

**Amrita Bhattacharyya, PhD**

Project Scientist

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**RESEARCH EXPERIENCE**

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**Project Scientist**, Earth and Environmental Sciences Area, *Lawrence Berkeley National Laboratory*, July 2018 - present.

**Research Associate**: Department of Chemistry and Biochemistry, *California State University East Bay*, February 2020 – present

**Postdoctoral Research Fellow**, Earth and Environmental Sciences Area, *Lawrence Berkeley National Laboratory*, July 2015-June 2018.

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

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**EDUCATION**

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**PhD**: Environmental Soil Chemistry, Department of Ecosystem Science and Management, *The Pennsylvania State University, USA* (December 2012)

**M.Sc.**: Soil Science, Department of Agricultural Sciences, *University of Calcutta, India* (2007)

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

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**RESEARCH INTERESTS**

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environmental biogeochemistry; metal redox processes in relation to carbon and nitrogen cycling; redox interactions of iron with organic matter in soils and model Fe-organic complexes; radiocarbon and isotope tracing; radionuclide chemistry and remediation at contaminated sites; rhizosphere processes and nutrient availability; metal geomicrobiology; synchrotron spectromicroscopy

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**PUBLICATIONS**

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- **Bhattacharyya, A.**, Schmidt, M.P., Stavitski, E., Azimzadeh, B. and Martínez, C.E. (2019) Ligands representing important functional groups of natural organic matter facilitate Fe redox transformations and resulting binding environments *Geochimica et Cosmochimica Acta*, **251**, 157-175.

- **Bhattacharyya, A.**, Campbell, A.N., Tfaily, M., Lin, Y., Kukkadapu, R., Silver, W.L., Nico, P.S. and Pett-Ridge, J. (2018) Redox Fluctuations control the coupled cycling of iron and carbon in tropical forest soils. *Environmental Science and Technology*, **52** (24), 14129-14139.
- Lin, Y., **Bhattacharyya, A.**, Campbell, A.N., Nico, P.S., Pett-Ridge, J., and Silver, W.S. (2018) Phosphorus fractionation responds to dynamic redox conditions in a humid tropical forest soil. *Biogeosciences*, **123**, <https://doi.org/10.1029/2018JG004420>.
- **Bhattacharyya, A.**, Schmidt, M.P., Stavitski, E. and Martínez, C.E. (2018) Iron speciation in peats: Chemical and spectroscopic evidence for the co-occurrence of ferric and ferrous iron in organic complexes and mineral precipitates. *Organic Geochemistry*, **115**, 124-137.
- **Bhattacharyya, A.**, Campbell, K.M., Roebbert, Y., Weyer, S., Bernier-Latmani, R. and Borch, T. (2017) Biogenic non-crystalline U (IV) revealed as major component in uranium ore deposits. *Nature Communications*, **8**, 15538.
- Percak-Dennett, E., He, S., Converse, B., Konishi, H., Xu, H., Corcoran, A., Noguera, D., Chan, C., **Bhattacharyya, A.**, Borch, T., Boyd, E. and Roden, E.E. (2017) Microbial acceleration of aerobic pyrite oxidation at circumneutral pH. *Geobiology* 00:1–14.
- **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.
- Dong, W., **Bhattacharyya, A.**, Fox, M. and Nico, P.S. (2020) Geochemical Controls on Release and Speciation of Fe (II) and Mn(II) from Hyporheic Sediments of East River, Colorado (in press).
- Lin, Y., Campbell, A.C, **Bhattacharyya, A.**, Didonato, N., Thompson, A.M. Nico, P.S., Silver, W.L., and Pett-Ridge, J. (2020) Differential effects of redox conditions on the decomposition of litter and soil organic matter. (under revision at *Biogeosciences*)

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## PROFESSIONAL SKILLS

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### **Analytical Experience**

- ~15 years of research experience in wet chemistry laboratory and field experiments.
- Proficient user of analytical instruments [ICP-OES, ICP-MS, FTIR, pH, TIC-TOC analyzer, spectrofluorometer] and has extensive experience of analyzing the data
- Proficient user of statistical packages such as JMP, Graphpad Prism
- Independent user at synchrotron facilities (Advanced Light Source, National Synchrotron Light Source, Advanced Photon Source and Stanford Synchrotron Radiation Light Source)
- Analysis of spectroscopy and imaging techniques (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), STXM/NEXAFS, FTIR, FT-ICR-MS, Mossbauer)
- Modeling of XAS data using Charge Transfer Multiplet Calculations (CTM4XAS program)
- Proficient in using chemical speciation packages (Visual Minteq)
- Proficient in Microsoft Office; Adobe Illustrator; SigmaPlot
- Basic MATLAB and R user

## **Field Experience**

Hands-on experience of field sampling at in-situ recovery uranium mines in collaboration with Cameco Resources, Inc., WY; soil and water sampling at Shale Hills Critical Zone Observatory, PA; Luquillo Critical Zone Observatory, Puerto Rico; LBL led SFA at East River, CO., LLNL led SFA at UC Hopland Research and Extension Center

## **Project Management Skills**

Research Program Coordinator of a DOE project involving several national laboratories and universities of USA; scientific data management for the project; work closely with senior research scientists, postdoctoral and graduate and undergraduate student researchers, HR and related personnel from the project to conduct research as well as organize meetings/workshops/seminars.

