

## Dr. Johanna M. Blake

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### APPOINTMENTS

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<b>United States Geological Survey, New Mexico Water Science Center</b>	Albuquerque, NM
<b>Hydrologist</b>	November 2015-present

### EDUCATION

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<b>University of New Mexico</b>	Albuquerque, NM
<b>Postdoctoral Fellow, NSF EPSCoR</b>	July 2014-October 2015

Departments of Chemistry, Earth and Planetary Sciences, and Civil Engineering

Mentors: Dr. Stephen Cabaniss (Chemistry), Dr. Abdul-Mehdi Ali (Earth and Planetary Sciences), and

Dr. Jose Cerrato (Civil Engineering)

<b>Lehigh University</b>	Bethlehem, PA
<b>Ph.D.</b> , Major: Earth and Environmental Sciences	May 2014
Dissertation: <i>Geologic, tectonic, and geochemical signatures leading to arsenic in groundwater in the Gettysburg Basin</i>	
Advisor: Dr. Stephen C. Peters	

<b>Lehigh University</b>	Bethlehem, PA
<b>M.S.</b> , Major: Earth and Environmental Sciences	May 2010
Thesis: <i>The fluxes and transport mechanisms of groundwater and surface water contaminants (Cd, Zn, Pb, As, and Cr) into a fluvial system: Palmerton, PA</i>	
Advisor: Dr. Stephen C. Peters	

<b>University of New Mexico</b>	Albuquerque, NM
<b>B.S.</b> , Major: Earth and Planetary Sciences, Minor: Distributed, Magna Cum Laude	July 2007
Senior Thesis: <i>The Gabbros of Monhegan Island, Maine: Formation in an Arc, or at a Mid-ocean Ridge?</i>	
Advisor: Dr. Jane Selverstone	

<b>Washington College</b>	Chestertown, MD
<b>B.A.</b> , Major: Psychology, Minor: Business Administration,	May 1999
Senior Thesis: <i>The Happiness of College Students</i>	
Advisors: Dr. George Spilich and Dr. Jim Siemen	

### AWARDS AND HONORS

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- NSF EPSCoR Interdisciplinary Working Group Award Co-PI
  - Lehigh University Graduate Student Teaching Award 2012
  - Lehigh University Department of Earth and Environmental Sciences Teaching Assistant of the Year, Academic Year 2010-2011
  - Geological Society of America Student Research Grant, 2012
  - Lehigh University College of Arts and Sciences Teaching Assistant summer fellowship- Summer 2010, Summer 2012
  - Best Poster- Lehigh University Earth and Environmental Sciences Graduate Symposium- February 2012

- UNM Department of Earth & Planetary Sciences Harry and Mabel Leonard Scholarship through the UNM Foundation
- UNM Department of Earth & Planetary Sciences J. Paul Fitzsimmons Award
- NMGS Fall 2006 Field Conference Scholarship Attendee
- December 2006 Albuquerque Gem and Mineral Club Award
- Outstanding Woman Geoscience Student Award from the Association for Women Geoscientists, Laramide Chapter
- Voted Outstanding Sophomore and Outstanding Senior by the UNM Department of Earth & Planetary Sciences Faculty

#### **PEER REVIEWED PUBLICATIONS AND MANUSCRIPTS IN REVIEW**

- Blake, J.M.** and Peters, S.C. 2015. The occurrence of and dominant controls on arsenic in the Newark and Gettysburg Basins. *Science of the Total Environment*. DOI: 10.1016/j.scitotenv.2014.02.013
- Blake, J.M.**, Avasarala, S., Artyushkova, K., Ali, A.S., Brearly, A.J., Shuey, C., Robinson, W.P., Bill, S., Lewis, J., Hirani, C.\*, Lezama-Pacheco, J.S., and Cerrato, J.M. 2015. Elevated concentrations of U and co-occurring metals in abandoned mine wastes in a Northeastern Arizona Native American community. *Environmental Science and Technology*. 49, 8506–8514. DOI: 10.1021/acs.est.5b01408
- Blake, J.M.**, Peters, S.C., and Casteel, A.\*, 2015. Zinc, copper, nickel, and arsenic monitoring in natural streams using in-situ iron-manganese oxide coated stream pebbles. *Journal of Geochemical Exploration*. 158, 168-175. <http://dx.doi.org/10.1016/j.gexplo.2015.07.013>
- Blake, J.M.** and Peters, S.C. 2015. Application of REE geochemical signatures for sediment provenance to the Gettysburg Basin. *Sedimentary Geology: Submitted*.

