Brandy D. Stewart

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EDUCATION

Stanford University, Palo Alto, CA
Ph.D., Civil and Environmental Engineering
Thesis Title: "The Influence of Calcium on the Biogeochemical Fate of Uranium"
M.S., Civil and Environmental Engineering

University of Colorado at Boulder, Boulder, CO
B.S., Chemical Engineering

EMPLOYMENT EXPERIENCE

SLAC National Accelerator Laboratory, Menlo Park, CA
Visiting Scholar, 2022-2023

- SLAC Floodplain Hydro-biogeochemistry Science Focus Area team member
- Conduct research as part of interdisciplinary group focused on understanding colloid formation, characterization, stability, transport, and reactivity to help predict groundwater quality response to changing to weather patterns

Departments of Soil, Water, and Climate and Earth and Environmental Science University of Minnesota, St.Paul, MN
Post Doctoral Research Associate, 2019 - Present

- Lead scientist roll in two MnDRIVE applied, cross-disciplinary projects on chromium biogeochemistry in industrial storm water treatment systems and heavy metal attenuation from mine waste using biogenic manganese oxides
- Direct and conduct research, including grant writing, publications, managing interdisciplinary team with multiple industrial partners, mentoring graduate and undergraduate students, teaching undergraduate courses

Enviromin Inc., Bozeman, MT
Environmental Consultant, 2018

- Design and oversight of experimental study on carbon and oxygen cycling in coal mine waste rock used to design field-scale wastewater treatment system

Professional Cross Country Ski Racer, 2008-2018 *(full time 2015-2018)*
Various locations throughout North America and Europe

- Competed in domestic and international races ranging in length from 1-70km
- Canadian Long Distance National Champion 2016
- Trained and conditioned year round including travel to offseason snow in Europe and New Zealand
- Planned and executed International travel to competitions and training camps
- Managed equipment and collaborations with several teams, coaches, and sponsors

Center for Biofilm Engineering Montana State University, Bozeman, MT
Industrial Research Scientist, 2012-2015 (Proprietary)

- Senior scientist role in multi-year cross-disciplinary project on selenium cycling in coal mine waste

Center for Biofilm Engineering Montana State University, Bozeman, MT
Post Doctoral Research Scientist, 2009-2012

- Directed research, publications, and grant writing in biogeochemistry of soil pollutants, advised and mentored undergraduate and graduate students

PUBLICATIONS

(H-index 13, total citations 847)

18. Pierce, C. E., S. Psarska, **B.D. Stewart**, R. Kolka, S. Sebestyen, N. Griffiths, J. Gutknecht, E. Nater, and B. Toner. Whole-Ecosystem Climate Manipulation Study Effects on Total Mercury within a Boreal Peatland. *Biogeochemistry,* in Review.

17. Stewart, B.D., S.L. Nicholas, S. Bone, R. Tappero, P. Eger, C. Sheik, B. M. Toner. Chromium in Industrial Stormwater Remediation via Peat Sorption- A Microprobe Study. *Journal of Environmental Quality* 2022, 51(5), 1054-1065.

16. Stewart, B.D., J.V. Sorensen, K. Wendt, J.B. Sylvan, C. R. German, K. Anantharaman, G.J. Dick, J.A Breier, and B. M. Toner. A multi-modal approach to measuring particulate iron speciation in buoyant hydrothermal plumes. *Chemical Geology* 2021, 560, 120018.

15. Sorensen, J.V., B. Gueguen, **B.D. Stewart**, J. Peña, O. Rouxel, and B. M. Toner. Large Nickel Isotope Fractionation Caused by Surface Complexation Reactions with Hexagonal Birnessite. *Chemical Geology* 2020, 537, 119481.

14. Stewart, B.D., A.C. Cismasu, K.H. Williams, B.M. Peyton, and P.S. Nico. Reactivity of Uranium and Ferrous Iron with Natural Iron Oxyhydroxides. *Environmental Science and Technology* 2015, 49(17), 10357-10365.

13. Stewart, B.D., C. Girardot, N. Spycher, R.K. Sani, and B.M. Peyton. Influence of Chelating Agents on Biogenic Uraninite Reoxidation by Fe(III) (hydr)oxides. *Environmental Science and Technology* 2013, 47(1), 364-371.

12. Singh, G., S. Sengor, A. Bhalla, S. Kumar, J. De, **B.D. Stewart**, N. Spycher, T.M. Ginn, B.M. Peyton, and R.K. Sani. Reoxidation of Biogenic Reduced Uranium – A Challenge Toward Bioremediation. *Critial Reviews in Environmental Science and Technology* 2013, 43(17).

