

Alysia Cox, PhD

Curriculum Vitae

Assistant Professor, Department of Chemistry and Geochemistry
Montana Tech of the University of Montana

Butte, MT

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September 22nd, 2015

EDUCATION/EXPERIENCE

2015 - present Department of Chemistry and Geochemistry, Butte, MT
Montana Tech of the University of Montana
Assistant Professor - Environmental Chemistry- Environmental Dynamics in Geobiochemical Engineering (EDGE) Laboratory

2015 South Pointe High School Phoenix, AZ
Teacher - Physical Science I, Physical Science II, Chemistry I, Chemistry II, 'Science Bridge' and Softball

2013 - 2014 School of Earth and Space Exploration, Astrobiology, ASU Tempe, AZ
Postdoctoral Scholar - Geochemistry and life in serpentinizing systems

2012 - 2013 Biogeoscience, Geological Institute, ETH Zürich Zürich, Switzerland
Postdoctoral Scholar - Biological role and geological legacy of Vitamin E

2011 School of Earth and Space Exploration, Astrobiology, ASU Tempe, AZ
Postdoctoral Scholar - Environmental (metallo-) proteins in hot spring ecosystems

2005 - 2011 Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Chemical Oceanography Cambridge, MA and Woods Hole, MA

PhD Chemical Oceanography

Dissertation - Interactions of cadmium, zinc, and phosphorus in marine *Synechococcus*: Field uptake, physiological and proteomic studies

2000 - 2004 Arizona State University, Barrett Honors College Tempe, AZ
B.S. Geological Sciences, *summa cum laude*, Minors - Biology and German
Honors Thesis - Limits of microbial photosynthesis in hot spring ecosystems

AWARDS AND HONORS

2015 2nd Deep Carbon Observatory (DCO) Early Career Scientist Organizing Committee Member

2014 DCO Early Career Scientist Workshop Participant

2013 University-National Oceanographic Laboratory System (UNOLS) Chief Scientist Training Program Alternate

2005 MIT Presidential Graduate Fellow

2004 and 2005 Honorable Mention - NSF Graduate Research Fellowship Program

2004 ASU Moeur Award for academic achievement (similar to valedictorian)

2004 Finalist - ASU College of Liberal Arts and Sciences Honor Award

2004 and 2003 Biological Research Experience for Undergraduates Fellowship (BREU)
2003 Robert S. Dietz Geological Field Camp Scholarship
2003 Arizona Power Authority Scholarship
2003 ASU Geosciences Alumni Scholarship
ASU Dean's List 2000-2004
President of ASU Great Outdoors Student Club 2001-2004
Awarded National Merit Scholarship 2000-2004
Valedictorian, Saline High School, 2000

PUBLICATIONS

Cox A, Noble AE, Saito MA. 2014. Enriched stable isotope uptake and Cd addition experiments with natural phytoplankton assemblages in the Costa Rica Upwelling Dome. *Marine Chemistry* 166: 70-81.

Cox A, Saito M. 2013. Proteomic responses of oceanic *Synechococcus* WH8102 to phosphate and zinc scarcity and cadmium additions. *Frontiers in Microbiological Chemistry* 4: 387. doi: 10.3389/fmicb.2013.00387.

Shock EL, Canovas P, Yang Z, Boyer G, Johnson K, Robinson K, Fecteau K, Windman T, **Cox A**. 2013. Thermodynamics of organic transformations in hydrothermal fluids. *Reviews in Mineralogy and Geochemistry* 76: 311-350.

Cox AD. 2011. Interactions of cadmium, zinc, and phosphorus in marine *Synechococcus*: Field uptake, physiological and proteomic studies, PhD dissertation, MIT/WHOI Joint Program in Chemical Oceanography.

Cox A, Shock EL, Havig JR. 2011. The transition to microbial photosynthesis in hot spring ecosystems. *Chemical Geology* 280: 344-351.