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

**Proposal Writing Experience:** Written several general user proposals to conduct synchrotron spectroscopy studies at DOE user facilities (NSLS, APS, SSRL and ALS); participated in research proposal writing to seek DOE funding

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

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## **MEETING ABSTRACTS** (*\*last ten abstracts as presenting author included*)

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- **Bhattacharyya, A.**, Campbell, A.N., Weber, P., Nico, P.S., and Pett-Ridge, J. (2020) The impact of redox fluctuations on soil organic matter decomposition in tropical forest soils (Oral Presentation, Virtual Goldschmidt Meeting)
- **Bhattacharyya, A.**, Dewey, C., Nico, P.S. and Pett-Ridge, J. (2019) Abiotic reduction-complexation reactions of iron with natural organic matter at circumneutral pH (Oral Presentation, American Geophysical Union, San Francisco).
- **Bhattacharyya, A.**, McFarlane, K., Nico, P.S., Nuccio, E.E., Firestone, M. and Pett-Ridge, J. (2019) Impacts of depth and soil type on carbon turnover and mineral-organic interactions under switchgrass cultivation (Oral Presentation, International Soil Science Meeting, San Diego, CA).
- **Bhattacharyya, A.**, Campbell, A.N., Lin, Y., Tfaily, M., Pasa-Tolic, L., Chu, R., Silver, W.L., Weber, P., Nico, P.S., and Pett-Ridge, J. (2018) Redox Fluctuations control Coupled Iron-

Carbon Cycling and Microbial Community Structure in Tropical Soils (Poster Presentation, DOE Genomic Sciences Meeting, Tysons, VA)

- **Bhattacharyya, A.**, Campbell, A.N., Weber, P., Nico, P.S., and Pett-Ridge, J. (2017) Coupled iron and carbon redox dynamics in tropical forest soils of Puerto Rico (Oral Presentation, Goldschmidt Meeting, Paris)
- **Bhattacharyya, A.**, Campbell, A.N., Nico, P.S., Weber, P. and Pett-Ridge, J. (2017) Iron-organic matter transformations in wet tropical soils (Oral Presentation, American Chemical Society Spring Meeting, San Francisco)
- **Bhattacharyya, A.**, Campbell, A.N., Lin, Y., Nico, P.S., Silver, W.L. and Pett-Ridge, J. (2016) The effects of redox fluctuation on iron-organic matter interactions in wet tropical soils (Oral Presentation, American Geophysical Union, San Francisco)
- **Bhattacharyya, A.**, Campbell, K.M., Roebbert, Y., Weyer, S., Bernier-Latmani, R. and Borch, T. 2015 Elucidating the role of non-crystalline U(IV) in uranium roll front formation. (Oral presentation, American Chemical Society Spring Meeting, Denver)
- **Bhattacharyya, A.**, Campbell, K.M., Stone, J. and Borch, T. (2014) Geochemical Characterization of Uranium from Baseline- and Post-Mining Site Conditions at an In-situ Recovery (ISR) Mine (Oral Presentation, Soil Science Society of America Annual Meeting, Long Beach)
- **Bhattacharyya, A.**, Borch, T., Johnson, T. and Stone, J. (2013) Geochemical Characterization of Uranium from Baseline- and Post-Mining Site Conditions at an In-situ Recovery (ISR) Mine (Global U-2013 Symposium, Oral Presentation, Corpus Christi, TX, USA)

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### MAJOR COURSES UNDERTAKEN (UNDERGRADUATE AND GRADUATE)

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Environmental Soil Chemistry, Soil Microbiology, Analytical Techniques in Molecular Spectroscopy, Inorganic and Analytical Chemistry, Soil Physics (Hydrology), Mineralogy, Kinetics of Geochemical Processes, Soil genesis and classification, Surface Chemistry, Organic Chemistry, Quantum Chemistry, Computational Chemistry, Isotope Geochemistry, Advanced Statistics, Differential and vector Calculus, All undergraduate Physics courses

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### SYNERGISTIC ACTIVITIES

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- **Session Convener**: American Geophysical Union and Soil Science Society Meeting
- **Co-chair** of Women in Science and Engineers' Council (WSEC) Networking Committee, Berkeley Lab (2017- 2019); Active member of WSEC and IDEA (Inclusion, Diversity, Equity and Accountability) communities at Berkeley Lab.
- **Judging**: Oral and poster presentations for Soil Chemistry Division, Soil Science Society of America Annual Meeting
- **Publicity Chair**: Environmental Chemistry Student Symposium, Penn State University, 2012.

- **Workshop Instructor:** Math Options STEM workshop for middle and high school students, 2010-2012.
- **Judging Coordinator:** Environmental Chemistry Student Symposium, Penn State University, 2011.
- **Mentoring Experience:** Kelly Patches, Undergraduate Teaching Assistant, Spring Semesters- 2009, 2010; David Robles, Undergraduate Intern, LBNL, 2016-2019
- **Reviewer:** reviewer for journals *Nature Communications*, *Environmental Science and Technology*, *Clays and Clay Minerals*, *Geochimica et Cosmochimica Acta*, *Chemical Geology*; NSF proposals; user proposals for synchrotron facility use.

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#### AWARD AND SCHOLARSHIPS

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- 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 -- MS oral presentations, University of Calcutta, India, 2007

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#### PROFESSIONAL AFFILIATIONS

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American Chemical Society

American Geophysical Union

Geochemical Society

Soil Science Society of America