11. Vogt, S.J., **B.D. Stewart**, J.D. Seymour, B.M. Peyton, and S.L. Codd. Detection of Biological Uranium Reduction using Magnetic Resonance. *Biotechnology and Bioengineering* 2012, 109, 877-883.

10. Spycher, N., M. Issarangkun, **B.D. Stewart**, S. Sengor, E. Belding, T.M. Ginn, B.M. Peyton, and R.K. Sani. On Modeling Biogenic Uraninite Precipitation and Reoxidation by Iron(III)(Hydr)oxides: Thermodynamic and Kinetic Considerations. *Geochimica Cosmochimica Acta* 2011, 75, 4426-4440.

9. **Stewart, B.D.**, R.T. Amos, and S. Fendorf. Effect of Uranium(VI) Speciation on Simultaneous Microbial Reduction of Uranium(VI) and Iron(III). *Journal of Environmental Quality* 2011, 40, 90-97.

8. **Stewart, B.D.**, R.T. Amos, P.S. Nico, and S. Fendorf. Influence of Uranyl Speciation and Iron Oxides on Uranium Biogeochemical Redox Reactions. *Geomicrobiology Journal* 2011, 28, 444-456.

7. **Stewart, B.D.**, M.A. Mayes, and S. Fendorf. Impact of Uranyl-Calcium-Carbonato Complexes on Uranium(VI) Adsorption to Synthetic and Natural Sediments. *Environmental Science and Technology* 2010, 44(3), 928-934.

6. Ginder-Vogel, M.G., **B.D. Stewart**, and S. Fendorf. Kinetic and Mechanistic Constraints on the Oxidation of Biogenic Uraninite by Ferrihydrite. *Environmental Science and Technology* 2009, 44(1), 163-169.

5. **Stewart, B.**, and S. Fendorf. The Influence of Calcium on the Biogeochemical Fate of Uranium. VDM Publishing House 2009.

4. Nico, P.S., **B.D. Stewart**, and S. Fendorf. Incorporation of Uranium(VI) into Fe (hydr)oxides during Fe(II) Catalyzed Remineralization. *Environmental Science and Technology* 2009, 43 (19), 7391-7396.

3. **Stewart, B.D.**, P.S. Nico, and S. Fendorf. Stability of Uranium Incorporated into Fe (hydr)oxides Under Fluctuating Redox Conditions. *Environmental Science and Technology* 2009, 43, 4922-4927.

2. Neiss, J., **B.D. Stewart**, P.S. Nico, and S. Fendorf. Speciation-Dependent Microbial Reduction of Uranium within Iron-Coated Sands. *Environmental Science and Technology* 2007, 41, 7343-7348.

1. **Stewart, B.D.**, J. Neiss, and S. Fendorf. Quantifying Constraints Imposed by Calcium and Iron on Bacterial Reduction of Uranium(VI). *Journal of Environmental Quality 2007*, 36, 363-372.

PUBLICATIONS IN PROGRESS

1. **Stewart, B.D**., C. Sheik, P. Eger, S. L. Nicholas, and B.M. Toner. Mechanisms of Chromium Attenuation in Peat Sorbent Reactors. *In prep*.

2. **Stewart, B**.D., S. Bone, and C. Santelli. Heavy Metal Remediation using Manganese-oxidizing Fungi and Recycled Carpet Fibers. *In prep.*

3. Wackett, A., **B.D. Stewart**, and B.M. Toner. Iron Mineralogy in Hydrothermal Plumes. *In prep.*

TEACHING EXPERIENCE

University of Minnesota, St. Paul, MN
Course Instructor, ESPM 4601 Environmental Pollution, 2020-2021

- Developed and delivered remote-learning lectures, discussions, and interactive activities during pandemic, designed reading and writing assignments and examinations

University of Minnesota, St. Paul, MN
Course Instructor, ESPM 1011 Issues in the Environment, 2019

- Developed and conducted lectures and in-class workshops, designed reading and writing assignments and examinations

Center for Biofilm Engineering Montana State University, Bozeman, MT
Research and Thesis Advisor, M.S. Candidate, 2009-2012

- Designed student research project and supervised daily experimental work
- Taught scientific concepts required for data interpretation and thesis development

Stanford University, Stanford, CA
Course Instructor, GES 175 Science of Soils, 2007

