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# CURRICULUM VITAE

## DR. THOMAS BORCH

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### Present Positions and Contact Information:

Professor  
Environmental Soil Chemistry and Biogeochemistry  
Room C-017 Plant Sciences Building  
Department of Soil and Crop Sciences  
Joint Position in Department of Chemistry  
Joint Position in Civ. & Environmental Engineering  
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### Education:

**Postdoctoral Fellow**, Soil and Environmental Biogeochemistry, *Stanford University*, **Jan 2004 – Jan 2006**. Research Topics: Biogeochemical Cycling of Iron, Nutrients and Trace Metals. Mentor: Dr. Scott Fendorf.

**Ph.D.**, Environmental Soil Chemistry, *Montana State University*, Defended - Dec. **2003**.  
Dissertation: Chromatographic, Spectroscopic and Microscopic Analyses Reveal the Impact of Iron Oxides and Electron Shuttles on the Degradation Pathway of 2,4,6-Trinitrotoluene (TNT) by a Fermenting Bacterium. Advisor: Dr. William P. Inskeep

**M.Sc.**, Environmental Chemistry, *University of Copenhagen*, December **1999**.  
Thesis: Degradation of Volatile Chlorinated Aliphatics in Unsaturated Soils. Advisor: Dr. Bo Svensmark.

**B.Sc.**, Environmental Chemistry, *University of Copenhagen*, October **1997**.  
Thesis: The Quantitative and Qualitative Impact of DOC on Nitrate Removal in Wetlands. Advisor: Dr. Bo Svensmark.

## **Areas of Specialization:**

Soil Science and Analysis, Environmental Chemistry, Analytical Chemistry, Fe and C Biogeochemistry, Remediation Techniques, Soil Reclamation and Remediation, Wetlands, Coal and Uranium Mining, Industrial Pollution, Soil Organic Matter, Explosives, Arsenic, Emerging Contaminants, Radionuclides, Heavy Metals, Organic Contaminants, Natural Gas/Hydraulic Fracturing Chemicals, Disinfection ByProducts, Biosolids, Hormones, Wastewater, Drinking Water, Groundwater.

## **Professional History:**

- Jul 2016 -*                      **Professor**  
Dept. of Soil and Crop Sciences; Dept. of Chemistry; Dept.  
Civ. & Environmental Engineering  
Colorado State University, USA
- Feb 2014 –Jul 2014*            **Visiting Professor (Kretzschmar Soil Chemistry Group)**  
The Institute of Biogeochemistry and Pollutant Dynamics,  
Department of Environmental Sciences at ETH Zurich,  
Switzerland
- Aug 2013 – Jul 2016*        **Joint Appointment as Associate Professor**  
Dept. Civ. & Environmental Engineering  
Colorado State University, USA
- Jul 2011 – Jul 2016*        **Associate Professor**  
Dept. of Soil and Crop Sciences; Dept. of Chemistry  
Colorado State University, USA
- Aug 2010 -*                    **Faculty Member of The Center for Environmental  
Medicine (CEM) - Colorado State University, USA**
- Feb 2010 –*                    **Faculty Member of The Graduate Degree Program in  
Ecology (GDPE) - Colorado State University, USA**
- Mar 2009 - Jul 2012*        **Team Leader – Pharmaceuticals**  
The Institute for Livestock and the Environment  
Colorado State University, USA
- Aug 2008 –*                    **Member of the School of Global Environmental  
Sustainability**  
Colorado State University, USA

- Dec 2007 –*                    **Institute Associate**  
Institute for Environmental Solutions  
Denver, Colorado
- Aug 2007 – Jul 2011*        **Joint Appointment as Assistant Professor**  
Analytical Chemistry  
Department of Chemistry  
Colorado State University, USA
- Mar 2006 – Jul 2011*        **Assistant Professor**  
Environmental Soil Chemistry  
Department of Soil and Crop Sciences  
Colorado State University, USA
- Aug 2005 – Mar 2006*        **Affiliate Faculty Member**  
Department of Soil and Crop Sciences  
Colorado State University, USA
- Jan 2004 – Jan 2006*        **Postdoctoral Fellow**  
Soil and Environmental Biogeochemistry Group  
Department of Geological & Environmental Sciences  
Stanford University, USA  
Mentor: Dr. Scott Fendorf
- Jul 2001*                        **Berkeley-Stanford Summer School in Synchrotron Radiation**  
UC Berkeley, California, USA
- Dec 1999 – Dec 2003*        **Ph.D. Student, Research and Teaching Assistant**  
Center for Biofilm Engineering and Department of Environmental Sciences at Montana State University
- Aug 1998 – Dec 1999*        **Graduate Researcher**  
Department of Plant Biology and Biogeochemistry  
Risø National Laboratory, Denmark  
Supervisor: Dr. Christian Grøn
- Sep 1997 – Dec 1999*        **Graduate Student**  
Laboratory of Molecular Spectroscopy, Department of Chemistry, University of Copenhagen, Denmark  
Advisor: Prof. Bo Svensmark

*Oct 1996 – Jul 1997*      **Undergraduate Researcher**  
Freshwater Biological Laboratory  
University of Copenhagen, Denmark  
Supervisor: Prof. Mogens R. Flindt

*Aug 1993 – Sep 1997*      **Undergraduate Student and Student Advisor**  
Department of Chemistry  
University of Copenhagen, Denmark  
Advisor: Prof. Bo Svensmark

## **Honors, Recognitions, Scholarships, and Awards:**

- 2016    **Promoted to early Full Professor**
- 2016    **Selection of article** “Spills of Hydraulic Fracturing Chemicals on Agricultural Topsoil: Biodegradation, Sorption, and Co-contaminant Interactions” for ACS press release and ACS AuthorChoice
- 2016    **Selection of article** “Analysis of Hydraulic Fracturing Flowback and Produced Waters Using Accurate Mass: Identification of Ethoxylated Surfactants” for ACS Virtual Special Issue “Water Analysis for Emerging Chemical Contaminants”
- 2015    **SSSA Marion L. and Chrystie M. Jackson Soil Science Award** by the Soil Science Society of America for outstanding contributions (research, teaching, and impact of total contributions on soil science) in the areas of soil chemistry and mineralogy.
- 2015    **Article** “Biocides in Hydraulic Fracturing Fluids: A Critical Review of Their Usage, Mobility, Degradation, and Toxicity” **acknowledged as “Highly Cited Paper” (top 1% of the academic field of Environment/Ecology) by Essential Science Indicators**
- 2014    **Outstanding Associate Editor**, Journal of Environmental Quality (JEQ)
- 2014    **Research Fellowship for Visiting Professors (5 months)**, The Institute of Biogeochemistry and Pollutant Dynamics, Department of Environmental Sciences at ETH Zurich, Switzerland
- 2013    **Chair** for the Soil Science Society of America Division S-11 - Soils and Environmental Quality. Chair-Elect 2013, Chair 2014, and Past Chair in 2015.
- 2012    **Excellence in Review Award**, Environmental Science & Technology (American Chemical Society).

- 2012 **Emerging Investigator 2012**, Journal of Environmental Monitoring (Royal Chemical Society).
- 2011 **Promoted to early Tenure and Associate Professor**
- 2011 **The Borch-Hoppess Fund for Environmental Contaminant Research.** This fund is supported by generous gift contributions from my benefactor Karl C. Hoppess. This fund supports environmental research in my research group and salary for undergraduate and graduate students as well as Post-Doctoral Fellowships.
- 2011 **The Borch-Hoppess Equipment Fund for Contaminant Research and Analysis.** This fund is supported by generous gift contributions from my benefactor Karl C. Hoppess. This fund supports acquisitions and maintains of large equipment for the Borch research group.
- 2009 **Faculty Early Career Development (CAREER) Award from the National Science Foundation (NSF).** The honor is considered one of the most prestigious for up-and-coming researchers in science and engineering in the U.S.A.
- 2008 **Recipient of the 2008 ACS Geochemistry Division's Best Poster Award,** Philadelphia, PA.
- 2008 **The Academic Keys Who's Who in Sciences Higher Education**
- 2006 Jenny M. Jones (honors student in my lab) **Awarded 2<sup>nd</sup> place in the American Society of Agronomy Undergraduate Research Symposium Contest (2006;** see platform presentations below)
- 2004 **Postdoctoral Fellowship at Stanford University, Stanford, CA.**
- 2005 **Recipient of the 2005 AGU Outstanding Student Paper Award** (see details in poster section below)
- 2003 **Inland Northwest Research Alliance Graduate Fellowship, \$36000 year<sup>-1</sup>,** Idaho Falls, ID.
- 2003 **W.G. Characklis Award** - Outstanding Ph.D. Candidate. Given for outstanding research work, interaction with industry, and dedication to the Center for Biofilm Engineering. Montana State University, Bozeman, MT.
- 2001 **Awarded 1<sup>st</sup> place for best poster at the First Annual INRA Subsurface Science Symposium,** September 6-7, 2001, Idaho Falls, ID (see also abstracts).
- 2000 **Louis Pasteur Academic Scholarship, Denmark**

1999 **Student Travel Award for Battelle's In Situ and On-Site Bioremediation Symposium**, San Diego, CA. Awarded by University of Copenhagen, Department of Chemistry.

## **Selected Expert Witness and Consulting**

Lambdin & Chaney, LLP – Law Firm (Denver, CO) - Paul, et al. V. GBT Farms, LLC, et al. Soil Scientist/Expert Witness in lawsuit, (pesticide application), Jan 2016

Barkan & Robon LTD – Law Firm (Oregon, OH) – Soil Scientist/Expert Witness in lawsuit, Jun 2013 – Dec 2013.

Vignery & Mason LLC – Law Firm (Goodland, KS) - Soil Scientist/Expert Witness in lawsuit, Oct. 2013.

