

Matthew Ginder-Vogel, Ph.D.

CONTACT INFORMATION

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EDUCATION

2006, Ph.D. **Stanford University**, Stanford, CA, Department of Geological and Environmental Sciences, Soil and Environmental Biogeochemistry Group
2002 **Marine Biological Laboratory**, Woods Hole, MA, Microbial Diversity Course
2000, B.A. **Carleton College**, Northfield, MN, Chemistry

EMPLOYMENT HISTORY

2009 Associate Scientist, Delaware Environmental Institute
2006 - 2009 Post Doctoral Associate, Delaware Environmental Institute, Environmental Soil Chemistry Group, University of Delaware
2001-2006 Graduate Research Assistant, Department of Geological and Environmental Sciences, Soil and Environmental Biogeochemistry Group, Stanford University
2001-2004 Graduate Teaching Assistant, Department of Geological and Environmental Sciences, Soil and Environmental Biogeochemistry Group, Stanford University
2000-2001 Graduate Research Associate, Structural Inorganic Chemistry Group, Los Alamos National Laboratory

FUNDING, PROFESSIONAL SERVICE, AND RECOGNITION

Funding

Primary Investigator, Delaware EPSCoR Seed Grant Program “*Quantification of Metal Distribution and Speciation in Particulate Matter Emitted from Delmarva Poultry Houses*” (\$50,000 / 1 yr).

Guest Editor

Environmental Science and Technology, Focus issue on Biogeochemical Redox Processes and their Impact on Contaminant Dynamics (To be published in January 2010)

Journal Reviewer

Environmental Science and Technology

Geochimica et Cosmochimica Acta

Geomicrobiology

Water Research

Vadose Zone Journal

Journal of Environmental Quality

Journal of Hazardous Materials

Geobiology

Symposium Organizer

Biogeochemical Redox Processes in Soils and Sediments – 237th Annual American Chemical Society Meeting, Philadelphia, PA.

Proposal Reviewer

Stanford Synchrotron Radiation Laboratory

National Synchrotron Light Source

Kearney Soil Science Foundation

Recognition/Awards

National Science Foundation Graduate Fellowship – Honorable Mention (2003)

Best Poster in Environmental Sciences, Stanford Synchrotron Radiation Laboratory

User’s Meeting (2003)

McGee Grant in Earth Science, \$3,000 (2002)

Marine Biological Laboratory Microbial Diversity Course Scholarship, \$5,000 (2002)

Professional Societies

Member of the American Chemical Society

Member of the American Geophysical Union

Member of the Soil Science Society of America

Member of the Geochemical Society

TEACHING AND OUTREACH EXPERIENCE

- Instructor: Introduction to Environmental Sciences – Honors Freshman Colloquium (Delaware)
- Institute of Soil and Environmental Quality High School Teacher Training Workshop (Delaware)
- Basic Soil Science, 4-H Summer Camp (Delaware Extension)
- Guest Instructor: PLSC 810 Kinetics and Surface Chemistry of Soils (Delaware)
PLSC 608 Environmental Soil Chemistry (Delaware)
- Lab Instructor: GES 1 Fundamentals of Geology (Stanford)
GES 175 Science of Soils (Stanford)
GES 166 Soil Chemistry (Stanford)
GES 266 Advanced Soil Chemistry (Stanford)
- Teaching Assistant: GES 275 Microbially Mediated Redox Processes (Stanford)
CHEM 122 Introduction to Chemistry (Carleton)
CHEM 233 Organic Chemistry I (Carleton)
CHEM 234 Organic Chemistry II (Carleton)
CHEM 306 Advanced Laboratory III (Carleton)

PEER-REVIEWED JOURNAL ARTICLES AND BOOK CHAPTERS (21)

Ginder-Vogel, M.; Stewart, B.; Fendorf S. Kinetic and mineralogical controls on the oxidation of biogenic UO₂ by ferrihydrite. (In press in *Environmental Science and Technology*)

Ginder-Vogel, M.; Sparks, D.L. The impacts of X-ray absorption spectroscopy on understanding soil processes and reaction mechanisms. (In press in a book entitled Synchrotron-based Techniques in Soils and Sediment)

Landrot, G.; **Ginder-Vogel, M.;** Sparks, D.L. Kinetics of chromium(III) oxidation by manganese(IV) oxides using quick-scanning X-ray adsorption spectroscopy (Q-XAS). (In press in *Environmental Science and Technology*)

Shimizu, M.; **Ginder-Vogel, M.;** Parikh, S.J.; Sparks, D.L. “Methylarsenate sorption on aluminum oxide” (In press in *Environmental Science and Technology*)