- Developed and conducted lectures, laboratories, and fieldtrips, designed problem sets, examinations, and final projects

Laboratory Instructor, GES 175 Science of Soils, 2006, 2007

- Created and supervised weekly laboratory and field sessions

Teaching Assistant, GES 230/CEE 260 Physical Hydrogeology, 2006, 2007

- Conducted weekly problem solving sessions, graded problem sets and exams

GRANTS AND RECOGNITION

College of Food, Agricultural, and Natural Sciences Postdoctoral Travel Award
University of Minnesota, St. Paul, MN
*Grant Awardee Goldschmidt International Geochemistry Conference***,** 2020

Institute on the Environment Mini-Grant
University of Minnesota, St. Paul, MN
Grant Awardee "Fostering academic and industrial collaborative relationships in environmental problem solving"**,** 2019

United States – European Commission Task Force on Biotechology Research
Oklahoma State University, Norman, OK
Selected US delegation member and course participant "The Theoretical and Practical Course on Molecular Approaches for in Situ Biodegradation"**,** 2009

- Selected as one of 12 US delegates to participate in residential, field-research based, program on Biotechnology designed to develop and foster collaboration between future US and European Scientific Leaders

Department of Energy – Subsurface Biogeochemical Research Program
Washington, D.C.
Student travel grant awardee, 2007, 2008

- Selected to travel, participate, and present research at annual program meeting (selection based on Ph.D. research productivity and publication record)

American Chemical Society – Division of Environmental Chemistry
Graduate Student Award, 2008
- Awarded for outstanding presentation at National American Chemical Society Conference

LEADERSHIP AND SERVICE

Natural Sciences and Engineering Research Council of Canada
Selection Committee for Earth Sciences, member, 2019-2021
- Review and evaluate postdoctoral and graduate fellowship applications

Goldschmidt International Geochemistry Conference and American Chemical Society
Knoxville, TN, Montreal, Canada, Honolulu, HI, and San Diego, CA
Symposium Convener, 2010, 2012, 2020, 2022
- Created, developed, and submitted symposium theme
- Selected and coordinated keynote and invited speakers
- Planned and conducted day long symposium during International Conference

Environmental Science and Technology, Vadose Zone Journal, Geochimica et Cosmochimica Acta, Frontiers in Environmental Science, Minerals, and Stanford Synchrotron Radiation Laboratory
Reviewer, 2010-Present
- Provide authors with detailed and critical review of manuscripts
- Make recommendations to Associate Editors on suitability of manuscripts for publication

DIVERSITY, EQUITY, AND INCLUSIVITY

Arsenic Superfund Site in Phillips Neighborhood
Minneapolis, MN
Soil and Water Team Experts Panel, 2020
- Reviewed and evaluated toxicity risk of building demolition, construction, and operation in Arsenic Superfund site in underserved urban neighborhood
- Coauthored affidavit for environmental justice legal case

Diversity, Equity, and Inclusivity Outreach Working Group
University of Minnesota, St. Paul, MN
Committee member, Soil, Water, and Climate Department, 2020
- Developed roadmap and implementation plan for departmental DEI outreach initiatives

Society of Women Engineers and Friend of STEM
University of Minnesota, St. Paul, MN
Professional Scientific Mentor, 2020-2021

- Acting mentor to several undergraduate minority engineering students across two professional mentoring programs

URGE - Unlearning Racism in Geoscience
University of Minnesota, St. Paul, MN and US wide
Pod Member, (Bio)geosciences, Earth Sciences, 2021

- Member of anti-racism educational discussion and policy forming group

Office of Equity and Diversity
University of Minnesota, St. Paul, MN
Equity and Diversity Certificate, 2021

- Participant in yearlong course covering a breadth of DEI topics and tools to build inclusive and equitable classroom and research settings

PRESENTATIONS

B.D. Stewart, S.H. Bone, and C.M. Santelli. *Remediation of Heavy Metals by Manganese-oxidizing Microbes and Recycled Carpet Fiber.* Goldschmidt International Geochemistry Conference, Honolulu, HI 2022.

B.D. Stewart. *Using "Big Science" to Evaluate Metal Removal.* American Society of Reclamation Sciences Annual Meeting, Duluth, MN 2022.

B.D. Stewart. *Remediation of Heavy Metals by Manganese-oxidizing Microbes and Recycled Carpet Fiber.* American Society of Reclamation Sciences Annual Meeting, Duluth, MN 2022.