Dufford, Waldeck, Milburn & Krohn, LLP - Law Firm (Grand Junction, CO) - Soil Scientist/Expert Witness in lawsuit (responsibilities: expert report, rebuttal, deposition, court trial, testify). Re: Morgan, et al. v. Western Fuels - Colorado LLC, et al. (surface coal mining, reclamation, prime farmland soil), Mar - Dec 2012.

HDR, Inc. - Wastewater treatment plant upgrade (Metro Wastewater Reclamation District (MWRD), Denver, CO) - biosolids application expert, Feb - June 2013

Technical book review - Adsorption Technology: Equilibrium and Kinetic Models by Saad Abdullah Al-Jlil, Jan 2013.

HDR, Inc. - Wastewater treatment plant update (Greeley, CO) - critical analysis of Class A versus Class B options with regard to future nutrient limits and contaminants of concern, Nov 2011 - Mar 2012.

CH2M Hill - Wastewater treatment plant upgrade (Westminster, CO) - focus on biosolids handling and management plan, Jan - Dec 2011.

## **Teaching and other Research Related Qualifications:**

### ***Borch Research Group:***

- Rachel Rehberg, Ph.D. Student (Dec 2016 – present)
- William Bahureksa, Ph.D. Student (Dec 2016 – present)
- Dr. Chunhui Fan. Associate professor in the School of Environmental Sciences & Engineering, Shaanxi University of Science & Technology (SUST). Sabbatical (Dec 2016 – Dec 2017).
- Molly McLaughlin, Ph.D. Student (previously a M.S. Student in my group) (Aug 2013 – present). Fate of Hydraulic Fracturing Chemicals.
- Yuheng Qiu, M.S. (Jan 2016 – present)
- Baylee Schell, Undergraduate Honors Student.
- Ellen Daugherty, Ph.D. Student (Jan 2013 - present). Organic matter mineral interactions.
- Dr. Rong Wei, Research Scientist and Lab Manager (Jul 2012 - current).

- Dr. Robert B. Young, Research Scientist I (Nov 2014 – present). Post-Doctoral Fellow (May 2014 – Nov 2014). Ph.D. Student (Aug 2007 – May 2014). Photolysis of Steroid Hormones and Pharmaceutically Active Compounds in Aquatic Environments.

*Former Research Group Members or Visitors:*

- Genevieve Kahrilas, Ph.D. Student (Jan 2013 – Dec 2016). Fate of Hydraulic Fracturing Chemicals.
- Jeremy Jasmann, Ph.D. Student (Jun 2012 – May 2016). Electrolytic treatment of contaminants.
- Andy Granger, Summer Undergraduate Intern, (June – July 2015).
- Celeste Raket, Undergraduate Research Student. (Sept 2015 – Dec 2015)
- Dr. Amrita Bhattacharyya, Post-Doctoral Fellow (Mar 2013 – July 2015). Uranium, iron and carbon biogeochemistry. (Currently a postdoc at LBNL, CA).
- Chris Fukami, M.S. Student (Nov. 2013 – Aug 2015). Uranium Treatability Studies.
- Dr. Georgina A. McKee, Post-Doctoral Fellow (Aug 2011 – July 2015). Fourier Transform Ion Cyclotron Resonance Mass Spectrometric and Solid State Nuclear Magnetic Resonance Spectroscopic Studies of Dissolved Organic Matter Fractionation at Mineral Interfaces. (Currently a Scientist at USGS in Boulder).
- Mitchell Cooper, Undergraduate Student. (Dec 2014 – May 2015).
- Moritz Zeising, Undergraduate Intern from Bayreuth University, Germany (Sep 2014 – Nov 2014). Arsenic sorption and redox transformation by mackinawite.
- Andria J. Marsh, M.S. Student (Jan 2010 – May 2014). Impact of organic matter on biogeochemical iron cycling.
- Lyndsay Troyer, Ph.D. Student (Jan 2008 – May 2014). Biogeochemical Cycling of Iron: Interactions with Arsenic and Uranium. (currently a postdoc at University of Washington, St. Louis).
- Joshua J. Stratton, Ph.D. Student (Jan 2008 – May 2014). Ammonia source tracking by isotopic signatures ( $\delta^{15}\text{N}$ ). (Currently an assistant professor at St. Ambrose in Iowa).
- Wilfredo Dumale, Jr., Fulbright Scholar (Nov. 2013 – May 2014). Nueva Vizcaya State University, Philippines. Impact of Liming and Biochar on SOC Turnover and CO<sub>2</sub> Emissions from Acid Soils.
- Prof. Dr. Benny Chefetz, The Hebrew University of Jerusalem, Israel, Sabbatical (Jul 2013 – Aug 2013).
- Dr. Aiju Liu, Visiting Research Scholar, Shandong University of Technology, China (Jan 2013 - July 2013). Photodegradation of Antiepileptic Drugs.
- Vincenzo Leone, Visiting PhD student from University of Naples II (Mar 2013 – Jun 2013)
- Damaris Raboin, Undergraduate Honors Student (Nov 2009 – May 2013). Impact of vegetation-derived dissolved organic carbon on disinfection byproduct formation during drinking water treatment.
- Danielle Maitland, Undergraduate Student (Jun 2012 – October 2012).

- Prof. Dr. Andreas Kappler, University of Tübingen, Germany, Sabbatical (June-July 2012)
- Dr. Masayuki Shimizu, Post-Doctoral Fellow (Nov. 2010 - August 2012). Soft X-ray Spectromicroscopy Studies of Organic Matter - Iron Interactions.
- Dr. Zhuanjun Zhao, Research Scholar (Jul. 2011 - July 2012). Bioreduction Kinetics and Pathways of Iron-Organic Matter Coprecipitates.
- Roger Daniel Hefley, M.S. Student (Jan 2010 - May 2012). Development of a safe water system for people living in Tushile, Kosovo. (Currently working for Water for Life in Norway; High School Teacher)
- Dr. Jens Blotevogel, Ph.D. Student (Jun 2007 - Dec 2010). Quantum Chemical Modeling of Redox Reactivity, Degradation Pathways and Persistence for Aqueous Phase Contaminants. Currently an Assistant Research Professor at CSU (Oct 2010 - present).
- Dr. Yun-Ya Yang, Ph.D. Student/Postdoc (Sep 2007 - Jan 2012). Biodegradation and Runoff Potential of Steroid Hormones from Animal Feedlots and Sewage Treatment Plants. (Currently a Postdoc at University of Florida)
- Dr. Jihai Zhou, Research Associate (Aug 2009 – Mar 2011). Impact of organic matter on bioreduction of iron minerals.
- Madison Martinez, Undergraduate Student (Jan 2010 - June 2010).
- M.Sc. Federico Masis Melendez, from Escuela de Química, Ingeniería Ambiental Instituto Tecnológico de Costa Rica was a visiting scientist in my lab during September of 2010.
- Ojo Olanrewaju Fatoba, Visiting Ph.D. student, University of the Western Cape, South Africa, (2009 - 2010). Synthesis and Characterization of Co-Precipitates of Humic Acid and Ferrihydrite.
- Aleksander Makedonski, M.Sc. student (2007 - 2008). Fate and Transport of Steroidal Hormones in the Environment (Plan B thesis defended Aug. 2008).
- Catherine R. Simpson, Graduate Student (2006 - 2007). Fate and Transport of Steroid Hormones from Animal Feedlots and Sewage Treatment Plants.
- Jennifer M. Jones, Chemistry Major - Work-Study (Honors Student/Thesis; 2006 - 2007). Photolysis of Steroid Hormones. (Currently employed at HACH in Loveland, CO)
- Yared Assefa Mulisa, Graduate Intern from Wageningen University, the Netherlands. (Currently a Ph.D. student at Kansas State University). (2006-2007)
- Pilar Montraveta Torrent, Undergraduate Intern from University of Lleida, Spain. (2006).

***Classes Taught:***

Graduate Student Seminar (SOCR 792) at Colorado State University, Fall 2011 - present

Co-Teaching: Foundations of Soil Science (SOCR 580A4) at Colorado State University, Fall 2009 - present

Co-Teaching: Global Challenges in Plant and Soil Science (SOCR 475) at Colorado State University, Fall 2010 - present



Co-Teaching: Summer Soil Institute at Colorado State University, Summer 2010 - present (for details: <http://soilinstitute.nrel.colostate.edu/>)

Teaching: Advanced Topics in Chemical Analysis - Environmental Chemical Analysis (CHEM530A) at Colorado State University, Spring 2009.

Teaching: Environmental Soil Chemistry (SOCR 567) at Colorado State University, Spring 2008 –

Teaching: Soil and Environmental Chemistry (SOCR 467) at Colorado State University, Spring 2007 –

Co-Teaching: Environmental Soil Science (SOCR 478) at Colorado State University, Spring 2007 - 2011

***Guest Lectures:***

In addition to the above classes, I have guest lectured on an annual or regular basis for the following courses: SOCR171 - Environmental Issues in Agriculture ("Fate of Sex Hormones and other Contaminants in the Environment"), SOCR 540 - Soil-Plant-Nutrient Relationships ("Radionuclides, Toxic Metals and Metalloids in the Environment"), and CIVE 680A1 - Emerging Concepts -Transport and Remediation ("Sorptions Phenomena").

**ADVISING:**

**GRADUATE STUDENTS:**

5 Current Graduate Advisees:

Rehberg, Rachel (Ph.D.)  
Bahureksa, William (Ph.D.)  
Daugherty, Ellen (Ph.D.)  
McLaughlin, Molly (Ph.D.)  
Yuheng Qiu (M.S.)

10 Graduate Degrees Completed Under Your Supervision (past 5 years):

Jasmann, Jeramy R (Ph.D.)  
Kahrilas, Genevieve (Ph.D.)  
Fukami, Christine, 2015, (M.S.)

