014
Lassen Volcanic National Park hot springs, California USA	2012, 2013

GRANTS RECEIVED

Census of Deep Life. “Utilizing Metagenomics to Resolve the Metabolic Potential of a Novel Bathyarchaeota Archaeon Putatively Implicated in Deep Biosphere Methane Cycling in South Africa’s Beatrix Gold Mine and IODP 370 Site C0023A in the Nankai Trough”. <i>Lead PI.</i>	2018
Integrated Ocean Discovery Program. Expedition 370: T-Limit of the Deep Biosphere Off Muroto. “Utilizing FISH-TAMB for the Isolation of CH ₄ -Cycling Microbes in the Nankai Trough”. <i>Lead PI.</i>	2017
Deep Energy – Deep Carbon Observatory. “Impact of Thermophilic and Barophilic Anaerobic Methane Oxidizers on the Clumped Isotopic Composition of Methane”. <i>Co-PI.</i>	2017
NASA Exobiology Program. “Transcriptomics and Proteomics of Methanogens under Simulated Subsurface Conditions that Mimic Recurring Slope Lineae on Mars”. <i>Co-PI.</i>	2017

SKILLS

Laboratory

Microbial culturing and enrichment (aerobic and anaerobic organisms)
 Stable isotope geochemistry (natural abundance and tracers (¹³C, ¹⁵N))
 Fluorescent *in situ* hybridization
 Flow Cytometry

Cavity Ring-Down Spectroscopy (CRDS)
Gas Chromatography Mass Spectrometry (GC MS)
Ion Chromatography Mass Spectrometry (IC MS)
Microscopy – epifluorescence and confocal
DNA/RNA isolation, amplification, and purification

Computational

Bioinformatics ([meta]genomics, [meta]transcriptomics)
R
Unix/Linux/Slurm
The Geochemist's Workbench
Adobe Illustrator

Linguistic

English: Native
Russian: Advanced
French: Intermediate

SOCIETY MEMBERSHIP

American Mountain Guides Association (Professional)	2018 - present
American Society for Microbiology	2017 - present
International Society of Microbial Ecology	2016 - present
American Geophysical Union	2016 - present
The Mars Society	2016 - present
Sigma Xi	2014 - present