#### **PEER REVIEWED MANUSCRIPTS IN PREPARATION**

- Blake, J.M.**, and Peters, S.C., The fluxes and transport mechanisms of groundwater and surface water contaminants (Cd, Zn, Pb, and Cr) into a fluvial system: Palmerton, PA. *In preparation for Toxicology and Environmental Chemistry*.
- Blake, J.M.**, Dykman, J.N.\*, Pazzaglia, F.J., and Peters, S.P. Alignment and divergence of pedologic, geomorphic, and geochemical data for Critical Zone hillslope soils in central PA. *In preparation for Geoderma*.
- Blake, J.M.**, Avasarala, S.M., Ali, A.S., Brearley, A.J., Spilde, M., Lezama-Pacheco, J.S., Artyushkova, K. and Cerrato, J.M. Mobility of metals from abandoned mine wastes. *In preparation for Environmental Science and Technology*.
- Blake, J.M.**, DeVore, C., Avasarala, S., Ali, A.S., Spilde, M., Roldan, C.\*, Bowers, F.\*, Artyushkova, K., and Cerrato, J.M. Uranium transport along the Rio Paguete, Jackpile Mine, Laguna Reservation. *In preparation for Applied Geochemistry*.

\*Undergraduate authors

#### **PRESENTATIONS and CONFERENCE PROCEEDINGS**

- Blake, J.M.**, Ali, A., Avasarala, S., Brearley, A., Cerrato, J. 2014. Dissolution of As and U in Abandoned Mine Wastes. AGU Fall Meeting 2014.
- Ali, M., Avasarala, S., Cerrato, J., and **Blake, J.M.** 2014. Chemical and mineralogical characterization of abandoned mine waste in northeastern Arizona. GSA Annual Meeting 2014.
- Blake, J.M.** 2014. How tectonic history influences arsenic in groundwater in the Newark and Gettysburg Basins. Wilkes University. **Invited Talk**.

- Peters, Stephen C., Pazzaglia, Frank J., **Blake, Johanna M.**, and Dykman, Jordan Nicole. 2014. Chemical weathering and soil formation from multiple parent materials in central Pennsylvania. NE GSA, 2014.
- Dykman, Jordan Nicole, Pazzaglia, Frank J., Peters, Stephen C., and **Blake, Johanna M.** 2014. Alignment and divergence of pedologic, geomorphic, and geochemical data for hillslope soils in central PA. NE GSA, 2014.
- Blake, J.M.**, Peters, S.C., and Casteel, A. 2013. Validation of In-Situ Iron-Manganese Oxide Coated Stream Pebbles as Sensors for Arsenic Source Monitoring. AGU Fall Meeting Abstracts, 2013.
- Blake, J.M.**, 2013. Water-rock interactions of arsenic in the Gettysburg Basin, Pennsylvania, USA. Geological Society of America Abstracts with Programs, 2013.
- Blake, J.M.**, 2013. Arsenic in rocks and water in the Newark and Gettysburg Basins. Finger Lakes Community College. **Invited Talk.**
- Blake, J.M.** and Peters, S.C., 2013. The occurrence and dominant controls of arsenic in the Newark and Gettysburg Basins Geological Society of America Abstracts with Programs, Northeastern Section, Vol. 45, No. 1, p. 46. Talk.
- Blake, J.M.** and Peters, S.C., 2012. Arsenic in the Newark and Gettysburg Basins: Does distance from sediment source matter? Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p.51. Talk.
- Blake, J.M.T.**, and Peters, S.C., 2012. Assessing the relationship between accreted terranes and arsenic in the Newark Supergroup of the Gettysburg Basin. Geological Society of America Abstracts with Programs, Northeastern Section, Vol. 44, No. 2, p. 41. Talk.
- Blake, J.M.T.**, and Peters, S.C., 2011. How Tectonic History and Geochemical Processes Could Influence Arsenic in Drinking Water. Ref: Abstract No: 195681. GSA Abstracts with Programs Vol. 43, No. 5. Talk.
- Blake, J.M.**, 2011. **Invited Talk:** Lehigh Valley Watershed Conference, March 11, 2011. Understanding metals transport in a large fluvial system.
- Blake, J. M.**, Peters, S.C., 2009, The fluxes and transport mechanisms of groundwater and surface water contaminants (Cd, Zn, Pb, As, and Cr) into a fluvial system: Palmerton, PA. Eos Trans. AGU, 90(52) Fall Meet. Suppl., Abstract H23B-0942.
- Sahagian, D.L., Peters, S.C., Yasko, G., **Blake, J.M.**, Smith, K., Lofaro, J, and Burrows, J.E., 2009, Horizontal and Vertical Distributions of Metals in Soils in Southeastern PA: Impact of 20th Century Zinc Smelting Operations. Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract B41B-0311.