Stratton, Joshua James, 2014, (Ph.D.)  
Troyer, Lyndsay Donn, 2014, (Ph.D.)  
Young, Robert Bruce, 2014, (Ph.D.)  
Marsh, Andria Jeanette, 2014, (M.S. Plan A)  
Hefley, Roger Daniel, 2012, (M.S. Plan A)  
Yang, Yun-Ya, 2010, (Ph.D.)  
Blotevogel, Jens, 2010, (Ph.D.)

## **POSTDOCTORAL STUDENTS/RESEARCH ASSOCIATES:**

### Current:

Pica, Nasim, (Ph.D.)  
Young, Robert Bruce, (Ph.D.)  
Wei, Rong, (Ph.D.)

### Past 5 years:

Bhattacharyya, Amrita, 2013-2015, (Ph.D.)  
McKee, Georgina A., 2011-2015, (Ph.D.)  
Dumale, Jr., Wilfredo, 2013-2014, (Ph.D.)  
Shimizu, Masayuki, 2010-2012, (Ph.D.)  
Zhao, Zhuanjun, 2011-2012, (Ph.D.)  
Zhou, Jihai, 2009-2011, (Ph.D.)

Co-mentor for Ph.D. students in Dr. Scott Fendorf's research group at Stanford University, 2004 - 2006

Mentor for Danny Richter (summer intern at Stanford University; now a Ph.D. student at Scripps Institute of Oceanography), 2004.

Assistant teacher in a civil engineering graduate class at Montana State University: *Groundwater Contamination*, spring 2002

Advisor on three undergraduate research projects (Kristian Paul (LRES), Eric Harrison (CE) and Jace Harwood (ChE)), 2001 – 2002

Mentor for six undergraduate research students and one master student at MSU, 2000 – 2003.

## **Professional Activities:**

### **Journals:**

**Editorial Board Member** for the Journal Environmental Pollution 2013 - present.

**Associate Editor** for the Journal of Environmental Quality 2012 - present.

**Guest editor** on an *Environmental Science & Technology* (ES&T) focus issue entitled “Biogeochemical Redox Processes and their Impact on Contaminant Dynamics”. This focus issue was approved based on a proposal submitted to ES&T by Prof. Ruben Kretzschmar (Institute of Biogeochemistry and Pollutant Dynamics, ETH Zurich, Switzerland), **Prof. Thomas Borch** and five other scientists. The issue was published January **2010** (<http://pubs.acs.org/toc/esthag/44/1>).

***Societies:***

**Chair** for the Soil Science Society of America Division S-11 - Soils and Environmental Quality. Chair-Elect 2013, Chair 2014, and Past Chair in 2015.

**Member of Young Investigator Award** Committee for the Soil Science Society of America 2012 - present.

**ASA-CSSA-SSSA - 2012 Environmental Quality Research Award** Committee

**Serve on the Soil Science Glossary Terms Committee** (see details under “published books”). 2007 - present

***Meetings:***

**Conference co-Chair** of the EmCon 2016 – 5th International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment, Sydney Australia. (2014 - 2016).

**Organizer and Host of Workshop** with U.S. EPA on Environmental Impacts of Hydraulic Fracturing CSU School of Global Environmental Sustainability. April 13, **2016**, Fort Collins, CO.

**Conference Symposium Co-Chair** of Hydraulic Fracturing Impacts on Water, Soil and Air Quality at the 249th American Chemical Society National Meeting & Exposition in Denver, CO from March 22 – 26, **2015**.

**Conference Symposium Co-Chair** of Iron Oxides: Formation, Structure, Reactivity and Applications at the 249th American Chemical Society National Meeting & Exposition in Denver, CO from March 22 – 26, **2015**.

**Conference Session Co-Chair** of Environmental Impacts of Hydraulic Fracturing, ISR U Mining, and Alternative Energy Production at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.

**Conference Symposium Co-Chair** of Symposium--Climate Change Impacts on Soil Carbon: Understanding and Estimating the Extent and Rates of Reactions, Processes, Interactions and Feedbacks at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.

**Conference Chair** of the EmCon 2014 – 4<sup>th</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment August 19-22, **2014**. University of Iowa, Iowa City, Iowa, USA. <http://www.iihr.uiowa.edu/emcon2014/>

**Conference Session Co-Chair** of Water Quality in a Changing Climate at the ASA, CSSA, and SSSA Annual Meetings, Nov. 3-6, **2013**, in Tampa, FL. Conveners Thomas Borch (CSU) and Gina McKee (CSU).

**Conference Steering Committee** of the Natural Gas Symposium **2012 & 2013**. Doing Energy Right. Colorado State University, <http://naturalgas.colostate.edu> .

**Chair** for the theme "Geochemical Impacts of Human Activity" (Theme 18) for the upcoming Goldschmidt Conference in Florence, August **2013** (<http://goldschmidt.info/2013/themes>).

**Scientific Advisory Board**. Monte Verità Conference on Iron Biogeochemistry. Ascona, Switzerland, March 3-8, **2013**.

**Co-Chair** of the Telluride Workshop: Biogeochemical Processes of the Iron Cycle: From Microbes to Mineral Surfaces (Tentative title) August, 7-11, **2012** in Telluride, Colorado, USA. Organizing Committee: T. Borch (CSU) and K. Rosso (PNNL). <http://www.telluridescience.org/>

**Conference Session Co-Chair** of Redox-active metals and the global carbon cycle at Goldschmidt 2012. June 24-29, **2012**. Montreal, Canada. Conveners Peter Nico (Berkeley Lab), Thomas Borch (CSU), and Karin Eusterhues (Jena, Germany)

**Conference Chair** of the EmCon 2011 - 3<sup>rd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment August 23-26, **2011**, Copenhagen, Denmark. Organizing Committee: T. Borch (CSU, Co-Chair), A. Boxall (CSL, Co-Chair), E.T. Furlong (USGS, Co-Chair), D.W. Kolpin (USGS, Co-Chair), and Bjarne Strobel (University of Copenhagen).

**Co-Chair** of the EAG/ESF/NSF Short Course: Tools in Environmental Biogeochemistry - Opportunities and Limitations. August 7-11, **2011**. University of Tübingen, Germany. Organizing Committee: A. Kappler (University of Tübingen), T. Borch (CSU), and R. Kretzschmar (ETH Zurich)

**Co-Chair** of the Telluride Workshop: Biogeochemical Processes of the Iron Cycle: From Microbes to Mineral Surfaces July 26-30, **2010** in Telluride, Colorado, USA. Organizing Committee: T. Borch (CSU) and S. Fendorf (SU).

<http://www.telluridescience.org/>

**Conference Session Co-Chair** of Mineral–Microbe Interactions at Goldschmidt 2010 - *Earth, Energy, and the Environment* at Goldschmidt 2010. June 13-18, **2010**. Knoxville, TN. Convenors: A. Kappler (Tubingen) and T. Borch (CSU).

<http://www.goldschmidt2010.org/themes?theme=15>

**Conference Chair** of the EmCon 2009 - 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment August 4-7, **2009** on the Colorado State University Campus in Fort Collins, Colorado, USA. Organizing Committee: T. Borch (CSU, Co-Chair), A. Boxall (CSL, Co-Chair), E.T. Furlong (USGS, Co-Chair), and D.W. Kolpin (USGS, Co-Chair).

[www.emcon2009.com](http://www.emcon2009.com)

**Conference Session Co-Chair** of Frontiers in analytical techniques: synchrotron and neutron scattering techniques at Goldschmidt 2009 - "*Challenges to Our Volatile Planet*" June 21 – 26, 2009 in Davos, Switzerland. Convenors: T. Borch (CSU) and S. Shaw (Leeds). <http://www.goldschmidt2009.org/index>

**Conference Session Co-Chair** of Biogeochemical Redox Processes in Soils and Sediments August 17-21, 2008 at the American Chemical Society 236<sup>th</sup> National Meeting and Exposition. Organizing Committee: T. Borch (CSU), M. Ginder-Vogel (UD), and K.M. Campbell (USGS).

**University:**

**Member of Vice President for Research Faculty Advisory Committee (VPAC), 2016**  
- present

**Departmental Coordinator of the Graduate Program, Dept. of Soil & Crop Sciences, 2016 – present.**

**Traveled to China with CSU Confucius Institute.** Presented talks and met with faculty at East China Normal University, Shanghai and Southwest University, Chongqing. October 23-29, 2016.

**Member of President's Sustainability Committee research subcommittee, 2016 – present.**

**Faculty Mentor, Dept. of Soil & Crop Sciences, 2016 – present.**

**Contributor** to the strategic plans for the One Health Institute at CSU, 2015 - present

**Member of Executive Council** for the School of Global Environmental Sustainability (SoGES), 2012 - 2015.

**Faculty Opponent** for Anneli Sundman's Ph.D. defense in the Department of Chemistry at Umeå University, Sweden. March 28, **2014**.

**Conference Steering Committee** of the Natural Gas Symposium 2012 & 2013. Doing Energy Right. Colorado State University, October 1-3, **2012** & October 14-16, **2013**.

**Colorado State Representative** on USDA NIFA multistate research projects W-1082 (2006-2010), W-2170 (2010 - 2014), and W-2082 (2010 - present). Secretary W2082 (2011- present).

**Evaluated Research Productivity.** Department of Soil and Crop Sciences - Self Study, (2012 - 2013).

**Institute for Livestock and the Environment** (<http://ile.colostate.edu/>). Team leader for the Pharmaceuticals Team. 2009 – 2012

**Serve on the Information Science & Technology Center (ISTeC) Research Advisory Committee** at Colorado State University. 2008 – 2011

**Serve on the CSU Scientific Vendors Focus Group Committee as a College of Agricultural Sciences (CAS) representative.** 2010 - 2012

**Co-organizer of the Celebrate Undergraduate Research & Creativity (CURC) Showcase** at Colorado State University 2008 – present

**Seminar coordinator** for the seminar series at the Center for Biofilm Engineering, 2001 – 2003

**Other Jobs:**

**Expert consultant** (*paid GS15 position*) to EPA's Science Advisory Board (SAB) Radiation Advisory Committee (RAC) in Washington D.C, 2011 - 2012.

