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**Drew E. Latta, Ph.D.**

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**EDUCATION**

**Ph.D. in Civil and Environmental Engineering** 12/2010

The University of Iowa, Iowa City, Iowa

Dissertation: *A Geochemical Investigation of Heterogeneous Redox Reactions Between Fe(II), Fe(III), and Uranium*

Faculty advisor: Prof. Michelle M. Scherer

**Bachelor of Science in Engineering - Civil and Environmental Engineering** 12/2005

The University of Iowa, Iowa City, Iowa

**RESEARCH INTERESTS**

My research provides molecular scale answers to outstanding questions in the global biogeochemical cycling of elements at the Earth's surface and in the critical zone. I use stable isotope geochemistry, spectroscopic methods, and electrochemistry to track how redox reactions influence biogeochemical cycles. I am particularly interested in the life cycle of elements important to emerging technology and sustainable energy applications, including the rare earth elements and radionuclides.

**RESEARCH EXPERIENCE**

**Postdoctoral Associate** 04/2011–Present

Biosciences Division, Argonne National Laboratory, Argonne, Illinois

Supervisor: Maxim I. Boyanov

- Investigated reduction-oxidation (redox) reactions of uranium under subsurface-relevant geochemical conditions.
- Gained experience in synchrotron x-ray absorption spectroscopy data collection, processing, and interpretation.
- Collaborated with researchers at Pacific Northwest National Laboratory and Utah State University in research studies of geochemical processes.

**Postdoctoral Associate** 01/2011-04/2011

Department of Civil and Environmental Engineering, The University of Iowa, Iowa City, Iowa

Supervisor: Michelle M. Scherer

- Developed a method to measure redox transformations of iron minerals using enriched stable isotope tracers with a quadrupole ICP-MS.
- Trained undergraduate and graduate students on geochemical laboratory procedures, use of stable isotope tracers, and collection of and analysis of Mössbauer spectroscopic data.

**Graduate Research Assistant** 01/2006-12/2010

Department of Civil and Environmental Engineering, The University of Iowa, Iowa City, Iowa

- Applied Mössbauer spectroscopic techniques and geochemical measurements to investigate redox transformations of iron minerals under geochemically complex conditions.
- Provided molecular-level insights into heterogeneous redox reactions between iron minerals and uranium using Mössbauer spectroscopy and wet-chemical methods.
- Collected and preserved reduced soil samples, analyzed their mineralogy, and determined the reactive iron minerals in the samples using geochemical techniques and Mössbauer spectroscopy.

**PEER REVIEWED PUBLICATIONS**

**Latta, D.E.;** J. Bachman, M.M. Scherer. Effect of Cation Substitution and Anion Sorption on Electron Transfer between Fe(II) and Goethite. *Environmental Science & Technology* **2012**, 46(19), 10614-10623. DOI: 10.1021/es302094a

Dimkpa, C.O.; J.E. McLean, **D.E. Latta**, E. Manangón, D.W. Britt, W.P. Johnson, M.I. Boyanov, A.J. Anderson. CuO and ZnO nanoparticles: phytotoxicity, metal speciation, and induction of oxidative stress in sand-grown wheat. *Journal of Nanoparticle Research* **2012**, 14, 1125-1139. DOI 10.1007/s11051-012-1125-9

**Latta, D.E.;** E.J. O'Loughlin, K.M. Kemner, M.I. Boyanov, M.M. Scherer. Abiotic reduction of uranium by Fe(II) in soil. *Applied Geochemistry* **2012**, 27 (8), 1512-1524. DOI: 10.1016/j.apgeochem.2012.03.003

**Latta, D.E.;** C.A. Gorski, E.J. O'Loughlin, M.I. Boyanov, K.M. Kemner, M.M. Scherer. Influence of Magnetite Stoichiometry on U<sup>VI</sup> Reduction. *Environmental Science & Technology* **2012**, 46 (2), 778-786. DOI: 10.1021/es2024912

**PUBLICATIONS IN REVIEW**

**Latta, D.E.;** C.I. Pearce, K.M. Rosso, K.M. Kemner, M.I. Boyanov. Reaction of U<sup>VI</sup> with titanium-substituted magnetite: Influence of Ti on U<sup>IV</sup> speciation. Submitted to: *Environmental Science & Technology*.

