

Hannah M. Miller

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EDUCATION

May 2017: Ph.D. in Geological Sciences, Concentration: Geomicrobiology, University of Colorado at Boulder, Advisor: Alexis Templeton

Low temperature hydrogen production and habitability of a hyperalkaline serpentinite aquifer in the Samail ophiolite

May 2012: Bachelor of Science in Environmental Geosciences, magna cum laude, University of Notre Dame

PROFESSIONAL EXPERIENCE

August 2012 – May 2017: Graduate Research Assistant

Department of Geological Sciences, University of Colorado

Conducted laboratory experiments in low-temperature hydrogen production from partially serpentinized rocks from Oman, analyzed mineralogy with microscale spectroscopic techniques, and cultured methanogens then investigated stable CH₄ isotope values produced by methanogens in hyperalkaline conditions; Planned and executed field work activities

July 2014: Deep Carbon Observatory Summer School

Yellowstone, Montana

Participated in week-long course for early career researchers focused on interdisciplinary deep carbon science

Jun 2013 – July 2013: Agouon-USC International Geobiology Summer Course

Colorado School of Mines, University of Southern California and California Institute of Technology

Participated in five-week intensive field and laboratory course to learn techniques in molecular biology, bioinformatics, geochemistry, petrology, and sedimentology, presented work at AGU

August 2012 – May 2013: Teaching Assistant - Introduction to Geology Laboratory and Geochemistry

Department of Geological Sciences, University of Colorado

Designed recitation exercises to give students practice solving complex geochemical problems, held weekly recitation and office hours

June – August 2011 & 2012: Science Undergraduate Internship (SULI)

Pacific Northwest National Laboratory

Investigated effects of surfactant-based remediation amendments on microbial diversity in uranium-contaminated soil with Biolog EcoPlates with Dr. Fred Tilton

Monitored Columbia River vadose zone for uranium contamination using colorimetric complexing agent Arsenazo III and UV/Vis spectrometry with Matt O'Hara

January 2011 – May 2012: Undergraduate Researcher

University of Notre Dame – Advisor: Dr. Jeremy Fein

Determined the pH ranges under which arsenic and mercury adsorbs onto common bacterial species

September 2011 – May 2012: Undergraduate Researcher

University of Notre Dame – Advisors: Dr. Peter Burns and Dr. Albrecht-Schmidt

Characterized nuclear waste crystallization by synthesizing and analyzing minerals incorporating neptunium and uranium into their crystal structures

PUBLICATIONS

Miller HM, Mayhew LE, Ellison ET, Kelemen P, Kubo M, Templeton AS, Low temperature hydrogen production during experimental hydration of partially serpentinized dunite (In rpress), *Geochim. Cosmochim. Acta*, manuscript available on request.

Mayhew LE, **Miller HM**, Ellison ET, Kelemen P, Templeton AS, Iron transformations during low temperature alteration of variably serpentinized rocks from the Samail ophiolite, Oman. (In review), *Geochim. Cosmochim. Acta*, manuscript available on request.

Rempfert KR, **Miller HM**, Bompard N, Nothhaft D, Matter JM, Kelemen P, Fierer N, Templeton AS (2017) Geological and geochemical controls on subsurface microbial life in the Samail ophiolite, Oman. *Frontiers in microbiology*. **Volume B**, 56.

Miller HM, Mayhew LE, Ellison ET, Kelemen P, Kubo M, Templeton AS (2017) Reply to "Methane origin in the Samail ophiolite: Comment on "Modern water/rock reactions in Oman hyperalkaline peridotite aquifers and implications for microbial habitability"" [Geochim. Cosmochim. Acta 179 (2016) 217–241]

Miller HM, Mayhew LE, Ellison ET, Kelemen P, Kubo M, Templeton AS (2016) Modern water/rock reactions in Oman hyperalkaline peridotite aquifers and implications for microbial habitability. *Geochim. Cosmochim. Acta* **179**, 217–241