**Borch Environmental Pollution Consulting, LLC** (*private consulting company/service*). Fort Collins, Colorado, April 2011 - present.

**Peer Reviewer for the Following National Laboratories, Funding Agencies including review panel duties, Journals, and Book publishers**

**National Laboratories:**

Serving on a standing Environmental Molecular Sciences Laboratory (EMSL) Peer Review Committee. Review of user research proposals for the scientific research at EMSL at the Pacific Northwest National Laboratory (PNNL), which is operated by Battelle for the U.S. Department of Energy. Serve as peer-reviewer for user proposals

submitted to Stanford Synchrotron Radiation Lightsource (SSRL) and the Canadian Light Source (CLS).

*Funding Agencies:*

The National Science Foundation (NSF)

-Served on chemistry environmental chemical sciences review panel March 2016

-Served on geobiology and low temp geochemistry review panel April 2015

-Served on postdoctoral fellowship review panel Dec 2014

The U.S. Department of Agriculture (USDA)

-Served on water science review panel summer 2010

The U.S. Department of Energy's Office of Basic Energy Sciences (DOE)

-Served on the subsurface biogeochemical research (SBR) review panel April 2016

Strategic Environmental Research and Development Program (SERDP)

U.S. Civilian Research & Development Foundation (CRDF)

United States - Israel - Binational Agricultural Research and Development Fund (BARD)

The Swiss National Science Foundation

*Journals:*

Achieves of Environmental Contamination and Toxicology

Analytical Chemistry

Applied Geochemistry

Chemosphere

Clays and Clay Minerals

Environmental Pollution

Environmental Science and Technology

Environmental Engineering Science

Geochimica et Cosmochimica Acta

Geomicrobiology Journal

Journal of the American Water Resources Association

Journal of Chromatography

Journal of Environmental Quality

The Proceedings of the National Academy of Sciences, U.S.A. (PNAS)

Science of the Total Environment

Soil Science

Soil Science Society of America Journal

Soil & Sediment Contamination: an International Journal

Water Research

*Book Publishers:*

Blackwell Publishing

Elsevier

**Membership in Scientific Societies**

The American Association for the Advancement of Science (AAAS), 2011 – present  
Soil Science Society of America, 2004 – present  
The Geochemical Society, 2004 – present  
American Geophysical Union, 2002 – present  
The American Chemical Society, 2002 – present  
The Danish Chemical Society, 2000 – 2010  
The Danish Pasteur Society, 1999 – 2004

### **Examples of Other – Service/Outreach:**

I delivered a Pinhead Punk Science presentation in Telluride for 70 children between the ages of 4 – 10 as part of the Smithsonian’s “Dig It! Come Get the Dirt on Messy Mud and Super Soil.” ([Full article.](#)) Pinhead Institute is a Smithsonian Affiliate based in Telluride, Colorado, that strives to promote science-education both locally & globally. An international network of the world’s leading scientists supports their many educational programs providing unparalleled opportunity to high-level scientific education in rural Colorado.

CREEC Board Member. The Consortium for Research and Education on Emerging Contaminants (CREEC) is a grass-roots community of world-class scientists and stakeholders from the Central Rocky Mountain region with a shared interest in the source, fate, and physiological effects of contaminants of emerging concern. CREEC consists not only of scientists at the local, University, State, and Federal level, but also has active participation from regional stakeholders including regulators, policy makers, public health workers, drinking water providers, wastewater-treatment providers, and concerned citizens. I have also been hosting CREEC meetings here at CSU For more details see <http://co.water.usgs.gov/CREEC/index.html>

Became an Institute Associate (via invitation in 2007) of the Institute for Environmental Solutions (IES) in Denver.  
For more details see <http://www.instituteforenvironmentalsolutions.org/index.html>

Served as an expert on the National Livestock and Poultry Environmental Learning Center’s “Pharmaceuticals Committee”. For more details <http://lpe.unl.edu/>

I have giving multiple "community service" presentations to various groups including: *wastewater managers in Colorado, pharmaceutical industry in Colorado, state decision makers in Denver, Colorado Ag stakeholders.*

### **Selected Grants** (for details please request a "Contracts and Awards" document from me):

Geochemical Modeling of Downgradient Post-Mining Conditions for the Smith Ranch-Highland ISR Uranium Facility. James Stone. Cameco. 2016-2017.



UNS: Collaborative Research: Characterizing pyrogenic soil organic matter as a source of nitrogenous disinfection byproducts. Fernando Rosario-Ortiz and Robert Young. NSF CBET. 2016-2019.

SusChEM: Collaborative Research: Influence of Fe<sup>2+</sup>- catalyzed recrystallization on Fe oxide reactivity and C stabilization. Michelle Scherer, Aaron Thompson, Brian Beard, Clark Johnson. NSF EAR Division Of Earth Sciences. 2015-2018

CSU Water Center. Impact of Shale-Gas Development on Surface Water and Lake Sediment Contamination. 2015-2016.

CSU The School of Global Environmental Sustainability - Global Challenges Research Team Award. 2015-2016.

Arcadis U.S., Inc. Uranium Remediation Research. 2014-2015

CSU Water Center. Exploring the Water-Energy Nexus at CSU: Hydrologic Fate and Transport of Chemicals Used in Oil & Gas Development. 2013-2014.

CSU Water Center. Characterizing Biological Pollutants in Agricultural Runoff at Colorado Dairies. 2013-2014.

USDA NIFA AFRI. Biogeochemical Iron Cycling in Subalpine Wetlands with Different Hydraulic Connectivity: Impact on Fate and Transport of Organic C and N. 2013-2016.

CSU – MultiChem Research Collaboration. Environmental Fate of Chemicals used for Hydraulic Fracturing of Natural Gas. 2013 - 2014

University of Wyoming - School of Energy Resources. Critical Evaluation of Restoration Goals for In-situ recovery (ISR) Uranium Mining Sites based on Improved Geochemical and Toxicological Characterization of Baseline- and Post-Mining Site Conditions. 2013-2015.

The US-Israel Binational Agricultural Research and Development Fund (BARD). Environmental Fate of Antiepileptic Drugs and their Metabolites: Biodegradation, Complexation, and Photodegradation. 2012 - 2016.

USDA NIFA AFRI. Climate change controls on natural organic matter chemical composition from subalpine environments: Implications for drinking water quality. 2012 - 2014.

National Science Foundation (NSF). CAREER: Climate Change Impacts on the Interrelationship between Iron Cycling and Organic Carbon: Environmental Biogeochemical Research and Education from Molecular to Field Scale. 2009 - 2014.

USDA AFRI Air. Emissions And Transport Of Reactive Nitrogen From Cattle Feedlots Along Colorado's Front Range. 2010 – 2013.

USDA AFRI Soil Processes. Summer Soil Institute: Addressing Environmental Challenges with Current and Emerging Techniques. 2009 - 2011.

USDA-FS. Soil, Water, and Air Investigation Concerning Abandoned Uranium Mines in Northwest South Dakota. 2009 - 2010.

DuPont. Thermodynamic modeling of Contaminants Fate in Natural and Engineered Systems and Electrochemical Treatment of Organic Pollutants. 2006 - present.

General Electric (GE) - Global. Continued CSU - GE Collaborative Environmental Research. 2008 - 2013.

Colorado Water Institute (CWI). Occurrence and Fate of Steroid Hormones in Sewage Treatment Plant Effluent, Animal Feeding Operation Wastewater and the Cache la Poudre River of Colorado. 2006 - 2009.

### **Publications:**

#### **Citation indices**

	All
Citations	1996
h-index	23
i10-index	34

Source: Google Scholar

### **PH.D. DISSERTATIONS:**

**Borch, T.** Chromatographic, Spectroscopic and Microscopic Analyses Reveal the Impact of Iron Oxides and Electron Shuttles on the Degradation Pathway of 2,4,6-Trinitrotoluene (TNT) by a Fermenting Bacterium. Montana State University, **2003**.

### ***ADVISEES:***

Kahrilas, G.A. The Downhole Behavior of the Chemicals of Hydraulic fracturing – An Insight to the Nature of Biocides and Surfactants Underground. Colorado State University, **2016**.

Jasmann, J.R. Catalytic Strategies for Enhancing Electrochemical Oxidation of 1,4-Dioxane: TiO<sub>2</sub> Dark Activation and Microbial Stimulation, **2016**.

Troyer, L.D. Impact of Fe and redox chemistry on the environmental fate of metalloids and radionuclides. Colorado State University, **2014**.

Young, R.B. Photodegradation of Selected Endocrine and Pharmaceutically Active Compounds Under Environmentally Relevant Conditions – Processes and Products. Colorado State University, **2014**.

Stratton, J.J. Tracking Ammonia Volatilization and Fate from Emission Source to Pristine Ecosystem, **2014**.

Yang, Y-Y. Degradation and Transport Pathways of Steroid Hormones from Animal and Human Waste. Colorado State University, **2010**.

Blotevogel, J. Quantum Chemical Modeling of Redox Reactivity, Degradation Pathways and Persistence for Aqueous Phase Contaminants. Colorado State University, **2010**.

### **M.S. THESES:**

**Borch, T.** Degradation of Volatile Chlorinated Aliphatics in Unsaturated Soils. University of Copenhagen, **1999**.

### *ADVISEES:*

McLaughlin, M.C. Environmental Fate of Hydraulic Fracturing Fluid Additives after Spillage on Agricultural Topsoil, **2016**.