**Latta, D.E.;** C.A. Gorski, M.M. Scherer. Influence of Fe<sup>2+</sup> Catalyzed Fe Oxide Recrystallization on Metal Cycling: A Brief Review. Submitted to: *Biochemical Society Transactions*.

**FIRST-AUTHOR PRESENTATIONS****INVITED**

**Latta, D.E.;** C.I. Pearce, C.A. Gorski, K.M. Rosso, K.M. Kemner, M.I. Boyanov. Reactivity of U(VI) with pure, oxidized, and Ti-substituted magnetites. Abstracts, The 22<sup>nd</sup> V.M. Goldschmidt Conference. Montreal, Canada, June 24-29, 2012.

**Latta, D.E.** Spectroscopic and isotope tracer studies of U and Fe redox cycling. Advanced Photon Source lunch-time seminar. Argonne, IL, United States, February 10, 2012.

**CONTRIBUTED**

**Latta, D.E.;** M.I. Boyanov, K.M. Kemner, E.J. O'Loughlin, M.M. Scherer. Ferrous iron minerals in soil reduce uranium<sup>VI</sup>. Oral Presentation. Abstracts, 243<sup>rd</sup> ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012.

**Latta, D.E.;** J. Bachman, M.M. Scherer. Contrasting effects of phosphate and aluminum on iron redox dynamics. Oral Presentation. Abstracts, 243<sup>rd</sup> ACS National Meeting & Exposition, San Diego, CA, United States, March 25-29, 2012.

**Latta, D.E.;** Boyanov, M.I.; O'Loughlin, E.J.; Kemner, K.M.; Scherer, M.M. *Abiotic Reduction of Uranium by Fe(II) in Soil*. Poster presentation. Abstracts, Subsurface Biogeochemical Research Contractor-Grantee Workshop, Washington, D.C., United States, March 29-31, 2010.

**Latta, D.E.** and Scherer, M.M. *Influence of Al, Mn, and Phosphate on Reaction of Fe(II) with*

*Goethite*. Oral presentation. Abstracts of Papers, 239<sup>th</sup> ACS National Meeting, San Francisco, CA, United States, March 21-25 2010.

**Latta, D.E.** and M.M. Scherer. *Redox reactions of aluminum substituted goethite*. Poster presentation. 2009 Association of Environmental Engineering and Science Professors Conference, July 26-29, 2009.

**Latta, D.E.;** E.J. O'Loughlin, M.I. Boyanov, K.M. Kemner, M.M. Scherer, *Reduction of U(VI) by soil containing natural green rust*. Oral presentation. Abstracts of Papers, 237<sup>th</sup> ACS National Meeting, Salt Lake City, UT, United States, March 22-26, 2009.

**Latta, D.E.;** E.J. O'Loughlin, K.M. Kemner, M.I. Boyanov, M.M. Scherer. *Reaction of U(VI) with anionic clay minerals*. Poster presentation. Abstracts of Papers, 235<sup>th</sup> ACS National Meeting, New Orleans, LA, United States, April 6-10, 2008.

#### AWARDS AND GRANTS

Argonne National Laboratory Electron Microscopy User Facility	09/2011-Present
Proposal title: <i>Role of Fe and S as redox buffers that mediate the subsurface mobility of uranium</i>	
• Awarded user facility time on electron microscopes	
U.S. DOE Environmental Remediation Sciences Program Travel Fellowship	03/2010
Neil B. Fisher Fellowship	09/2008 – 05/2009
Center for Global and Regional Environmental Research, Student Travel Grant	03/2008

#### TEACHING EXPERIENCE

Seminar in College Teaching	
• Attended a class on practical methods in collegiate teaching with a practicum exercise.	
Practicum: Guest Lecturer, Geology for Engineers	Spring 2009
Teaching Assistant, Geology for Engineers	Spring 2008
Teaching Assistant, Engineering Problem Solving I	Fall 2006
Teaching Assistant, Natural Environmental Systems	Spring 2006

#### PROFESSIONAL SERVICE

Argonne National Laboratory Energy Showcase Volunteer	09/2012
Co-chair Argonne Electron Microscopy Center Workshop, Argonne Users' Meeting.	05/2012

#### AD HOC PEER REVIEWER

*Environmental Science & Technology*  
*Geochimica et Cosmochimica Acta*  
*American Mineralogist*