Wang S, Alekseev EV, Diwu J, **Miller HM**, Oliver AG, Liu G, Depmeier W, Albrecht-Schmitt, TE (2011), Functionalization of Borate Networks by the Incorporation of Fluoride: Syntheses, Crystal Structures, and Nonlinear Optical Properties of Novel Actinide Fluoroborates. *ChemInform*, 42

Wang S, Alekseev EV, Diwu J, **Miller HM**, Depmeier W, Albrecht-Schmitt, TE (2011), Boronic Acid Flux Synthesis and Crystal Growth of Uranium and Neptunium Boronates and Borates: A Low-Temperature Route to the First Neptunium(V) Borate. *ChemInform*, 42

In preparation

Miller HM, Conrad ME, Bill M, Chaudhry N, Templeton AS; "Carbon and hydrogen isotope fractionation by *Methanobacterium sp.* growing at alkaline pHs" (In prep), *will submit to Proceedings of the National Academy of Sciences*, manuscript available on request.

Ellison ET, Mayhew LE, **Miller HM**, Templeton AS, Co-registered Fe Pre-Edge and Raman Imaging to Trace Fe Redox Transformations in Serpentinites from Oman (In prep), *will submit to American Mineralogist*, manuscript available on request.

CONFERENCES

Rocky Mountain GeoBiology Symposium, April 2017

Miller HM, Conrad ME, Bill M, Chaudhry N, Templeton AS; "Carbon and hydrogen isotope fractionation by *Methanobacterium sp.* growing at alkaline pHs"

Oral presentation

Astrobiology Graduate Conference, July 2016

Miller HM, Mayhew L, Ellison E, Kelemen PB, Templeton AS; "Low temperature hydrogen production during experimental hydration of partially-serpentinized dunite"

Oral presentation in session "Rocks"

Goldschmidt Conference, Aug 2015

Miller HM, Kelemen PB, Ellison E, Conrad M, Templeton AS; “Modern peridotite alteration in Oman hyperalkaline aquifers and implications for microbial habitability”
Oral presentation in session “Marine and terrestrial subsurface microbiology”

Deep Carbon Observatory Summer School, July 2014

Miller HM, Kelemen PB, Matter J, Templeton AS; “Low-temperature peridotite hydration in the shallow subsurface in Oman”
Poster presentation

American Geophysical Union, Dec 2014

Miller HM, Kelemen PB, Matter J, Templeton AS; “Low-temperature peridotite hydration in the shallow subsurface in Oman”
Poster presentation in session “Chemical, Physical, and Biological Interactions During Serpentinization of Ultramafic Rocks II”

Corsetti FA, **Miller HM**, Asangba AE, Johannessen KC, Wang DT, Petryshyn VA, Tripathi A, Saphiro RS; “Clumped isotopes, trace elements, and d18O of stromatolites from the Laney member of the Green River Formation (Eocene): Implications for paleoenvironments during the Eocene Climatic Optimum
Poster presentation in Session “Clumped Isotopes: Applications, Calibrations and Theory II”

American Geophysical Union, Dec 2013

Miller HM, Mayhew L, Templeton AS; “Low-temperature hydration, oxidation and hydrogen production from Oman peridotite”
Poster presentation in session “Mechanisms of Mineral Carbonation, Hydration and Oxidation, With Potential Applications Including Carbon Capture and Storage II”

CONTACT INFORMATION FOR LETTERS OF REFERENCE

Alexis Templeton was my PhD advisor. Peter Kelemen and John Spear were committee members. I have conducted 2 seasons of field work with Peter, as well as collaborating on several papers. I attended the 2013 International Geobiology Summer Course, which John Spear led, and we have been involved in the Rock Powered Life NASA Astrobiology grant together, investigating microbial processes in the subsurface of the Samail Ophiolite in Oman. If you want additional perspectives from a close collaborator, Lisa Mayhew would be an excellent contact. She is a Research Associate in the Templeton lab and has served as another mentor.

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Communications Director – Rock Powered Life NASA Astrobiology Institute
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