Fukami, C. Plan B. Colorado State University, **2015**.

Marsh, A. Plan B. Colorado State University, **2014**.

Hefley, R.D. Urbanized Nutrient Enrichment of the Klina River in Kosovo: Impact on Surface Water and Drinking Water Quality in a Developing Country. Colorado State University, **2012**.

Makedonski, A. Fate and Transport of Steroidal Hormones in the Environment (Plan B), **2008**.

### **B.S. HONORS THESES:**

Damaris Raboin. Impact of vegetation-derived dissolved organic carbon on disinfection byproduct formation during drinking water treatment, **2013**.

Jennifer M. Jones. Photolysis of Steroid Hormones, **2007**.

### **BOOKS:**

*PUBLISHED (1):*

**Glossary of Soil Science Terms 2008** -- by Soil Science Glossary Terms Committee. 92 pages, **2008**, SSSA. ISBN 978-0-89118-851-3. The 2008 revision of *Glossary of Soil Science Terms* replaces the 2001 edition. The SSSA has published definitions or glossaries since 1956. Those making major contributions to this edition include Glenn Wilson, Thomas Borch, Robert Kremer, Margie Faber, Ward Hurt, Michael Wilson, Sally Logsdon, and some of the recent chairs of the S374 Glossary of Soil Science Terms Committee (Louis Schipper, Ray Weil, Christian Schulthess, Philip Schoenberger). <https://www.soils.org/publications/soils-glossary>

### **BOOK CHAPTERS:**

#### *PUBLISHED (2):*

Young, R. B.; **Borch, T.** Sources, Presence, Analysis, and Fate of Steroid Sex Hormones In Freshwater Ecosystems - A Review. Chapter 4 in *Aquatic Ecosystem Research Trends*, Nairne, G. H., Ed. Nova Science Publishers, Inc.: Hauppauge, New York, **2009**; p. 103-164.

**Borch, T.**, Fendorf, S. Phosphate Interactions with Iron (Hydr)oxides: Mineralization Pathways and Phosphorus Retention Upon Bioreduction. Chapter 12 in *Adsorption of Metals by Geomedia II: Variables, Mechanisms, and Model Applications*; edited by Barnett, M. O., Kent, D. B., Elsevier, Amsterdam, The Netherlands, **2008**, p. 321-348.

### **JOURNAL ARTICLES:**

#### *IN REVIEW (11):*

BLOTEVOGEL, J.; RAPPÉ, A.K.; MAYENO, A.N.; SALE, T.C.; **BORCH, T.** (2016): Post-Transition-State Bifurcation Controls Selectivity of Undirected C-H Bond Activation by Permanganate. *Science*, invited submission, internal review.

JASMANN, J.R.; GEDALANGA, P.B.; **BORCH, T.**; MAHENDRA, S.; BLOTEVOGEL, J. (2016): Synergistic Treatment of Mixed 1,4-Dioxane and Chlorinated Solvent Contaminations by Electrolytic Stimulation of *Pseudonocardia dioxanivorans* CB1190. *Environmental Science & Technology*, internal review.

KAHRILAS, G.A.; BLOTEVOGEL, J.; **BORCH, T.** (2016): Endocrine Disrupting Chemical Formation from Nonylphenol Ethoxylate Hydrolysis Under Unconventional Oil and Gas Reservoir Conditions. *Environmental Science & Technology Letters*, internal review.

BLOTEVOGEL, J.; GIRAUD, R.J.; **BORCH, T.** (2016): Kinetic Model Development and Estimation for the Reductive Defluorination of Perfluorooctanoic Acid by Zero-valent Metals. *Journal of Hazardous Materials*, internal review.

HEYOB, K.M.; BLOTEVOGEL, J.; VOLKER, M.; BROOKER, M.; **BORCH, T.**; LENHART, J.J.; LAMENDELLA, R.; MOUSER, P.J. (2016): Anaerobic Attenuation of Ethoxylated and Glycol Surfactants in Hydraulic Fracturing Fluids: Degradation Rates, Extents, and Microbial Pathways. *Environmental Science & Technology*, internal review.

BURGOS, W.D.; MEZA, L.C.; DROHAN, P.J.; TASKER, T.L.; ALBERT, P.E.; GEEZA, T.J.; BLOTEVOGEL, J.; MCLAUGHLIN, M.C.; REILLY, R.; **BORCH, T.**; WARNER, N.R. (2016): Watershed-scale Impacts from Surface Water Discharge of Oil & Gas Wastewater. *Proceedings of the National Academy of Sciences*, in preparation.

Bhattacharyya, A., Campbell, K.M., Kelly, S., Roebbert, Y., Weyer, S., Bernier-Latmani, R., **Borch, T.** Biogenic non-crystalline U(IV) revealed as major component in uranium ore. **2016.**

Troyer, L.D., Stone, J.J. Campbell K.M., Emerson, J., Lezama-Pacheco, J.S., Bargar J.R., **Borch T.** Impact of biostimulation on As and U redox chemistry in mine tailings sediments. **2016.**

Stratton, J.J. Ham, J. **Borch, T.**, Ammonia Emissions from Sub-Alpine Forest and Mountain Grassland Soils. **2016.**

Larson, L.N., Grettenberger, C., Macalady, J.L., Bibby, K.J., Gorski, C.A., **Borch, T.**, Burgos, W.D. Hydrobiogeochemical factors influencing iron mineralogy beneath an acid mine drainage-contaminated stream. **2016.**

McKee, G.A., Rhoades, C.C., Bergstrom R., Burton, S., Kelly, E.F., **Borch, T.** Hydrogeomorphic controls on soil carbon quantity and composition in subalpine wetlands. **2016.**

*PUBLISHED (46):*

Gray, J.L., **Borch, T.**, Furlong, E.T., Davis, J.G., Yager, T.J., Yang, Y-Y., Kolpin, D.W. Rainfall-Runoff of Anthropogenic Waste Indicators from Agricultural Fields Applied with Municipal Biosolids. *Sci. Total Environ.* **2017.**  
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Avneri-Katz, S., Young, R.B., McKenna, A.M., Chen, H., Corilo, Y.E., Polubesova, T., **Borch, T.**, Chefetz, B. Adsorptive fractionation of dissolved organic matter (DOM) by mineral soil: Macroscale approach and molecular insight. *Organic Geochemistry* **2017**, 103 (2017) 113–124

Cawley, K. M.; Hohner, A. K.; McKee, G. A.; **Borch, T.**; Omur-Ozbek, P.; Oropeza, J.; Rosario-Ortiz, F. L., Characterization and spatial distribution of particulate and soluble carbon and nitrogen from wildfire-impacted sediments. *Journal of Soils and Sediments* **2016**, 1-13.

Kahrilas, G. A.; Blotevogel, J.; Corrin, E. R.; **Borch, T.**, Downhole Transformation of the Hydraulic Fracturing Fluid Biocide Glutaraldehyde: Implications for Flowback and Produced Water Quality. *Environmental Science & Technology* **2016**, 50 (20), pp 11414–11423

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- Paz, A., Tadmor, G., Malchi, T., Blotevogel, J., **Borch, T.**, Polubesova, T., Chefetz, B. Fate of carbamazepine, its metabolites, and lamotrigine in soils irrigated with reclaimed wastewater: Sorption, leaching and plant uptake. *Chemosphere*. **2016**. *160*, 22-29.
- McLaughlin, M.C., **Borch, T.**, Blotevogel, J. Spills of Hydraulic Fracturing Chemicals on Agricultural Topsoil: Biodegradation, Sorption, and Co-Contaminant Interactions. *Environ. Sci. Technol.* **2016**. *50* (11), 6071–6078.
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- Kahrilas, G. A.; Blotevogel, J.; Stewart, P. S.; **Borch, T.** Biocides in Hydraulic Fracturing Fluids: A Critical Review of Their Usage, Mobility, Degradation, and Toxicity. *Environmental Science & Technology* **2015**, *49*, (1), 16-32.
- Troyer, L. D.; Tang, Y.; **Borch, T.**, Simultaneous Reduction of Arsenic(V) and Uranium(VI) by Mackinawite: Role of Uranyl Arsenate Precipitate Formation. *Environ. Sci. Technol.* **2014**, *48*, (24), 14326-14334.
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- Young, R.B. Chefetz, B. Liu, A., **Borch, T.** Direct Photodegradation of Lamotrigine (an Antiepileptic) in Simulated Sunlight – pH Influenced Rates and Products. *Environmental Science: Processes & Impacts*. **2014**, *6*(4), 848-857.
- Troyer, L.D., Stone, J.J., **Borch, T.** Impact of biogeochemical redox processes on the fate and transport of As and U at an abandoned uranium mine site: An X-ray absorbance spectroscopy study. *Environ. Chem.* **2014**, *11*, 18-27.

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- Kozubal, M. A.; Macur, R. E.; Jay, Z. J.; Beam, J. P.; Malfatti, S. A.; Tringe, S. G.; Kocar, B. D.; **Borch, T.**; Inskeep, W. P., Microbial iron cycling in acidic geothermal springs of Yellowstone national park: Integrating molecular surveys, geochemical processes and isolation of novel Fe-active microorganisms. *Frontiers in Microbiology* **2012**, 3.
- Amstaetter, K.; **Borch, T.**; Kappler, A., Influence of humic acid imposed changes of ferrihydrite aggregation on microbial Fe(III) reduction. *Geochim. Cosmochim. Acta* **2012**, 85, 326-341.
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- Burgos, W.D., **Borch, T.**, Brown, J.F., Troyer, L.D., Luan, F., Lambson, J., Larson, L.N., Shimizu, M. Schwertmannite and Fe oxides formed by biological low-pH Fe(II) oxidation versus abiotic oxidative hydrolysis: Impact on trace metal sequestration. *Geochimica et Cosmochimica Acta* **2012**, 76, 29-44.
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pathways and microbial community composition. *Environ. Sci. Technol.* **2011**, *45*, 6879-6886.