Feng, X.H.; Zhu, M.; **Ginder-Vogel, M.;** Ni, C.; Parikh, S.J.; Sparks, D.L. Formation of nano-crystalline todorokite from biogenic Mn oxides. (In press in *Geochimica et Cosmochimica Acta*)

Borch, T.; Kretzschmar, R.; Van Cappellen, P.; Kappler, A.; **Ginder-Vogel, M.;** Voeglin, A.; Campbell, K. Biogeochemical redox processes and their impact on contaminant dynamics. (In press in *Environmental Science and Technology*)

Khalid, S.; Caliebe, W.; Siddons, P.; So, I.; Clay, B.; Lenhard, T.; Hanson, J.; Wang, Q.; Frenkel, A.I.; Marinkovic, N.; Hould, N.; **Ginder-Vogel, M.;** Landrot, G.L.; Sparks, D.L.; Ganjoo, A. “QEXAFS Instrument with Milli-Second Time Scale, Optimized for *In Situ* Applications. (In press in *Review of Scientific Instruments*)

Ginder-Vogel, M.; Fischel, J.S.; Landrot, G.; Sparks, D.L. Quantification of rapid environmental redox processes using quick-scanning X-ray absorption spectroscopy (Q-XAS). *Proceedings of the National Academy of Sciences*. **2009**, 106(38), 16124-16128. (Published online)

Moseley, R.A.; Barnett, M.O.; Stewart, M.A.; Mehlhorn, T.L.; Jardine, P.M.; **Ginder-Vogel, M.;** Fendorf, S. Decreasing lead bioaccessibility in industrial and firing range soils with phosphate-based amendments. *Journal of Environmental Quality*. **2008**, 37, 2116–2124.

Cardenas, E.; Wu, W.; Leigh, M.B.; Carley, J.; Carroll, S.L.; Gentry, T.; Luo, J.; Watson, D.; Gu, B.; **Ginder-Vogel, M.;** Kitanidis, P.; Jardine, P. M.; Zhou, J.; Criddle, C.S.; Marsh, T.L.; Tiedje, J.M. Microbial communities in contaminated sediments association with bioremediation of uranium to submicromolar levels. *Applied and Environmental Microbiology*. **2008**, 74(12), 3718-3729.

Ginder-Vogel, M.; Fendorf, S. Biogeochemical Uranium Redox Transformation: Potential Oxidants of Uraninite. Adsorption of Metals by Geomedia II: Variables, Mechanisms, and Model Applications. M. O. Barnett and D. B. Kent. Amsterdam, The Netherlands, Elsevier. **2008**, 7, 293-320.

Seiter, J.M.; Staats-Borda, K.E.; **Ginder-Vogel, M.;** Sparks, D.L. XANES spectroscopic analysis of phosphorus speciation in alum-amended poultry litter. *Journal of Environmental Quality* **2008**, 37, 477-485.

Wu, W.; Carley, J.; Luo, J.; **Ginder-Vogel, M.;** Cardenas, E.; Leigh, M.B.; Hwang, C.; Kelly, S.D.; Ruan, C.; Wu, L.; Van Nostrand, J.; Gentry, T.; Lowe, K.; Mehlhorn, T.; Carroll, S.; Fields, M.W.; Gu, B.; Watson, D.; Kemner, K.M.; Marsh, T.; Tiedje, J.; Zhou, J.; Fendorf, S.; Kitanidis, P.K.; Jardine, P.M.; Criddle, C.S. In-situ bioreduction of uranium (VI) to submicromolar levels and reoxidation by dissolved oxygen. *Environmental Science and Technology* **2007**, 41, 5716-5723.

Tappero, R.; Peltier, E.; Grafe, M.; **Ginder-Vogel, M.;** Heidel, K.; Livi, K.J.T.; Rivers, M.L.; Marcus, M.A.; Chaney, R.L.; Sparks, D.L. Metal interaction and localization in Ni/Co hyperaccumulator *Alyssum murale*: Results from synchrotron-based X-ray microfluorescence and tomography. *New Phytologist* **2007**, 174, 641-654.

Bank, T.L.; Vishnivetskaya, T.A.; Jardine, P.M.; **Ginder-Vogel, M.;** Fendorf, S.; Baldwin, M.E. Elucidating geochemical and biogeochemical uranium reduction on neutral, reducing soils. *Geomicrobiology Journal* **2007**, 24, 125-132.