Cox AD. 2004. The limits of microbial photosynthesis in hot spring ecosystems, Honors Thesis, Barrett Honors College, Arizona State University.

PUBLISHED ABSTRACTS

Köbberich M, Ritscher A, **Cox A**, Vance D. 2015. Iron limited diatoms do not fractionate zinc isotopes: Culturing evidence. Goldschmidt Conference.

Howells A, Poret-Peterson AT, **Cox A**, Canovas P, and Shock EL 2015. Geochemical influences on sediment bacterial communities in a serpentinization-hosted ecosystem, AbSciCon.

Cox AD. 2014. Exploring life's limits: Deep geobiochemistry. American Geophysical Union (AGU) Fall Meeting Abstract B13A-0171.

Köbberich M, **Cox A**, Vance D. 2013. Zinc isotopes as a tool to study zinc uptake by marine phytoplankton. *Mineralogical Magazine* 77(5): 1485.

Cox AD, Eglinton TE. 2012. The geological legacy of Vitamin E. AGU Fall Meeting Abstract B13A-0477.

Cox AD, Shock EL. 2011. Evidence supporting biologically mediated sulfide oxidation in hot spring ecosystems. AGU Fall Meeting Abstract B51G-0481.

Cox AD, Bulygin V, Saito MA. 2010. Metal stress in Cyanobacteria: Physiological and proteomic culture studies of Atlantic *Synechococcus*. American Society of Limnology and Oceanography (ASLO) Ocean Sciences Meeting.

Saito MA, Bertrand EM, Bulygin V, **Cox AD**, Goepfert TJ, Moran D. 2010. The potential for colimitation of marine primary productivity: Three biochemical definitions, field observations, application of proteomic diagnostics, and comments on the future (Invited). ASLO Ocean Sciences Meeting.

Saito MA, Noble AE, **Cox A**, Goepfert TJ. 2009. Trace element distributions and phytoplankton colimitations on a full depth ocean section in the South Atlantic ocean. *Geochimica et Cosmochimica Acta* 73 (13) Supplement, June, A1146.

Cox AD, Noble AE, Saito MA. 2006. Bioavailability of cadmium: Stable isotope uptake and toxicity of Cd to marine phytoplankton in the Costa Rica Upwelling Dome. *Geochimica et Cosmochimica Acta* 70 (18) Supplement, August–September, A114.

Cox AD, Noble AE, Saito MA. 2006. Cadmium stable isotope uptake by phytoplankton, speciation, and toxicity experiments in the Costa Rica Upwelling Dome. ASLO Summer Meeting, Victoria, Canada.

Cox AD, Shock EL. 2003. Limits of microbial photosynthesis in hot spring ecosystems. *Eos Trans. AGU* 84(46), Fall Meet. Suppl., Abstract B41D-0927.

Sharp TG, **Cox A**, De Gregorio BT. 2002. Morphologies and structures of microfossils in HF-etched samples of Gunflint Chert. *Astrobiology* 2 (4), Abstract #12895, p.626.

EDUCATIONAL SYNERGY

Oregon State Science Olympiad Tournament: Event Supervisor Dynamic Planet - Oceanography, Oregon State University, Corvallis, OR, April 18th, 2015
ASU, Earth and Space Exploration Day, The Rock Cycle Shuffle, 2011, 2013, and 2014
North Falmouth Elementary School visit to USGS, The Rock Cycle, 2009
Woods Hole Science and Technology Partnership (WHSTEP) Liaison Dinner, 2009

AT SEA AND FIELD EXPERIENCE

July 2015, Yellowstone National Park (2 weeks), E Shock and A Cox, field leaders.
July - August 2014, Yellowstone National Park (2 weeks), E Shock, field leader; A Cox, team leader.
January 2014, Samail Ophiolite, Oman (2 weeks), E Shock, field leader.
September 2013, Nevada hot springs (2 days), A Cox, field leader.
July 2013, Shoshone Geyser Basin (4 days), backpacking sampling expedition, A Cox, field leader.
July 2013, Yellowstone National Park (2 weeks), E Shock, field leader; A Cox, team leader.
June 2013, Patagonia, AZ acid mine drainage (2 days), Brian St. Clair, field leader.
In September/October 2012 (5 total days), Joeri alpine lakes, Engadin cold springs, and Alpine farmland, Switzerland, Kurt Hanselmann, field leader.