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Blotevogel, J.; Mayeno, A. N.; Sale, T. C.; **Borch, T.** Prediction of contaminant persistence in aqueous phase: A quantum chemical approach. *Environ. Sci. Technol.* **2011**, *45*, 2236-2242.

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Blotevogel, J., **Borch, T.**, Desyaterik, Y., Mayeno, A.N., Sale, T.C. Quantum Chemical Prediction of Redox Reactivity and Degradation Pathways for Aqueous Phase Contaminants: An Example with HMPA. *Environ. Sci. Technol.* **2010**, *44*, 5868-5874.

Yang, Y.-Y., **Borch, T.**, Young, R. B., Goodridge, L. D., Davis, J. G., Degradation Kinetics of Testosterone by Manure-Borne Bacteria: Influence of Temperature, pH, Glucose Amendments, and Dissolved Oxygen. *Journal of Environmental Quality* **2010**, *39*, 1153-1160.

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Geesey, G.G., **Borch, T.**, Reardon, C.L. Resolving Biogeochemical Phenomena at High Spatial Resolution through Electron Microscopy. *Geobiology*. **2008**, *6*, 263-269.

Ziganshin, A.M., Gerlach, R., **Borch, T.**, Naumov, A.V., Naumova, R.P. Production of Eight Different Hydride Complexes and Nitrite Release from 2,4,6-Trinitrotoluene by *Yarrowia lipolytica*. *Applied and Environmental Microbiology*. **2007**, *73*, 7898-7905.

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#### **PEER-REVIEWED PROCEEDINGS/TRANSACTIONS:**

**Borch, T.,** Young, R.B., Gray, J.L., Foreman, W.T., Yang, Y-Y. Presence and Fate of Steroid Hormones in a Colorado River. Division of Environmental chemistry - *Abstract of Papers of the American Chemical Society (preprint)*, 2008, 8 (2), 689-694. ([PDF](#))

Jones, J.M., **Borch, T.,** Young, R.B., Davis, J.G., Simpson, C.R. Photolysis of testosterone, progesterone, and 17 $\beta$ -estradiol by UVA light In *Emerging Contaminants of Concern in the Environment: Issues, Investigations, and Solutions*; Drewes, J. E., Battaglin, W. A., Kolpin, D. W., Eds.; American Water Resources Association, Middleburg, Virginia, Vail, Colorado, **2007**; Vol. Proceedings of the AWRA 2007 summer specialty conference, TPS-07-2, CD-ROM (5 pages).

#### **NON-PEER-REVIEWED PROCEEDINGS/TRANSACTIONS:**

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Archibeque, S.L., **Borch, T.,** Davis, J.G. Impact of Growth Hormones on Nutrient Excretion. The Great Plains Soil Fertility Conference March 4-5, **2008**, Denver, CO (6 pages).

Davis, J.G., **Borch, T.,** Marcillac, N.M. Agriculture's Contribution to Nitrogen Deposition in Rocky Mountain National Park. The Great Plains Soil Fertility Conference March 4-5, **2008**, Denver, CO (8 pages).

Archibeque, S.L., **Borch, T.,** Engle, T.E., Wagner, J.J., Han, H. Potential endocrine disruptors from dairies and feedlots, and environmental implications. 2008 Intermountain Nutrition Conference January 29-30, **2008**, Salt Lake City, UT (14 pages).

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CSU team calls for more study of fracking spills. *Coloradoan* June 1, 2016.

Figuring Out Fracking Wastewater. *Chemical and Engineering News (C&EN)* Vol. 93 Issue 11 | pp. 8-12, 2015

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Study: Many common chemicals found in fracking fluid. *USA TODAY*. November 12, 2014

Do you know dirt about soil? Here's a three-step primer. *The Denver Post*. 03/29/2013.

Discover Dirt - Punk Science on Magnificent Muck by Philip Straub. *Telluride Daily Planet*, Vol. 18, Number 64, July 27, **2010**.

Chemical Imbalance - From car seats to condoms, nasty compounds have invaded our lives - By Josh Zaffos. *Colorado Springs Independent*, June, 12, **2008**

Our Chemical Romance - Chemicals are Causing Heartbreak and Hormone Havoc by Joshua Zaffos. *Rocky Mountain Chronicle*, vol. 2, issue 28, April 10-16, **2008**.

#### **SELECTED REPORTS:**

**Borch, T.**, Johnson, T., Stone, J.J., Bhattacharyya, A., Ruedig, E., Truax, R. 2015. Critical evaluation of restoration goals based on improved geochemical and toxicological characterization of baseline and post-mining site conditions. Prepared for University of Wyoming School of Energy Resources, legislature of State of Wyoming In-Situ Recovery of Uranium Research Program, Laramie, WY.

**Borch, T.**, Davis, J.G., Yang, Y-Y., Young, R.B. Occurrence of Steroid Sex Hormones in the Cache la Poudre River, and Pathways for their Removal in the Environment. Colorado Water Institute - Completion Report. November 4, **2009**, p. 1-61.

Grøn, C., Laturus, F., **Borch, T.**, Haselmann, K.F. Kloroform i Vand fra Skove. I: Grundvand fra Skove – Muligheder og Problemer, edited by Raulund-Rasmussen, K., Hansen, K. Skovbrugsserien nr. 34, *Skov og Landskab*, Hørsholm, **2003**, 34, p. 77-86.

## **Platform Presentations:**

### *INVITED:*

Burgos, W.; Meza, L.; Drohan, P.; Tasker, T.; Blotevogel, J.; McLaughlin, M.; **Borch, T.**; Reilly, R.; Warner, N. (2016): Frozen Core Analysis of River/Lake Sediments Impacted by Oil & Gas Waste Water Discharge. University Consortium for Field-Focused Groundwater Contamination Research, Focus Meeting. Fort Collins, CO, 10/12-10/13/2016

**Borch, T.** Unconventional Oil and Gas Development: Implications for Water Quality. East China Normal University, Shanghai, China. October 28, 2016.

**Borch, T.** Unconventional Oil and Gas Development: Implications for Water Quality. Southwest University, Chongqing, China. October 27, 2016.

**Borch, T.** New Insights into Environmental Stabilization of Iron(II) and Natural Organic Matter. The University of New South Wales, Australia. September, 19, **2016**.

**Borch, T.** How does Fe and C protect each other? Telluride Science Research Center Workshop: Biogeochemistry and Redox Transformations of Iron, August 1-4, **2016**, Telluride, CO.

**Borch, T.**, Daugherty, E., Nico, P., Gilbert, B. Role of NOM complexation in Fe(II) stabilization. The 26<sup>th</sup> Goldschmidt Conference. June 29, **2016** in Yokohama, Japan.

Warner, N., Burgos, W., Drohan, P., **Borch, T.** Historical Wastewater Management Recorded in River-Lake Sediment and Porewater Using Major Elements, <sup>7</sup>Be, <sup>210</sup>Pb, <sup>87</sup>Sr/<sup>86</sup>Sr, and <sup>226</sup>Ra/<sup>228</sup>Ra. The 26<sup>th</sup> Goldschmidt Conference. June 28, **2016** in Yokohama, Japan. [Keynote].

Blotevogel, J.; Jasmann, J.R.; Gedalanga, P.B.; **Borch, T.**; Mahendra, S. (2016): Synergistic Treatment of Emerging Contaminants via Electrolytic Biostimulation. University Consortium for Field-Focused Groundwater Contamination Research, Annual Meeting. Guelph, ON, Canada, 06/13-06/15/2016

Blotevogel, J.; Jasmann, J.R.; Myers, M.; Gedalanga, P.B.; **Borch, T.**; Mahendra, S. (2016): Electrolytic Stimulation of Aerobic 1,4-Dioxane Biodegradation. Emerging Contaminants Summit. Westminster, CO, 03/01-03/02/2016

**Borch, T.** Fate of Hydraulic Fracturing Chemicals under Downhole Conditions and after Contamination of Surface Soils. University of Wyoming. March 25, **2016**.

M.M. Scherer, Thompson, A., **Borch, T.**, Pasakarnis, T., Latta, D., Zhou, Z. Adsorption on Geomedia III Symposium. Fe(II)-catalyzed Fe oxide recrystallization: Effect of organic carbon. ACS National Meeting in San Diego **2016**.

**Borch, T.** Invited by The Danish Society for Analytical Chemistry to present two invited talks at their workshop entitled “Chemical techniques for analytical characterization of hydraulic fracturing chemicals”. University of Copenhagen, October 23<sup>rd</sup>, **2015**.

**Borch, T.** NSF Food-Energy-Water Nexus Workshop. South Dakota School of Mines & Technology Surbeck Center on October 19-20, **2015**. [I cancelled my presentation].

**Borch, T.** Fate of hydraulic fracturing chemicals under downhole conditions and after contamination of surface soils. School of Earth and Atmospheric Sciences. Georgia Institute of Technology. October 1<sup>st</sup>, **2015**.

**Borch, T.** Transformation and reactivity of hydraulic fracturing chemicals under downhole conditions: Focus on glutaraldehyde. 19th Annual Green Chemistry & Engineering Conference that will be held in North Bethesda, Maryland, July 14-16, **2015**.

Kahrilas, G. Blotevogel, J., **Borch, T.** Fate of hydraulic fracturing chemicals under downhole conditions. Montana Biofilm S&T Meeting, Montana State University, Bozeman, Montana, July 13–16, **2015**. [*I was invited but student presented*].

Blotevogel, J., **Borch, T.** Fate of Hydraulic Fracturing Chemicals under Downhole Conditions and after Inadvertent Releases. National Science Foundation Sponsored Workshop: Development of Green Fracturing Fluids and Sustainable Remediation and Containment Technologies Conference on April 21, **2015** on the University of Arkansas at Little Rock campus.

