

Bryn E. Kimball

Whitman College
Department of Geology
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Current Position:

Visiting Assistant Professor, Department of Geology, Whitman College; August 2014 to present

Professional Experience:

William E. White Postdoctoral Scholar, Department of Geological Sciences and Engineering,
Queen's University; July 2013 to August 2014

Adjunct Faculty, Department of Geological Sciences and Engineering, Queen's University; Jan. 2014
to May 2014

Mendenhall Postdoctoral Fellow, Eastern Mineral and Environmental Resource Science Center, U.S.
Geological Survey; Oct. 2010 to June 2013

Research Geologist, Eastern Mineral and Environmental Resource Science Center, U.S. Geological
Survey; Jan. 2010 to Sept. 2010

Education:

Ph.D., Dec. 2009 Geosciences/Biogeochemistry, Pennsylvania State University
Co-advisors: Dr. Susan Brantley and Dr. Jennifer Macalady
Dissertation title: Biogeochemical cycling of copper in acid mine drainage

B.S., June 2004 Geosciences with Honors, *Summa Cum Laude*, U. of Oregon
Thesis Advisor: Dr. Mark Reed
*Thesis title: Investigation of Hot Spring Water Composition, Mt. St. Helens,
Washington, 1986-2002*

Publications:

Cannon, W.F., **Kimball, B.E.**, Corathers, L.A. (in press) Manganese: economic and environmental
geology, and prospects for future supply, *in* Schulz, K.J., Bradley, D.C., DeYoung, J.H., and
Seal, R.R., II (eds.) Critical mineral resources: U.S. Geological Survey Professional Paper 2014-
XXXX.

Foley, N.K., Jaskula, B.W., **Kimball, B.E.**, Schulte, R. (in press) Gallium: economic and
environmental geology, and prospects for future supply, *in* Schulz, K.J., Bradley, D.C.,
DeYoung, J.H., and Seal, R.R., II (eds.) Critical mineral resources: U.S. Geological Survey
Professional Paper 2014-XXXX.

Slack, J.F., **Kimball, B.E.**, Shedd, K.B. (in press) Cobalt: economic and environmental geology
and prospects for future supply, *in* Schulz, K.J., Bradley, D.C., DeYoung, J.H., and Seal, R.R.,
II (eds.) Critical mineral resources: U.S. Geological Survey Professional Paper 2014-XXXX.

Kelley, K.D., Scott, C.T., Polyak, D.E., **Kimball, B.E.** (in press) Vanadium: economic and environmental geology and prospects for future supply, *in* Schulz, K.J., Bradley, D.C., DeYoung, J.H., and Seal, R.R., II (eds.) Critical mineral resources: U.S. Geological Survey Professional Paper 2014-XXXX.

Kimball, B.E. (2013) Chalcopyrite—bearer of a precious, non-precious metal. *Geology Today*, v. 29, p. 30-35.

Kimball, B.E., Rimstidt, J.D., and Brantley, S.L. (2010) Chalcopyrite dissolution rate laws. *Applied Geochemistry*, v. 25, p. 972-983.

Kimball, B.E., Mathur, R., Dohnalkova, A.C., Wall, A.J., Runkel, R.L., and Brantley, S.L. (2009) Copper isotope fractionation in acid mine drainage. *Geochimica et Cosmochimica Acta*, v. 73, p. 1247-1263.

Manuscripts in Preparation:

Kimball, B.E., Foster, A.L., Seal, R.R. II, Piatak, N.M., Hammarstrom, J.M. (in prep.) Copper speciation in variably toxic sediments. *Environmental Science and Technology*.

Kimball, B.E., Seal, R.R. II (in prep.) Trace copper and zinc release from jarosite. *Chemical Geology*.

Successful Research Proposals:

2013 Two year extension of beam time access, Stanford Synchrotron Radiation Lightsource (\$350,000 worth of beam time to date)
2011 Two years of beam time access, Stanford Synchrotron Radiation Lightsource
2010 Mendenhall Postdoctoral Fellowship, U.S. Geological Survey (\$56,000)
2008 Student Research Grant, International Association of Geochemistry (\$3,000)
2007 Ten days of laboratory use, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory
2005 – 2008 Science to Achieve Results Fellowship, U.S. Environmental Protection Agency

Other Research Proposals:

2007 Co-author of a National Aeronautics and Space Administration grant entitled “Organomarkers as Indicators of Biological Contributions to Rock Weathering” Co-PIs: Susan Brantley (Penn State), Jon Chorover (University of Arizona), Oliver Chadwick (University of California, Santa Barbara)