August 2011, Iceland, (2 weeks), E Shock, field leader.
July 2011, Yellowstone National Park (2 weeks), E Shock, field leader.
November - December 2007, Brazil - Namibia, R/V Knorr, M Saito, chief scientist.
July 2006, Yellowstone National Park (2 weeks), E Shock, field leader.
June - July 2006, Florida - Barbados - Cape Verde, R/V Seward Johnson, Joseph Montoya, chief scientist.
July - August 2005, Panama - Galapagos, R/V Knorr, M Saito, chief scientist.
July 2004, Yellowstone National Park (2 weeks), E Shock, field leader.
July 2003, Yellowstone National Park (2 weeks), E Shock, field leader.

TEACHING EXPERIENCE

Montana Tech of the University of the Montana, Fall 2015
CHMY 442/540 Environmental Chemistry
CHMY 141 College Chemistry
CHMY 302 Chemistry Literature
Physical Science I & II and Chemistry I & II - South Pointe High School, Phoenix, AZ, 2015
○ Developed curriculum for Title I at risk student population and taught daily
Geomicrobiology and Biogeochemistry - ETH Zürich Department of Earth Science Masters Course, team-taught 2012
○ Developed and gave two lectures - ‘Marine Microbial Bioinorganic Chemistry from Modern to Ancient’ and ‘Oceanic Trace Metal Biogeochemistry: Interactions with Phytoplankton’
○ Developed and taught lab section - Molecular Markers of Cyanobacteria
German Tutor, Saline Area Schools, Summer 2001
Algebra and Mathematics Tutor, National Honor Society, Saline High School, 1998-2000

STUDENT MENTORING

Jordan Foster – Montana Tech Department of Chemistry and Geochemistry, Undergraduate Student

Renee Schmidt - Montana Tech Environmental Chemistry Masters Student, 2015 (A Cox, thesis advisor)

Georgia Dahlquist - Montana Tech Environmental Chemistry Masters Student, 2015 (A Cox, thesis advisor)

Molly Benkaim - ASU Barrett Honors College and Department of Chemistry and Biochemistry, Undergraduate Student 2014 - Culturing microbes from an extremely dynamic hot spring

Nicole Kündig - ETH Zürich Department of Earth Science, 2012 - The effects of changes in seawater carbonate chemistry on the lipid composition in coccolithophore *Emiliana huxleyi* (A Cox - undergraduate bachelor thesis mentor/co-examiner)

Michael Köbberich - ETH Zürich Department of Earth Science, 2012, advisor Derek Vance - Zn isotope effects in marine phytoplankton (A Cox - graduate student mentor)

INVITED SPEAKER

Cox A. Introduction to the Deep Energy Community of the DCO, University of the Azores, Sao Miguel, Portugal, September 1st, 2015.

Cox A. Coevolution of Earth's chemistry and life: A metalloprotein perspective. Jet Propulsion Laboratory, Pasadena, CA, April 9th, 2015.

Cox A. Coevolution of Earth's chemistry and life: A metalloprotein perspective. Department of Chemistry and Geochemistry, Montana Tech of the University of Montana, March 6th, 2015.

Cox A. Coevolution of Earth's chemistry and life: A metalloprotein perspective. Department of Chemistry, Brooklyn College, Brooklyn, NY, December 8th, 2014.

Cox A. Geology drives geochemistry: GEOPIG water chemistry compared to USGS drill cores. Hot Life in the Desert IX, Arizona State University, March 6th, 2014.