**Borch, T.**, Troyer, L., Campbell, K., Stone, J., Lezama-Pacheco, J., Bargar, J. Fate of U and As in biostimulated mine tailings sediments. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO

**Borch, T.**, Kahrilas, G., Thurman, E.M., Ferrer, I., Blotevogel, J. How stable are hydraulic fracturing fluid chemicals deep below the Earth’s surface? 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO

**Borch, T.**, Daugherty, E., Nico, P., Gilbert, B. Role of NOM complexation in Fe(II) stabilization. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO

**Borch, T.** Daugherty, E., Nico, P., Gilbert, B. Impact of Dissolved Organic Matter Chemistry on the Fate of Iron(II) in Oxic Environments at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.

Campbell, K., Bhattacharyya, A., **Borch, T.** Microbial Community Composition in Baseline and Post-Mining Core Samples at an in-Situ Recovery (ISR) Uranium Mine

at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.

Stone, J., Truax, R., **Borch, T.**, Johnson, R.H. Geochemical Modeling of the Down Gradient Transport Potential of Uranium at an in-Situ Recovery (ISR) Facility at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.

Blotevogel, J., **Borch, T.** The Persistence of Perfluorinated Surfactants Used in Fire-Fighting Foams: An Example with Perfluorooctanoic Acid (PFOA) at the University Consortium 2014 Fall Focus Meeting Brown Palace Hotel, Denver, Colorado – Central City Room, October 30 and 31, **2014**.

**Borch, T.** Fate of U and As in Co-Contaminated Systems under Various Redox Conditions. Telluride Science Research Center Workshop: Biogeochemistry and Redox Transformations of Iron, August 4-8, **2014**, Telluride, CO.

**Borch, T.** Fate of Hydraulic Fracturing Fluids Used for Unconventional Shale Gas Development: An Overview. Eawag, Swiss Federal Institute of Aquatic Science and Technology. Duebendorf, Switzerland, June 19, **2014**.

Percak-Dennett, E., Roden, E., Xu, H., Konishi, H., Chan, C., Bhattacharyya, A., **Borch T.** Microbial chemolithoautotrophic oxidation of pyrite at neutral pH. Goldschmidt2014 in Sacramento, California, June 8-13, **2014**.

**Borch, T.** Fate of U and As in Co-Contaminated Systems under Reducing Conditions. Ecole polytechnique fédérale de Lausanne (EPFL), Switzerland, June 2, **2014**.

**Borch, T.** Environmental Fate and Transport of Selected Endocrine and Pharmaceutically Active Compounds. The EAWAG Distinguished Lecturer Series. Eawag, Swiss Federal Institute of Aquatic Science and Technology. Duebendorf, Switzerland, May 23, **2014**.

**Borch, T.** Impact of C and P on Dissimilatory Reduction and Transformation of Ferrihydrite. Seminar in Prof. Dr. Johan Six's Group. ETH Zurich, Zurich, Switzerland, May 8, **2014**.

**Borch, T.** Fate of Hydraulic Fracturing Fluids Used for Unconventional Shale Gas Development: An Overview. Department of Soil and Water Sciences at The Hebrew University of Jerusalem. April 2, **2014**.

**Borch, T.** Global Implications of Iron Cycling. Department of Chemistry at Umeå University, Sweden. March 28, **2014**.

**Borch, T.** Current Environmental Research in the Borch Lab: An Overview. Spring Seminar Series in Prof. Dr. Ruben Kretzschmar's Group. ETH Zurich, Zurich, Switzerland, February 24, **2014**.

**Borch, T.** Sorption Processes for Organic and Inorganic compounds. University Consortium for Field-Focused Groundwater Contamination Research 2013 Focus Meeting. Brown Palace Hotel, Denver, Colorado, October 24-25, **2013**.

**Borch, T.** Does Hydraulic Fracturing, Uranium Mining, or Dissolved Organic Matter Affect Our Health and Environment? NREL Fall 2013 Seminar Series "Using Aquatic Ecosystem Science to Inform Freshwater Resource Use and Sustainability", Colorado State University, September 25, **2013**.

Jasmann, J.; **Borch, T.**; Sale, T.C.; Blotevogel, J. (2013): Catalyzed Electrolytic Degradation of 1,4-Dioxane in Contaminated Water. Consortium for Research and Education on Emerging Contaminants (CREEC). Denver, CO, 09/12/**2013**.

**Borch, T.** Impact of Biogeochemical Redox Processes on Transport and Fate of Arsenic and Uranium: From Molecular to Field Scales. University Consortium for Field-Focused Groundwater Contamination Research, Annual Progress Meeting. Guelph, ON, Canada, May 29-31, **2013**.

**Borch, T.** Shimizu, M., Zhou, J., Obst, M., Schröder, C., Kappler, A. Dissimilatory Reduction and Transformation of Ferrihydrite-Natural Organic Matter Coprecipitates. Monte Verità Conference "Iron Biogeochemistry - From Molecular Processes to Global Cycles to be held March 3-8, **2013**. CSF (Centro Stefano Franscini), Monte Verità Ascona, Switzerland.

**Borch, T.** Steroid Sex Hormones in the Environment. Animal Reproduction and Biotechnology Laboratory, Colorado State University, February 25, **2013**.

**Borch, T.** Endocrine Disrupters in Biosolids. RMWEA Biosolids Committee Annual Workshop, Biosolids and Agriculture - Can the Relationship Continue? Colorado State University, Nov. 15, **2012**.

**Borch, T.** Impact of Organic Matter on Biogeochemical Cycling of Iron. Purdue University, TBD.

**Borch, T.** Sex Hormone Biodegradation and Runoff under Agriculturally Relevant Conditions. Colorado School of Mines, April 12, **2012**.

**Borch, T.** Impact of Biogeochemical Redox Processes on U and As Dynamics within a U Mining Impacted Watershed. 'Uranium biogeochemistry: transformations and applications', International Workshop, March 11-16, 2012, CSF (Centro Stefano Franscini), Monte Verità Ascona, Switzerland.

**Borch, T.** Environmental Fate of Sex Hormones and Iron Oxides: Molecular to Field Scale Observations. Center for Environmental Medicine, Colorado State University, January 25, **2012**.

**Borch, T.** Biogeochemical Iron Cycling in Subalpine Wetlands with Different Hydraulic Connectivity: Impact on Fate and Transport of Organic C and Nutrients. American Geophysical Union (AGU) Fall Meeting, December 5-9, **2011**, San Francisco, CA.

**Borch, T.** Biogeochemical Redox Processes and their Impact on Contaminant and Organic Matter Dynamics: From Molecular to Field Scale. Synchrotron Environmental Science V (SES V) Meeting, June 23-24, **2011**, University of Saskatchewan Saskatoon, Saskatchewan, Canada (**PLENARY TALK**).

**Borch, T.** Steroid Hormone Runoff from an Agricultural Field Applied with Municipal Biosolids. Consortium for Research and Education on Emerging Contaminants (CREEC) Meeting held at the Northern Colorado Water Conservancy District, June 9, **2011** Berthoud, Colorado.

Kappler, A., **Borch, T.**, Amstaetter, K., Larese-Casanova, P., Jiang, J., Bauer, I., Paul, A. Arsenic redox transformation by humic substances and Fe minerals. 9th International Symposium - Geochemistry of the Earth's Surface (GES-9). June 3-7, **2011**, University Memorial Center, University of Colorado Boulder, Colorado.

**Borch, T.** Biogeochemical Processes within the Rhizosphere: Molecular to Field Scale - State-of-the-Science. Emerging Frontiers in Rhizosphere Science, March 16-18, **2011**, Warrenton, VA

Young, R.B. and **Borch, T.** Photodegradation of Dilute Aqueous Solutions of Androstenedione and Testosterone in Near UV Light: LC-QTOF MS Analysis of Phototransformation Products. Pittcon Conference and Exposition 2011. March 13-18, **2011**. Georgia World Congress Center. Atlanta, GA. [*I was invited but my Ph.D. student presented*].

Yang, Y-Y., Gray, J.L., Furlong, E.T., Yager, T.J.B., Davis, J.G., Foreman, W.T., **Borch, T.** Hormone and Anthropogenic Waste Indicator Runoff From Biosolids Amended Soils. ASA-CSSA-SSSA International Annual Meetings, Oct 31-Nov 3, **2010**, Long Beach, CA. [*I was invited but my Ph.D. student presented*].

**Borch, T.** Environmental Fate and Transport of Steroid Sex Hormones from Human and Animal Wastes. Oct. 1, **2010**. Dept. Civil and Environmental Engineering, Penn State, University Park, PA.

**Borch, T.** Impact of Adsorbed and Co-precipitated Humics on Ferrihydrite Reduction and Secondary Iron Formation. Telluride Science Research Center Workshop: Biogeochemical Processes of the Iron Cycle: From Microbes to Mineral Surfaces, July 28-31, **2010**, Telluride, CO.



**Borch, T.** Steroid Hormone Runoff from an Agricultural Field Applied with Biosolids. Colorado Water Science Day. New challenges, new science for managing Colorado Water. June 23, **2010**, University of Colorado, Boulder, CO

**Borch, T.** Fate and Occurrence of Emerging Contaminants & Limitations of Waste Water Treatment Processes for PPCP Reduction. EPA Region 8 - Pharmaceuticals & Personal Care Products (PPCP) Panel Discussion. April 21, **2010**. Colorado Mountain College, Breckenridge Campus.

**Borch, T.** Environmental Fate of Steroid Sex Hormones. Department of Environmental Engineering, November 13<sup>th</sup>, **2009**. University of Colorado, Boulder, CO.