Select Awards and Honors:

2013 The William E. White Postdoctoral Scholarship, Queen’s University
2010 The Mendenhall Postdoctoral Fellowship, U.S. Geological Survey
2009 The Peter Dienes Lecturer, Penn State
2008 Center for Environmental Kinetics Analysis Graduate Assistantship, Penn State
2007, 2008 Goldschmidt Conference Student Travel Grant, Geochemical Society
2005 Science to Achieve Results Fellowship, U.S. Environmental Protection Agency
2004 Biogeochemical Research Initiative for Education Fellowship, Penn State
2004 Inducted into Phi Beta Kappa

Supervision of Student Research:

- 2013 - 2014 Supervised a senior honors thesis at Queen's University. I advised Amanda McKenzie in microscopic, spectroscopic, and X-ray diffraction characterization of contaminated stream bed sediments from the Ely Superfund Site in Vermont.
- 2011 – 2012 Co-supervisor of a student contractor from George Mason University at the U.S. Geological Survey in Reston, VA. I helped direct Natalia Ainsfield with various laboratory techniques used to characterize water, soil, and rock samples.
- 2005 Co-supervised an undergraduate summer intern from the University of Puerto Rico at Penn State. I taught Cyd Ruiz how to prepare microbiological culture medium, to grow bacteria, and to prepare bacterial cells for observation under a confocal microscope.

Teaching Experience:

- 2014, Fall Mineralogy, Whitman College
I will instruct the lectures and labs for this upper-level course in mineralogy, design the in-class and lab exercises and all student assessments.
- 2014, Winter Geochemical Characterization of the Earth, Queen's University
I co-instructed this upper-level course in geochemistry with another postdoctoral fellow. We shared the design of lectures, problem sets, laboratory exercises, and exams equally.
- 2008, Fall Environmental Geology, Penn State
As the sole teaching assistant, I organized field trips and designed, taught, and graded the lab section.
- 2006, Spring Techniques in Environmental Geochemistry, Penn State
As the sole teaching assistant, I facilitated field trips and collection of samples and directed analysis of field samples.
- 2004, Spring Introduction to Petrology, U. of Oregon
As an undergraduate teaching assistant, I answered student questions during the lab section.

Research Experience:

- 2010 – present Postdoctoral Fellow, U.S. Geological Survey and Queen's University
Experimental and field studies of trace metal speciation and mobility in mine waste environments, with an emphasis on the influence of abiogenic and biogenic secondary minerals on metal speciation
- 2004 – 2009 Graduate Research Assistant, Penn State Geosciences Department
Studied copper isotope fractionation in acid rock drainage, chalcocite and enargite dissolution, and acidophilic bacteria—jarosite interaction
- 2004 Field Assistant, U. of Oregon Geosciences Department
Mapped areas of the Tien Shan Mountains, Kyrgyzstan
- 2003 – 2004 Undergraduate Research Assistant, U. of Oregon Geoscience Department
Used FTIR to measure the H₂O content in Mt. St. Helens plagioclase melt inclusions, advised by Dr. Paul Wallace and Dr. Katharine Cashman
- 2002 Field Assistant, U.S. Geological Survey
Assisted with hot spring and gas sampling, Mt. St. Helens, Washington
- 2002 Field Assistant, U. of Oregon Geosciences Department
Assisted with the collection of mineralized vein samples and fracture measurements within the fault-bounded, hydrothermally-altered Chalk Cliffs, Colorado

Invited Oral Presentations:

- 2014, Apr. Dartmouth College, Hanover, NH
- 2013, Nov. Geological Society of Washington, Washington, D.C.
- 2013, Nov. U.S. Geological Survey, Reston, VA

2013, June U.S. Geological Survey, Menlo Park, CA
 2013, Feb. Temple University, Philadelphia, PA, Department of Earth and Environmental Science
 2012, Feb. Towson University, Towson, MD, Department of Physics, Astronomy, and Geosciences
 2009, Oct. Penn State, University Park, PA, Department of Geosciences
Distinguished Peter Deines Lecturer
 2009, Sept. University of Delaware, Newark, DE, Department of Geosciences
 2009, Sept. ETH Zürich, Zürich, Switzerland, Department of Environmental Science

Current and Recent Collaborators:

