

Amrita Bhattacharyya, PhD (Environmental Soil Chemistry)

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Postdoctoral Research Fellow, Geochemistry, *Lawrence Berkeley National Laboratory*, July 2015-present. Research Topic: *Organic Matter Transformations in Wet Tropical Soils: The Effects of Redox Fluctuation*.

Mentor: Dr. Peter Nico

Postdoctoral Research Fellow, Soil and Environmental Biogeochemistry, *Colorado State University*, March, 2013 – June, 2015. Research Topic: *Geochemical Characterization and Reactive Transport Modeling of Uranium at an In-Situ Recovery (ISR) Uranium Mine*.

Mentor: Dr. Thomas Borch

EDUCATION

Ph.D: Environmental Soil Chemistry, Department of Ecosystem Science and Management, *The Pennsylvania State University*, December 2012. Dissertation title: *Biogeochemistry of Iron in Organic Soils and Fe-organic complexes: From Molecular to Field Scale Processes*.

Advisor: Dr. Carmen Enid Martínez

M.Sc.: Soil Science, Department of Agricultural Sciences, 2007, *University of Calcutta*, India. Research topic: *Transport and Degradation of Pendimethalin, a dinitroaniline herbicide in an acidic Indian soil*.

Advisor: Dr. Ashim Chowdhury

B.Sc.: Chemistry (Honors); Physics and Mathematics (Minors). *University of Calcutta*, 2004, India.

RESEARCH INTERESTS

Metal redox processes in relation to C, N cycling, redox interactions of iron with organic matter in soils and model Fe-organic complexes; uranium redox chemistry and remediation at in-situ recovery mines; environmental biogeochemistry; synchrotron x-ray absorption spectroscopy, metal geomicrobiology

WORK EXPERIENCE

July, 2015 – present: Postdoctoral Research Fellow, Earth Sciences Division, Lawrence Berkeley National Laboratory

March, 2013 – June, 2015: Postdoctoral Research Fellow, Soil and Environmental Biogeochemistry, Colorado State University

2008-2012: Graduate Research Assistant, Department of Ecosystem Science and Management, The Pennsylvania State University

SKILLS

Professional:

- Worked independently as a general user several times in beamlines at National Synchrotron Light Source (Brookhaven National Laboratory); Advanced Photon Source (Argonne National Laboratory); and Stanford Synchrotron Radiation Light Source (Stanford University)
- Analysis of X-Ray Absorption Spectroscopy (Fe L-edge XANES, Fe K-edge EXAFS, O K-edge XANES, C K-edge XANES, S K-edge XANES, N K-edge XANES, U L-edge EXAFS) data using Athena and Artemis
- Modeling of XAS data using Charge Transfer Multiplet Calculations (CTM4XAS program)
- Experienced in working in wet chemical laboratory and with anaerobic chamber
- Thermodynamic calculations (Visual Minteq)
- SIGMAPLOT
- Basic MATLAB user: data plotting
- Proficient in Microsoft Office; Adobe Illustrator; basic knowledge of DFT calculations using Gaussian and Gaussview.

Field: Hands-on experience at collecting soil cores at In-situ Recovery Uranium Mines in collaboration with Cameco Resources, Inc; water sampling by lysimeters at Shale Hills Critical Zone Observatory, PA

Presentational: Wrote and reviewed journal articles; wrote and reviewed proposals to obtain beamtime at synchrotron facilities to do synchrotron work; gave poster and oral presentations

Teaching Experience:

- Soil Chemistry Instructor at Summer Soil institute at Colorado State University, June, 2014, 2015.
- Instructor for Graduate level Environmental Soil Chemistry (SOCR567) course, Spring semester, 2014, Department of Soil and Crop Sciences, Colorado State University.

- Soils 101 Laboratory Instructor, Department of Ecosystem Science and Management, The Pennsylvania State University, University Park, Spring, 2009, 2010

Mentoring Experience: Kelly Patches, Undergraduate Teaching Assistant, Spring Semesters-2009, 2010

Personal: Excellent communication and organizational skills; responsible and attentive to details

Award and Scholarships

- Graduate Research Assistantship- NSF, CEKA, The Pennsylvania State University, August, 2008-July 2010
- Graduate Research Assistantship- The Pennsylvania State University, August, 2010-December, 2012
- Best speaker award in MS oral presentations, University of Calcutta, India, 2007