Ginder-Vogel, M.; Wu, W.; Kelly, S.D.; Kemner, K. Carley, J.; Jardine, P.; Criddle, C.S.; Fendorf, S. Micro-scale heterogeneity in biogeochemical uranium cycling. *Physica Scripta* **2006**, 882, 190-192.

Nyman, J.; Marsh, T. L.; **Ginder-Vogel, M.;** Gentile, M.; Fendorf, S.; Criddle, C. Heterogeneous response to biostimulation for U(VI) reduction in replicated sediment microcosms. *Biodegradation* **2006**, 17, 303-316.

Wu, W.-M.; Carley, J.; Gentry, T.; **Ginder-Vogel, M.;** Fienen, M.; Mehlhorn, T.; Yan, H.; Carroll, S.; Pace, M.; Nyman, J.; Luo, J.; Gentile, M.; Fields, M. W.; Hickey, R.; Watson, D. B.; Cirpka, O.; Zhou, J.; Fendorf, S.; Kitanidis, P.; Jardine, P. M.; Criddle, C. Field-scale bioremediation of uranium in a highly contaminated aquifer II: Geochemical control of U(VI) bioavailability and evidence of U(VI) reduction. *Environmental Science and Technology* **2006**, 40, 3986-3995.

Ginder-Vogel, M.; Criddle, C.; Fendorf, S. Thermodynamic constraints on the oxidation of biogenic UO₂ by Fe(III) (hydr)oxides. *Environmental Science and Technology* **2006**, 40, 3544-3550.

Ginder-Vogel, M.; Borch, T.; Mayes, M.A.; Jardine, P.M.; Fendorf, S. Chromate reduction and retention mechanisms within arid subsurface environments. *Environmental Science and Technology* **2005**, *39*, 7833-7839.

Gu, B.; Wu, W.; **Ginder-Vogel, M.;** Yan, H.; Fields, M.W.; Zhou, J.; Fendorf, S.; Criddle, C.; Jardine, P.M. Bioreduction of uranium in a contaminated soil column. *Environmental Science and Technology* **2005**, *39*, 4841-4847.

SUBMITTED JOURNAL ARTICLES AND BOOK CHAPTERS (4)

Zhu, M.; **Ginder-Vogel, M.;** Parikh, S.J.; Feng, X.H.; Ravel, B.; Sparks, D.L. Effects of formation conditions on the structure and reactivity of biogenic Mn-oxides: 1. Structural Study. (Submitted to *Environmental Science and Technology*)

Zhu, M.; **Ginder-Vogel, M.;** Sparks, D.L. Effects of Formation Conditions on the Structure and Reactivity of Biogenic Mn-Oxides: 2. Ni(III) Sorption. (Submitted to *Environmental Science and Technology*)

Debnath, S.; Smolen, J.; **Ginder-Vogel, M.;** Sparks, D.L.; Strongin, D.R. Reductive dissolution of birnessite by arsenite: An AFM and XPS study. (Submitted to *Environmental Science and Technology*)

Revoll, Kristin L.; **Ginder-Vogel, M.;** Fendorf, S. Competitive microbial reduction of U(VI) and Fe(III): Biofilm influence on substrate availability and utilization. (Submitted to *Journal of Environmental Quality*)

FIRST-AUTHOR PROFESSIONAL PRESENTATIONS

Invited (18)

Ginder-Vogel, M. 2009 Arsenic Biogeochemistry at the Field, Microbe, Mineral and Nano-scales.

Ginder-Vogel, M. 2009 Biogeochemical Redox Chemistry: Minerals, Microbes, and Metals. University of Delaware, DE.

Ginder –Vogel, M.; Lafferty, B.J.; Sparks, D.L. **2008** Inhibition of As(III) oxidation by Mn(IV) mineral surface alteration. 237th American Chemical Society National Meeting National Meeting, Philadelphia, PA.

Ginder-Vogel, M.; Sparks, D.L. **2008** Advances in Elucidating Reactivity and Speciation at the Mineral/Water Interface: The Role of Analytical Techniques. 2008 Goldschmidt Geochemistry Conference, Vancouver, BC, Canada.

Ginder-Vogel, M. 2008 Biogeochemical Redox Processes Controlling Contaminant Mobility. University of California, Davis, CA.

Ginder-Vogel, M. 2008 Arsenic Contamination in Delaware: Sources, Sinks, and Mobility. University of Delaware, Newark, DE.