Heather Jamieson (Queen’s University), Danielle Fortin (University of Ottawa), Robert Seal (U.S. Geological Survey), Denise Akob (U.S. Geological Survey), David Borrok (University of Louisiana, Lafayette), Andrea Foster (U.S. Geological Survey), Samuel Webb (Stanford Synchrotron Radiation Lightsource), Alice Dohnalkova (Pacific Northwest National Laboratory), Kenneth Kemner (Argonne National Laboratory), J. Donald Rimstidt (Virginia Polytechnic Institute and State University), Jeffery Vervoort (Washington State University), Jennifer Macalady (Pennsylvania State University), Susan Brantley (Pennsylvania State University)

Analytical and Computational Skills:

Analytical: Transmission and Scanning Electron Microscopy paired with Energy Dispersive X-ray Spectroscopy, X-ray Absorbance Spectroscopy, X-ray Fluorescence Microscopy, Fourier Transform Infrared Spectroscopy and Raman Spectroscopy, Spectrophotometry, bulk- and micro-X-ray Diffraction, Ion Chromatography, Atomic Absorption Spectrometry, Inductively Coupled Plasma (ICP) Atomic Emission Spectrometry, ICP-Mass Spectrometry, Multi-collector ICP-Mass Spectrometry, Polymerase Chain Reaction, Fluorescence In-Situ Hybridization, sterile microbiological culturing techniques (oxic and anoxic)
 Computational: PC, Macintosh; plotting software including Kaleidagraph, Origin, and R; Adobe Photoshop and Illustrator; JMP and R for statistics; Geochemical modeling software including PHREEQC and Geochemist’s Workbench; X-ray Diffraction analysis software including X’Pert HighScore Plus and JADE; the X-ray Fluorescence Microscopy analysis package Microanalysis Toolkit; the X-ray Absorption Spectroscopy analysis packages Athena and SixPack

Service to the Professional Community:

2013 Program Chair for the Geological Society of Washington
 Peer-review for: *Applied Geochemistry, Journal of Geochemical Exploration, Geochimica et Cosmochimica Acta, Ore Geology Reviews, Icarus, Astrobiology*, and internal U.S. Geological Survey publications

University Service:

2005 – 2006 Member of the Environmental Chemistry Student Symposium committee
 2004 – 2005 Member of the Geosciences Department colloquium committee, Penn State

Professional Society Memberships:

Geochemical Society
 Geological Society of Washington
 Geological Society of America

Published Abstracts:

- Kimball, B.E., Foster, A.L., Seal, R.R. II, Piatak, N.M., Hammarstrom, J.M. (2012) Copper speciation in variably toxic sediments: Ely Copper Mine Superfund Site, Vermont. The 22nd V.M. Goldschmidt Conference, Montreal, Canada, June 24-29, 2012.
- Kimball, B. E., Rimstidt, J. D., Brantley, S. L. (2010) Development of chalcopyrite dissolution rates laws through meta-analysis. Geological Society of America, 2010 annual meeting.
- Kimball, B. E., Dohnalkova, A. C., Kemner, K., Lai, B., Macalady, J., and Brantley, S. L. (2009) Using TEM and μ -XRF to characterize bacterially-mediated precipitation of dissolved copper. *Geochimica et Cosmochimica Acta*. v. 73(13), p. A656.
- Kimball, B. E., Mathur, R., Dohnalkova, A., and Brantley, S. L. (2008) Copper isotopic fractionation in acid mine drainage. *Geochimica et Cosmochimica Acta*. v. 72, p. A473.
- MacLean, L. C. W., Southam, G., Kimball, B. E., Brantley, S. L., Wirick, S. (2008) Scanning transmission x-ray microscopy (STXM) in biogeochemical environments. *Geochimica et Cosmochimica Acta*. v. 72, p. A581.
- Kimball, B. E., Brantley, S. L., and Mathur, R. (2007) Using copper isotopes to distinguish biotic and abiotic effects on acid mine drainage. *Geochimica et Cosmochimica Acta*. v. 71(15), p. A485.
- Kimball, B. E., Brantley, S. L., Mathur, R., and Vervoort, J. D. (2006) Copper isotopic composition of stream water documents sulfide mineral dissolution during acid mine drainage. Geological Society of America, 2006 annual meeting.
- Kimball, B. E., Mathur, R., Brantley, S. L., and Vervoort, J. D. (2005) Investigating the copper isotope composition of Red Mountain Creek: A stream affected by acid mine drainage. *EOS Trans. AGU*. v. 86(52), Abstract H31B-1304, Fall Meet. Suppl.