B.D. Stewart, S.H. Bone, and C.M. Santelli. *Remediation of Heavy Metals by Manganese-oxidizing Microbes and Recycled Carpet Fiber.* American Chemical Society, San Diego, CA 2022.

B.D. Stewart, S. L. Nicholas, P.Eger, C. Sheik, and B.M. Toner. *An XRF Study in Mechanisms of Chromium Removal from Industrial Stormwater using Peat Medium.* American Chemical Society, San Diego, CA 2022.

B.D. Stewart, S.H. Bone, and C.M. Santelli. *Remediation of Heavy Metals by Manganese-oxidizing Microbes and Recycled Carpet Fiber.* American Geophysical Union, New Orleans, LA 2021.

B.D. Stewart, S. L. Nicholas, P.Eger, C. Sheik, and B.M. Toner. *An XRF Study in Mechanisms of Chromium Removal From Industrial Stormwater Using Peat Medium.* Geological Society of America, Portland, OR 2021.

B.D. Stewart, S. L. Nicholas, P.Eger, C. Sheik, and B.M. Toner. *Mechanisms of Chromium Removal from Industrial Stormwater via Peat Sorption.* National Synchrotron Light Source II User Meeting, ***Invited***, 2021.

B.D. Stewart, S. L. Nicholas, P.Eger, C. Sheik, and B.M. Toner. *Using Peat to Remove Chromium from Stormwater.* MnDrive Recycling and Reuse of Critical Minerals Workshop, ***Invited***, 2021.

B.D. Stewart, S. L. Nicholas, P.Eger, C. Sheik, and B.M. Toner. *An XRF Study in Mechanisms of Chromium Removal From Industrial Stormwater Using Peat Medium.* American Geophysical Union, 2020.

B.D. Stewart, P.Eger, C. Sheik, and B.M. Toner. *Can microbial activity enhance chromium removal from industrial stormwater?* Goldschmidt International Geochemistry Conference, ***Invited***, 2020.

B.D. Stewart. *Bioremediation of Heavy Metals.* Bioremediation and Bioenergy Seminar: Soil, Water, and Climate, University of Minnesota, ***Invited,*** 2020.

B.D. Stewart, P.Eger, C. Sheik, and B.M. Toner. *Mechanisms of chromium removal from industrial stormwater via peat sorption.* Soil, Water, and Climate Seminar Series, University of Minnesota, ***Invited,*** 2019.

B.D. Stewart, P.Eger, C. Sheik, and B.M. Toner. *Mechanisms of chromium removal from industrial stormwater via peat sorption.* American Geophysical Union, San Francisco, CA 2019.

B.D. Stewart, P.Eger, C. Sheik, and B.M. Toner. *Can microbial sulfur-reduction enhance chromium removal from industrial stormwater?* Goldschmidt International Geochemistry Conference, Barcelona, Spain 2019.

B.D. Stewart, P.Eger, C. Sheik, B.M. Toner, and C. Sheik. *Can microbial activity enhance chromium removal from industrial stormwater?* Geobiology Society Conference, Banff, Canada 2019.

P. Eger, **B.D. Stewart**, C. Sheik, P. Jones, D. Green, and B.M. Toner. *Peat sorption media-successful treatment of mine drainage but how does is really work?* Society for Mining Engineers Annual Conference, Denver, CO 2019.

B.D. Stewart, L. Kirk, D.Skoropa, R. Macur, and B.M. Peyton. *Microbial communities and selenium reduction in coal waste rock deposits.* Center for Biofilm Engineering Invited Seminar Series, Bozeman, MT 2013.

B.D. Stewart, P.S. Nico, and B.M. Peyton. *Uranium association and interaction with redox boundary in Rifle surface seep sediments.* Goldschmidt International Geochemistry Conference, Montreal, Canada 2012.

B.D. Stewart, C. Girardot, and B.M. Peyton. *Influence of chelating agents on biogenic uraninite reoxidation by Fe(III) (hydr)oxides.* American Chemical Society Fall Meeting, Denver, CO 2011.

B.D. Stewart, P.S. Nico, and S. Fendorf. *Stability of uranium incorporated into Fe(hydr)oxide structure under fluctuating redox conditions.* American Chemical Society Fall Meeting, Denver, CO 2011.