- Ginder-Vogel, M. 2008** Microbial and Mineralogical Controls on Uranium Redox Cycling. University of Delaware, Newark, DE.
- Ginder-Vogel, M. 2008** Biogeochemical Processes Controlling Uranium and Chromium Mobility. University of Wisconsin, Madison, WI.
- Ginder-Vogel, M. 2008** Influences on Arsenic and Uranium Mobility: Oxidation by Transition Metal (Hydr)oxides. University of Wisconsin, Madison, WI.
- Ginder-Vogel, M. 2007** Biogeochemical Pathways Controlling Contaminant Mobility in the Critical Zone. Juniata College. Huntingdon, PA.
- Ginder-Vogel, M. 2007** Biogeochemical Cycling of Uranium and Nitrate in Soils and Sediments. State University of New York. Stonybrook, NY.
- Ginder-Vogel, M. 2007** Synchrotron Techniques for Examining Biogeochemical Processes in the Critical Zone. Brookhaven National Lab. Upton, NY.
- Ginder-Vogel, M. 2006** Biogeochemical Redox Processes Controlling the Fate and Transport of Contaminants and Nutrients in Soils and Sediments. North Carolina State University. Raleigh, NC.
- Ginder-Vogel, M.; Fendorf, S. 2006** Biogeochemical uranium cycling. United States Geological Survey. Menlo Park, CA.
- Ginder-Vogel, M.; Fendorf, S. 2006** Kinetic and mineralogical controls on uraninite oxidation by ferrihydrite. Annual Stanford Environmental Sciences Institute Meeting. Stanford, CA.
- Ginder-Vogel, M.; Fendorf, S. 2006** Uranium cycling within fractured saprolite. University of Delaware. Newark, DE.
- Ginder-Vogel, M.; Fendorf, S. 2005** Processes controlling the toxicity and transport of metal contaminants in subsurface environments. Advanced Photon Source Strategic Advisory Committee Review of GSE-CARS. Argonne, IL.

Volunteered (24)

- Ginder-Vogel, M; Landrot, G.; Sparks, D.L. 2009** Quantification of rapid environmental redox processes using quick-scanning X-ray absorption spectroscopy (Q-XAS). 2009 Goldschmidt Geochemistry Meeting. Davos, Switzerland
- Ginder-Vogel, M; Sparks, D.L. 2008** Impact of Mineral Surface Modification on As(III) Oxidation by Mn(IV) Oxides. 2008 Soil Science Society of America National Meeting. Houston, TX.
- Ginder-Vogel, M; Fischel, J.S.; Sparks, D.L. 2008** Rates and Mechanisms of Arsenite Oxidation by Nano-Mn(IV) Oxide Mineral Phases. 2008 Soil Science Society of America National Meeting. Houston, TX.
- Ginder-Vogel, M.; Sparks, D.L. 2008** Monitoring As(III) Oxidation in Real-Time using Q-XAS, 2008 Goldschmidt Geochemistry Conference, Vancouver, BC, Canada.
- Ginder-Vogel, M.; Parikh, S.; Sparks, D.L. 2008** Arsenite Oxidation by Hydrous Manganese Oxide: Impact of oxyanions. 235th American Chemical Society National Meeting National Meeting, New Orleans, LA.
- Ginder-Vogel, M.; Sparks, D.L.; 2007** Real-Time Surface-Chemistry of Arsenite Oxidation by Hydrous Manganese Oxide. 2007 Soil Science Society of America National Meeting. New Orleans, LA.

Ginder-Vogel, M.; Fendorf, S. **2007** Geochemical and mineralogical controls on the oxidation of biogenic uraninite by ferrihydrite. 233rd American Chemical Society National Meeting, Chicago, IL.

Ginder-Vogel, M.; Fendorf, S. **2006** Mineralogical controls on uraninite oxidation by ferrihydrite. In Abstracts of Papers 232nd American Chemical Society National Meeting, San Francisco, CA.

Ginder-Vogel, M.; Wu, W.; Kelly S.D.; Kemner, K.; Carley, J.; Jardine, P.; Criddle, C.S.; Fendorf, S. **2006** Spatial heterogeneity in biogeochemical uranium cycling. X-ray Absorption Fine Structure 13 (XAFS 13) Meeting. Stanford, CA.

Ginder-Vogel, M.; Fendorf, S. **2006** UO₂ oxidation by Fe(III) (hydr)oxides: Thermodynamic limitations and implication for uranium bioremediation. 231st American Chemical Society National Meeting, Atlanta, GA.

Ginder-Vogel, M.; Criddle, C.; Fendorf, S.; **2005** Thermodynamic constraints on biogenic UO₂ oxidation by ferric-(hydr)oxides: Implications for bioremediation. 2005 Soil Science Society of America National Meeting, Salt Lake City, UT.