Meeting Abstracts

- Bhattacharyya, A., Campbell, K.M., Roebbert, Y., Weyer, S., Bernier-Latmani, R. and Borch, T. 2015 (American Chemical Society, Denver, CO, USA; Geochemistry Division Oral presentation) **Elucidating the role of non-crystalline U(IV) in uranium roll front formation.**
- Bhattacharyya, A., Campbell, K.M., Stone, J. and Borch, T. 2014 (Soil Science Society of America Annual Meeting, Oral Presentation Long Beach, CA, USA) **Geochemical Characterization of Uranium from Baseline- and Post-Mining Site Conditions at an In-situ Recovery (ISR) Mine.**
- Percak-Dennett, E.M., Roden, E.E., Xu, H., Konishi, H., Chan, C., Bhattacharyya, A. and Borch, T. 2014. Invited talk by Dr. Eric E. Roden (Goldschmidt Annual Conference, Sacramento, CA, USA) **Microbial chemolithoautotrophic oxidation of pyrite at neutral pH.**
- Bhattacharyya, A., Borch, T., Johnson, T. and Stone, J. 2013 (Global U-2013 Symposium, Oral Presentation, Corpus Christi, TX, USA) **Geochemical Characterization of Uranium from Baseline- and Post-Mining Site Conditions at an In-situ Recovery (ISR) Mine.**
- Bhattacharyya, A., Dvorak, J. and Martínez, C.E. 2012 (Goldschmidt Meeting, Oral Presentation, Montreal, Canada) **Monitoring Oxidation-Reduction Reactions between redox active Fe and Cysteine: An Insight into Fe Coordination Chemistry**
- Bhattacharyya, A., Dvorak, J. , Stavitski, E. and Martínez, C.E. 2012 (American Chemical Society Oral Presentation, San Diego; Environmental Chemistry Student Symposium Oral presentation, Penn State University) **Iron speciation in redox stratified peat soils**

- Bhattacharyya, A., Dvorak, J. and Martínez, C.E. 2011 (American Chemical Society Poster) **XANES Investigations of Fe(II,III)-Cysteine Complexes: An Insight into Coordination Chemistry**
- Bhattacharyya, A. and Martínez, C.E. 2010 (Environmental Chemistry Student symposium Poster, Penn State University) **Fe L-edge X-Ray Absorption Near Edge Spectroscopy (XANES) Analyses of forested soils from the Shale Hills watershed: Fe species as a function of landscape position and soil depth.**
- Bhattacharyya, A. and Martínez, C.E. 2009 (Center for Environmental Kinetics Analysis Annual Meeting Poster Presentation, Penn State University) **Iron Chemistry in the Shale Hills Watershed of Central Pennsylvania**

Publications

- Bhattacharyya, A., Stavitski, E., Dvorak, J. and Martínez, C.E. 2013. **Redox interactions between Fe and cysteine: Spectroscopic studies and multiplet calculations.** *Geochimica et Cosmochimica Acta*, **122**, 89-100.
- Bhattacharyya, A., Stavitski, E., Dvorak, J. and Martínez, C.E. **Sulfur and nitrogen functionalities of organic ligands and the (de)-stabilization of the oxidation state of iron in relation to its propensity to undergo redox transformations.** (*under review*)
- Bhattacharyya, A., Stavitski, E., Dvorak, J. and Martínez, C.E. **Co-existence and stabilization of Fe(II) and Fe(III) in oxic and anoxic peats: an insight into Fe-organic matter redox chemistry.** (*very soon to be submitted to Environmental Science & Technology*)
- Bhattacharyya, A., Campbell, K., Stone, J. and Borch, T. **Hydrobiogeochemical Controls on the Fate of Uranium (U) at an In-Situ Recovery Uranium Mine** (*in preparation*)
- Bhattacharyya, A., Campbell, K.M., Roebbert, Y., Weyer, S., Bernier-Latmani, R. and Borch, T. **Elucidating the role of non-crystalline U(IV) in U roll-front formation** (*in preparation*)

Major Courses Undertaken (Undergraduate and Graduate)

- Environmental Soil Chemistry
- Analytical Techniques in Molecular Spectroscopy
- Soil Physics (Hydrology)
- Kinetics of Geochemical Processes
- Soil genesis and classification
- Surface Chemistry
- Organic Chemistry
- Inorganic and Analytical Chemistry

- Quantum Chemistry
- Computational Chemistry
- Stable Isotopes
- Techniques in Geochemistry
- Soil Microbiology

Minor Courses Undertaken (Undergraduate and Graduate)

- Differential and vector Calculus
- All undergraduate Physics courses (electrostatics, dynamics, fluids, magnetism)
- Statistics courses
- Linear Programming

Professional and Community Service

- Co-chair; Division of Soil and Environmental Quality: Session: *Environmental Impacts of Hydraulic Fracturing, ISR U Mining, and Alternative Energy Production*, Soil Science Society of America Annual Meeting, 2014, Long Beach, CA, USA.
- Judge for oral and poster presentations for Soil Chemistry Division, Soil Science Society of America Annual Meeting, 2014, Long Beach, CA, USA.
- Workshop on Research Plagiarism, Colorado State University, 2013.
- Publicity Chair, Environmental Chemistry Student Symposium, Penn State University, 2012.
- Workshop Instructor in a Math Options STEM workshop for 7th and 8th grade girls, 2010, 2011, 2012.
- Judging Coordinator, Environmental Chemistry Student Symposium, Penn State University, 2011.

Professional Affiliations

American Chemical Society

American Geophysical Union

Geochemical Society

Soil Science Society of America