

# Brandy D. Stewart

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## EDUCATION

### **Stanford University**, Palo Alto, CA

Ph.D., Civil and Environmental Engineering, received 2008

*Thesis Title: "The Influence of Calcium on the Biogeochemical Fate of Uranium"*

M.S., Civil and Environmental Engineering, received 2002

### **University of Colorado at Boulder**, Boulder, CO

B.S., Chemical Engineering, received 2000

## EMPLOYMENT EXPERIENCE

### **Department of Soil, Water, and Climate University of Minnesota**, St. Paul, MN

*Post Doctoral Research Associate*, October 2018 - Present

- Lead scientist roll in MnDRIVE applied, cross-disciplinary project on chromium biogeochemistry in industrial storm water treatment system
- Direct research including grant writing and managing interdisciplinary team with industrial partners, mentor graduate and undergraduate students, teach undergraduate course

### **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

### **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

### **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

### **Professional Cross Country Ski Racer**, 2010-2018 (*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

## **PUBLICATIONS**

(H-index 12, total citations 660)

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 unpacking iron biogeochemical processes in buoyant hydrothermal plumes. *Submitted Chemical Geology*.
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. *Critical 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.

### **WORK 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 – A Microprobe Study. *In prep.*
2. **Stewart, B.D.**, C. Sheik, P. Eger, B. M. Toner. Microbial Community Dynamics in Chromium Stormwater Treatment System. *In prep.*

### **TEACHING EXPERIENCE**

#### **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, 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 for 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 Biotechnology 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*

- Reviewed and evaluated fellowship applications

### **Goldschmidt International Geochemistry Conference, Knoxville, TN, Montreal, Canada, and Honolulu, HI**

*Symposium Convener, 2010, 2012, 2020*

- 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, 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,*

- 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

## **PRESENTATIONS**

**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 it 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<sub>2</sub> 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*. 10<sup>th</sup> 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, Switzerland 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.