Cox A. Environmental proteomics in hot spring ecosystems. Deep Carbon Observatory Early Career Scientist Workshop, Costa Rica, February 18-24, 2014.

Cox A. Towards linking the presence of enzymes with metabolic flux and what precludes photosynthesis in Figure 8 and outflow channel. Hot Life in the Desert VIII, ASU, February 21th, 2013.

Cox A. The biological role and geological legacy of Vitamin E. Astrobiology Seminar, ASU, April 10th, 2013.

Cox A. Biomarker transformations after deposition can reveal changing temperatures, pressures and compositions during geologic processes. Hydrothermal Organic Geochemistry Group Meeting, ASU, March 27th, 2013.

Cox A. The biological role and the geological legacy of Vitamin E (tocopherols and tocotrienols). Lehmann Environmental Science Group Meeting, University of Basel, January 16th, 2013.

Cox A. Exploring the biological role and the geological legacy of Vitamin E. McNeill Environmental Chemistry Group Meeting, ETH, September 18th, 2012.

Cox A. Why metal uptake data are cool. WHOI Biogeochemistry Seminar, April 2nd, 2008.

Cox A. The limits of microbial photosynthesis in hot spring ecosystems. Hot Life in the Desert, ASU, February 17th, 2006.

PARTICIPANT AND PROFESSIONAL SERVICE

Sloan Foundation Proposal Reviewer, 2015

DCO 2nd International Science Meeting, Muenich, Germany, March 25-28, 2015, presentation:
Exploring life's limits: Deep geobiochemistry.

NSF Biological Oceanography Proposal Reviewer, 2015.

Research Vessel Marcus Langseth Science Oversight Committee New User Workshop, San Francisco, December 13-14, 2014.

NSF Improving Undergraduate STEM Education Program Webinar, November 5th, 2014.

Arizona Geological Society Event, November 4th, 2014.
DCO Extreme Physics and Chemistry Workshop, October 3-5th, 2014, presentation: Extreme proteomics: Linking protein presence with fluid geochemistry.
Beyond Habitability: Life and the Early Earth - Drivers of Complexity (Earliest Oxygenesis through Cryogenian), NASA/NSF/Smithsonian Institution Workshop, Washington DC, August 20-22nd, 2014, invited.
Origins 2014, Japan, July 6-11th, Environmental proteomics at life's limits: Towards origins.
DCO Data Science Workshop, Rensselaer Polytechnic Institute, Troy, June 5-6th, 2014, invited.
NSF Day, ASU, Tempe, December 5th, 2013.
Deep Submergence Science Committee (DESSC) Early Career Scientist Program, San Francisco, December 1-2, 2012.
ETH Alpine Microbiology and Biogeochemistry Field Course, Switzerland, September 3-5, 2012.
NSF Low Temperature Geochemistry and Geobiology Proposal Reviewer, 2013, 2014.

PROFESSIONAL AFFILIATIONS

2014 - present Arizona Geological Society Member
2006 - present Geochemical Society of America Member
2003 - present Sigma Xi Associate Member
2003 - present American Geophysical Union Member

OTHER PROFESSIONAL EXPERIENCE

January 2005 - May 2005, May 2004 - August 2004, May 2002 - August 2002
University of Michigan Department of Paleontology, Dan Fisher **Ann Arbor, MI**
Research Assistant - Buesching and Hyde Park mastodon bone photography, digitizing, molding and casting
<http://umorf.ummp.lsa.umich.edu/wp/wp-content/3d/bonePicker.html?name=Buesching>

August 2001 - May 2002 **ASU Department of Biology, Stan Faeth** **Tempe, AZ**
Research Assistant - fungal endophytes in native grasses

Summer 2000 **Wacker-Chemie** **Adrian, MI**
Laboratory Technician

INTERESTS

backpacking, camping, hiking, packrafting, skiing, snowboarding, kayaking, rollerblading, capoeira, painting, reading, crocheting, lobstering