## **TEACHING EXPERIENCE**

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*University of New Mexico Department of Chemistry*

**Postdoctoral Professor, Environmental Chemistry**

Fall 2014, Fall 2015

**Mentor**, PhD candidate Department of Civil Engineering

Fall 2014

**Mentor**, three undergraduate minority student summer projects (AMP/SCCORE)

Summer 2014

*Muhlenberg College Department of Chemistry*

**Lecturer**, Environmental Geology Laboratory

Fall 2013

*Lehigh University Department of Earth & Environmental Sciences*

**Adjunct Professor, Introduction to Planet Earth**

Fall 2013

**Mentor**, High School student capstone project

Summer 2013

**Mentor**, Independent Undergraduate Research and Senior Capstone Projects

Spring 2011-  
Spring 2014

**Teaching Assistant**, Updating curriculum for Exploring Earth

Summer 2013

**Teaching Assistant**, The Environment and Living Systems

Summer 2013

<b>Teaching Assistant</b> , Limnology	Spring 2013
<b>Teaching Assistant</b> , Exploring Earth: Integrated Intro Lab	Spring 2013
<b>Teaching Assistant</b> , Surficial Processes	Fall 2012
<b>Teaching Assistant</b> , Earth System Science	Fall 2011
<b>Teaching Assistant</b> , Geographical Analysis of a Changing World	Spring 2011
<b>Teaching Assistant</b> , Earth History	Spring 2010-12, 2014
<b>Teaching Assistant</b> , <u>Field Camp</u>	Summer 2010, 2011, 2012
<b>Teaching Assistant</b> , <u>Hydrogeology</u>	Fall 2009, 2010

## **RESEARCH EXPERIENCE**

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*Uranium Science Group*, NSF NM EPSCoR funded research, UNM July 2014-present  
Analyze geochemical parameters of abandoned mine waste and associated waters through acid and base extractions, ICP-OES, ICP-MS, and XRF analysis. Characterize surface redox parameters, chemical distribution and crystal structure through advanced spectroscopy and microscopy tools such as SEM-EDS, XPS, and XANES. Create geochemical models using PHREEQC and VMINTEQ.

*Geochemistry in and around the Gettysburg Rift Basin*, Lehigh University May 2010-May 2014  
Organized and performed field sampling of bedrock, surface and groundwater across the mid-Atlantic states of the US. Rocks were prepared for analysis using acid dissolution. Alkalinity titrations were performed on water in addition to measure pH, temperature and conductivity. All samples were analyzed by ICP-MS for major elements, arsenic (coupled with Hydride Generation), rare earth elements, and additional trace elements.

*In-situ stream pebbles as environmental monitors*, Lehigh University May 2010-May 2014  
Organized field and laboratory methods for sampling stream pebbles and water. Pebbles were leached with nitric and hydrochloric acid, followed by filtration and dilution for analysis by ICP-MS. Locations and data were analyzed using ArcGIS, PHREEQC, and Excel.

*Groundwater-surface water interactions near a closed zinc smelter*, August 2008-May 2010  
Lehigh University  
Surface water was sampled periodically at 5 locations along a reach of the Lehigh River, in eastern Pennsylvania, adjacent to a closed zinc smelter. Groundwater samples were collected using a peristaltic pump and waiting for water parameters such as pH and temperature to equilibrate. The fluxes of zinc, lead, cadmium and chromium were calculated via Excel and data was plotted using Aabel and Adobe Illustrator.

*Metals Contamination of Soils from 20th Century Zinc Smelting*, August 2008-August 2009  
Lehigh University  
Traveled within a 15 km radius of a closed zinc smelter to sample the A horizon of soils. The goal of this project was to assess the contamination radius from the smelter particulates. Soils were digested with hydrogen peroxide and nitric acid followed by filtration and dilution for analysis by ICP-MS. The data was then analyzed using Excel and ArcGIS.