Ginder-Vogel, M.; Criddle, C.; Fendorf, S.; **2005** Thermodynamic constraints on biological UO₂ oxidation by ferric-(hydr)oxides: Implications for uranium bioremediation. 2005 Natural and Accelerated Bioremediation – Field Research Center (NABIR-FRC) PI meeting, Oak Ridge, TN.

Ginder-Vogel, M.; Borch, T.; Fendorf, S.; **2005** Chromate reduction and retention mechanisms within arid subsurface environments. Synchrotron Environmental Science III Meeting. Brookhaven, NY.

Ginder-Vogel, M.; Wu, W.; Gentry, T.; Carley, J.; Jardine, P.; Criddle, C.; Fendorf, S. **2005** Stimulation of biological uranium reduction in fractured saprolite. Goldschmidt Conference. Geochemical Society National Meeting. Moscow, ID.

Ginder-Vogel, M.; Borch, T.; Fendorf, S.; **2005** Chromate reduction and retention mechanisms within arid subsurface environments. 2005 Goldschmidt Conference. Geochemical Society National Meeting. Moscow, ID.

Ginder-Vogel, M.; Borch, T.; Fendorf, S.; **2005** Chromate reduction and retention mechanisms within arid subsurface environments. Annual Stanford Environmental Sciences Institute (EMSI) Meeting. Stanford, CA.

Ginder-Vogel, M.; Wu, W.; Carley, J.; Gentry, T.; Caroll, S.; Fienen, M.; Mehlhorn, T.; Fendorf, S.; Fields, M.; Gentile, M.; Gu, B.; Jardine, P.M.; Kitanidis, P.; Lowe, K.; Luo, J.; Nyman, J.; Tsai, E.; Watson, D.; Yan, H.; Zhou, J.; Criddle, C. **2005** Field-scale demonstration of in-situ biological uranium(VI) reduction at Area 3, NABIR Field Research Center, Oak Ridge, TN. American Society of Microbiology Spring Meeting. New Orleans, LA.

Ginder-Vogel, M.; Wu, W.; Mehlhorn, T.; Carley, J.; Jardine, P.; Criddle, C.; Fendorf, S. **2005**. Geochemical controls on biological reduction of uranium within fractured saprolite. Natural and Accelerated Bioremediation (NABIR) PI Annual Meeting, Department of Energy (DOE), VA.

Ginder-Vogel, M.; Borch, T.; Fendorf, S.; **2004**. Chromate reduction by detrital magnetite and biotite: Abiotic reaction pathways for metal reduction. Soil Science Society of America Annual Meeting. Seattle, WA.

Ginder-Vogel, M.; Fendorf, S.; Nyman J.; Wu, W.; Jardine, P.; Mehlhorn, T.; Gu, B.; Yan, H.; Carley, J. Criddle, C. **2004** Biological uranium reduction in Area 3 of the Field Research Center. Natural and Accelerated Bioremediation - Field Research Center (NABIR - FRC) PI Annual Meeting, Department of Energy (DOE). Oak Ridge, TN.

Ginder-Vogel, M.; Borch, T.; Fendorf, S. **2004.** Hexavalent chromium reduction in Hanford sediments: Implications for transport in heterogeneous environments. Advanced Light Source (ALS) Annual Users Meeting, Berkeley, CA.

Ginder-Vogel, M.; Street, J.; Labiosa, R.; Fendorf, S.; Golan, D.; Post, A.; Resing, J.; Paytan, A. **2004.** Phase Characterization of atmospheric dust input to the Northern Gulf of Aqaba. Stanford Synchrotron Radiation Laboratory (SSRL) Annual Users Conference. Stanford, CA.

Ginder-Vogel, M.; Nyman, J.; Wu, W.; Criddle, C.; Fendorf, S. **2003.** Biological reduction of uranium in Oak Ridge Source Zone Sediment. Stanford Synchrotron Radiation Laboratory (SSRL) Annual Users Conference. Stanford, CA.

Ginder – Vogel, M.; Smith, D.M.; Ruggiero, C.E.; Reilly, S.D.; Solderhom, L.; Hersman, L.E.; Forsythe J. H.; Skanthakumar, S.; Neu, M.P. **2001** Actinyl interactions with iron and manganese oxides and (oxy)hydroxides under abiotic and biotic conditions. 222nd American Chemical Society National Meeting, Chicago ,IL.

PROFESSIONAL REFERENCES

Dr. Donald L. Sparks – Post Doctoral Mentor
Professor
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Dr. Craig Criddle – Doctoral Committee Member
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