B. Peyton, T. Ginn, R. Sani, N. Spycher, **B.D. Stewart,** C. Girardot, M. Issarangkun, S. Sengor, E. Squillace, G. Singh, M. Lasisi, and P.S. Nico. *Subsurface uranium fate and transport: integrated experiments and modeling of coupled biogeochemical mechanisms of nanocrystalline uraninite reoxidation by Fe(III)(hydr)oxides.* Environmental Remediation Sciences Program Annual meeting, Washington D.C. 2011.

L.B. Kirk, **B.D. Stewart**, R. Macur, and R.Gerlach. *Lithology-dependent selenate reduction by native bacteria in phosphate mine waste.* Society for Mining, Metallurgy, and Exploration Annual Meeting, Denver, CO 2011.

L.B. Kirk, **B.D. Stewart**, R. Macur, and R. Gerlach. *Speciation of selenium by facultative bacteria in phosphate mine waste.* Goldschmidt International Geochemistry Conference, Knoxville, TN 2010.

B.D. Stewart and B. Peyton. *Mechanisms of biogenic uraninite oxidation in the presence of Fe(III) (hydr)oxides.* Goldschmidt International Geochemistry Conference, Knoxville, TN 2010.

N.Spycher, M. Issarangkun, **B.D. Stewart**, S. Sengor, T. Ginn, R. Sani, and B. Peyton. *Modeling UO_2 bioprecipitation and reoxidation by Fe(III) (hydr)oxides.* Goldschmidt International Geochemistry Conference, Knoxville, TN 2010.

B. Peyton, T. Ginn, R. Sani, N. Spycher, **B.D. Stewart,** C. Girardot, M. Issarangkun, S. Sengor, E. Squillace, G. Singh, and M. Lasisi. *Subsurface uranium fate and transport: integrated experiments and modeling of coupled biogeochemical mechanisms of nanocrystalline uraninite reoxidation by Fe(III)(hydr)oxides.* Environmental Remediation Sciences Program Annual meeting, Washington D.C. 2010.

S. Vogt, J. Seymour, **B.D. Stewart**, B. Peyton, and S. Codd. *Detection of uranium oxidation and solubility using NMR.* 10th International Conference on Magnetic Resonance Microscopy, Montana 2009.

B.D. Stewart and B. Peyton. *Elucidating dominant mechanisms of nanocrystalline uraninite reoxidation by Fe(III)(hydr)oxides.* Goldschmidt International Geochemistry Conference, Davos, Switerland 2009.

B. Peyton, T. Ginn, R. Sani, N. Spycher, A. Adhikari, J. De, R. Gurram, **and B.D. Stewart**. *Subsurface uranium fate and transport: integrated experiments and modeling of coupled biogeochemical mechanisms of nanocrystalline uraninite reoxidation by Fe(III)(hydr)oxides.* Environmental Remediation Sciences Program Annual meeting, Washington D.C. 2009.

B.D. Stewart, P.S. Nico, and S. Fendorf. *Stability of uranium incorporated into Fe(hydr)oxide structure upon oxidation and under fluctuating redox conditions.* American Geophysical Union, San Francisco 2008.

B.D. Stewart, P.S. Nico, and S. Fendorf. *Stability of uranium incorporated into Fe(hydr)oxide structure under fluctuating redox conditions.* Goldschmidt International Geochemistry Conference, Vancouver 2008.

B.D. Stewart, P.S. Nico, and S. Fendorf. *Stability of uranium incorporated into Fe(hydr)oxide structure upon oxidation and under fluctuating redox conditions*. Environmental Remediation Sciences Program Annual meeting, Washington D.C. 2008.

B.D. Stewart and S. Fendorf. *Geochemical conditions convoluting the fate of uranium in surface and subsurface environments.* Stanford Environmental and Molecular Sciences Institute Meeting, 2007.

B.D. Stewart, J. Neiss, and S. Fendorf. *Constraints on microbial reduction of uranium within soils and sediments.* Environmental Remediation Sciences Program Annual meeting, Washington D.C. 2007.

B.D. Stewart, P.S. Nico, R.T. Amos, and S. Fendorf. *Quantitatively describing and predicting electron balance between competitive iron and uranium reduction.* American Chemical Society, Chicago 2007.

B.D. Stewart and S. Fendorf. *Constraints on microbial reduction of uranium within soils and sediments.* American Chemical Society, San Francisco 2006.

B.D. Stewart, J. Neiss, and S. Fendorf. *Geochemical limitations of microbial reduction of uranium within soils and sediments.* Soil Science Society of America, Salt Lake City 2005.

REFERENCES

Scott Fendorf
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