*Geochemistry of Gabbros of Monhegan Island, Maine* August 2006-May 2007  
Bedrock samples were crushed and sieved to 100 mesh for digestion and fusion for ICP and XRF analysis respectively. Samples were analyzed and data was compared to public datasets of other igneous rocks. Electron microprobe thin sections were made by an outside source and then analyzed at the University of New Mexico.

*Geology of Carrizo Arroyo Area: Laramide Deformation -*  
Class Project, University of New Mexico

January 2007-May 2007

This was a field based mapping project to understand the deformation in the Carrizo Arroyo. Measurements were made with Brunton compasses and Jacob staffs.

### **INSTRUMENTATION AND TECHNICAL SKILLS**

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES), Ion Chromatography (IC), X-Ray Fluorescence (XRF), High Performance Liquid Chromatography (HPLC), Total Organic Carbon (TOC), Atomic Absorption (AA), Scintillation Counter, Gas Proportional Counter, Picarro Isotopic Analyzer, XPS, XANES

Data processing, statistics and modeling using Microsoft Excel, SigmaPlot, Aabel, ArcGIS, PHREEQC, VMINTEQ

### **RELATED WORK EXPERIENCE**

#### **Field and GIS Assistant**

*Consulting*

Bethlehem, PA

August-2009-May 2010

- Collect trail data using GPS and ArcPad at the Lehigh Gap Nature Center and use ArcGIS to compile data into a map for the Lehigh Gap Nature Center.

#### **Chemist-Operational in the Radiochemistry Department**

*State of New Mexico, Department of Health, Scientific Laboratory Division, Albuquerque, NM*

January 2008-August 2008

- Prepare and analyze groundwater and surface water for Ra-226 using a Gas Scintillation Counting System

#### **Chemist-Basic in the Radiochemistry Department**

*State of New Mexico, Department of Health, Scientific Laboratory Division, Albuquerque, NM*

July 2007-January 2008

- Radiochemistry of waters
- Prepare and analyze groundwater and surface water for gross alpha beta using a Gas Proportional Counter

#### **Laboratory Technician**

*University of New Mexico Department of Earth and Planetary Sciences, Albuquerque, NM*

October 2004-May 2007

- Experience in instrumental chemical analysis using: Inductively Coupled Plasma-Atomic Emission Spectrometer, X-Ray Fluorescence Spectrometer, Ion Chromatography, Flame Atomic Absorption, Hydride Generation.
- Develop methods for analyses.
- Prepare rock, water, and soil samples for analysis by performing one or more of the following: pulverizing, acid digestion, acid extraction, fusion, press pellets, filtration.
- Manage laboratory budget by tracking revenues and expenses.
- Order supplies
- Assist in teaching undergraduate and graduate classes and other laboratory users on laboratory procedures.
- Follow safety guidelines set by University's Safety Health and Environmental Administration
- Perform data processing, validation and reporting.

## **PROFESSIONAL DEVELOPMENT**

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NE GSA Spring Meeting- March 2012, March 2013, March 2014  
Lehigh University Teacher Training, Fall 2012  
AWG Conference- March 2012  
GSA - October 2011, October 2012, October 2013  
Lehigh Valley Watershed Conference- October 2009, March 2011  
AGU Fall Meeting- December 2009, December 2013  
New Mexico Geological Society 44<sup>th</sup> Field Conference- October 2006  
Lehigh Gap Nature Center Roundtable- July 2009

## **AFFILIATIONS/MEMBERSHIPS**

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American Geophysical Union  
Association of Women in Geosciences  
Geological Society of America  
Geochemical Society  
American Chemical Society

## **SERVICE**

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Co-Director of NSF funding Alliance for Minority Participation (AMP) program  
Reviewer for *Science of the Total Environment* and *Journal of Analytical Chemistry*  
Co-organizer of Lehigh University EES Seminar Series, Fall 2011-Fall 2013.  
Member- Bethlehem Environmental Advisory Council, January 2011- Spring 2014  
Lehigh University EES Student Travel Fund Coordinator, Fall 2010-Spring 2011.  
Student member on Lehigh University EES Department Graduate Information Council, Fall 2008-Spring 2009