**Borch, T.** Biodegradation, Photolysis, and Runoff Potential of Steroid Sex Hormones in the Environment. November 10<sup>th</sup>, **2009**. Colorado Wastewater Utility Council (CWWUC), Highlands Ranch, CO.

**Borch, T.** Degradation and Transport of Steroid Sex Hormones in the Environment. Department of Animal Sciences Seminar, May 5<sup>th</sup>, **2009**. Colorado State University, CO.

**Borch, T.** Fate of Steroids in the Environment. Colorado Environmental Partnership Workshop, April 30, **2009**. The Boettcher Mansion, Golden, CO.  
[www.coloradoenvironmentalpartnership.org/home/](http://www.coloradoenvironmentalpartnership.org/home/)

**Borch, T.** Fate of Steroid Sex Hormones in the Environment. Department of Chemical and Biological Engineering Seminar, April 24, **2009**. Colorado State University, CO.

**Borch, T.** Environmental Fate of Steroid Sex Hormones. Water Center - School of Natural Resources, April 7-8, **2009**. University of Nebraska, Lincoln, NE

**Borch, T.** Fate of Steroid Sex Hormones in the Environment. Department of Chemistry and Geochemistry Seminar, February 20<sup>th</sup>, **2009**. Colorado School of Mines, Golden, CO.

**Borch, T.** Overview of Steroid Hormone Research in The Borch Lab. Presented to the Executive Board of the Colorado Livestock Association. Colorado State University, February 17<sup>th</sup>, **2009**. Fort Collins, CO.

**Borch, T.** Environmental Fate of Steroid Sex Hormones. Soil and Water Sciences Seminar Series at University of California Riverside, January 4-9, **2009**. Riverside, CA

**Borch, T.** Occurrence and Fate of Steroid Hormones in Sewage Treatment Plant Effluents, Animal Feeding Operation Wastewater and the Cache la Poudre River of

Colorado. Colorado Water Institute Advisory Committee, November 21, **2008**, Denver, Co.

**Borch, T.** Fate of Steroid Hormones. Biosolids, PPCPs and the Environment - The Rocky Mountain Water Environment Association's Biosolids Committee Seminar, November 13, **2008**, Denver, CO.

**Borch, T.** Iron-Oxide Surface Catalyzed Reduction of Nitroaromatic Compounds by Ferrous Iron: Implications of Oxide Type on Reactivity and Degradation Pathway. Telluride Science Research Center Workshop: Biogeochemical Processes of the Iron Cycle: From Microbes to Mineral Surfaces, July 29-August 1, **2008**, Telluride, CO.

**Borch, T.,** Occurrence and Fate of Steroid Hormones in Sewage Treatment Plant Effluents, Animal Feeding Operation Wastewater and the Cache la Poudre River of Colorado. Colorado Water Congress, 50<sup>th</sup> Annual Convention, January 23-25, **2008**, Hyatt Regency Tech Center, Denver, CO.

**Borch, T.,** Gerlach, R., Peyton, B.M. Fendorf, S. Identification of Biogeochemical Mechanisms Controlling the Fate of Uranium, Phosphate, and 2,4,6-Trinitrotoluene. June 17-20, **2007**. 62nd NORM Meeting of the American Chemical Society in Boise Idaho, USA.

**Borch, T.,** Biogeochemical Cycling of Iron: Interactions of Nutrients and Contaminants from Atoms to Planets. June 5<sup>th</sup>, **2007**. Center for Applied Geoscience (ZAG), Eberhard-Karls-University Tuebingen, Germany.

**Borch, T.** Fate of Pharmaceuticals, Nutrients and Explosives in the Environment. Department of Chemistry Seminar, April 27<sup>th</sup>, **2007**. Colorado State University, CO.

**Borch, T.** The Environmental Fate of Steroid Hormones from Animal Feeding Operations. Department of Animal Sciences Seminar, April 3<sup>rd</sup>, **2007**. Colorado State University, CO.

**Borch, T.** Phosphate Interactions with Iron (Hydr)oxides: Mineralization Pathways and Phosphorus Retention Upon Bioreduction. Department of Bioagricultural Sciences and Pest Management Seminar, March 28<sup>th</sup>, **2007**. Colorado State University, CO.

**Borch, T.** Fate of Pharmaceuticals, Nutrients and Explosives in the Environment. Gamma Sigma Delta Seminar, November 29<sup>th</sup>, **2006**. Colorado State University, CO.

**Borch, T.** Iron (hydr)oxide Biomineralization: Interactions of Oxyanions and Nitroaromatics. Department of Chemistry and Geochemistry Seminar, September 29<sup>th</sup>, **2006**. Colorado School of Mines, Golden, CO.

**Borch, T.** Ferrihydrite Biomineralization: Interactions of Oxyanions and Nitroaromatic Compounds. Telluride Science Research Center Workshop: Iron Redox Chemistry at Environmentally Relevant Surfaces, July 25-28, **2006**, held in Telluride, CO.

Sani, R., Moberly, J., Parveen, R., Barua, S., Sengor, S., Peyton, B., Ginn, T., **Borch, T.**, Spycher, N. The diversity of microorganisms and their interactions with toxic metals in sediments of Lake Coeur d'Alene. INRA Subsurface Biotechnology and Bioremediation Symposium and Workshop. June 22 – 23, **2006**. Center for Biofilm Engineering, Montana State University, MT,

**Borch, T.**, Fendorf, S. Phosphate adsorption on iron oxides: Impact on reductive biomineralization. March 26-30, **2006**. The 231<sup>st</sup> American Chemical Society (ACS) National Meeting, Atlanta, GA, USA.

**Borch, T.** Phosphate Dynamics Upon the Biomineralization of Iron Oxides. February 3, **2006**. The Royal Agricultural University of Denmark.

**Borch, T.** Biogeochemical Cycling of Iron: Interactions of Nutrients and Contaminants from Atoms to Planets. May 13, **2005**. Stanford Environmental Molecular Science Institute's (EMSI) Seminar Series.

**Borch, T.** Biogeochemical Cycling of Iron: Interactions of Nutrients and Contaminants from Atoms to Planets. April 27, **2005**. Department of Soil and Crop Sciences at Colorado State University.

**Borch, T.** Role of Microbes and Oxyanions in Iron Mineralization Processes Studied by X-ray Absorption Spectroscopy (XAS) and Soft X-ray Spectromicroscopy (STXM). March 31, **2005**. Center for Biofilm Engineering at Montana State University.

**Borch, T.** Biogenic Iron Mineralization by a Novel Gram-Positive: Impact on the Fate of 2,4,6-Trinitrotoluene (TNT). May 16, **2003**. Departments of Earth and Planetary Science and Environmental Science, Policy, and Management, University of California Berkeley.

**Borch, T.** Biomineralization of Iron(III)Minerals by a Novel Gram-Positive Bacterium in the Presence and Absence of the Humic Analog AQDS: Impact on the Fate of 2,4,6-Trinitrotoluene. February 25<sup>th</sup>, **2003**. Department of Geological and Environmental Sciences, Stanford University, USA.

**Borch, T.** Biogenic Iron Mineralization by a Novel Gram-Positive Bacterium Isolated at the PNNL's Hanford Site: Impact on the Transformation of 2,4,6-Trinitrotoluene. February 14<sup>th</sup>, **2003**. The William R. Wiley Environmental Molecular Sciences Laboratory (EMSL), Pacific Northwest National Laboratory (PNNL) in Richland, Washington, USA.

**Borch, T.** Influence of Biogenically Produced Fe(II), Electron Shuttling, and Humic Acid on the Fate of 2,4,6-trinitrotoluene (TNT). December 19<sup>th</sup>, **2002**. Department of Chemistry, Lund University, Sweden.

**Borch, T.** and Holman, H-Y. N. Biodegradation Studies of PAH and TNT *at the Molecular Level* by Synchrotron Radiation-Based Infrared Spectromicroscopy. July 23-25, **2002**. Technical Advisory Conference, Center for Biofilm Engineering at Montana State University – Bozeman.

**Borch, T.,** Biederman, J.A., Mogk, D.W., Butterfield, P.W., Camper, A.K., Jordan, R.N. Characterization of Two Iron Oxide Models for Environmental Research: Microscopic and Spectroscopic Studies. April **2002**. Center for Biofilm Engineering Seminar Series at Montana State University – Bozeman.

**Borch, T.,** Walker, D.K., Jordan, R.N. Bioavailability of 2,4,6-Trinitrotoluene (TNT) as a Result of Biofilm-Induced Changes to Soil Organic Matter Structure. July 24-25, **2001**. Technical Advisory Conference, Center for Biofilm Engineering at Montana State University – Bozeman.

VOLUNTEERED:

Rosario-Ortiz, Fernando., Webster, Jackson., Retuta, Ariel., Borch, Thomas. Young, Robert. Mobilization of dissolved organic matter from soils and sediments impacted by thermal processes. AGU Fall Meeting, San Francisco, CA, 12/12-12/16/2016

Kanno, C.; McLaughlin, M.; Blotevogel, J.; **Borch, T.**; McCray, J. (2016): Surface Spills at Unconventional Oil and Gas Sites: a Contaminant Transport Modeling Study for the South Platte Alluvial Aquifer. AGU Fall Meeting, San Francisco, CA, 12/12-12/16/2016

Polubesova, T.; Paz, A.; Tadmor, G.; Malchi, T.; Blotevogel, J.; **Borch, T.**; Chefetz, B. (2016): Fate of lamotrigine, carbamazepine and its metabolites in soils irrigated with reclaimed wastewater: sorption, mobility and wheat uptake. International Symposium on Persistent Toxic Substances, Leipzig, Germany, 10/11-10/14/2016

Blotevogel, J.; Jasmann, J.R.; Myers, M.; Gedalanga, P.B.; **Borch, T.**; Mahendra, S. (2016): Synergistic Treatment of 1,4-Dioxane by Combining Electrochemical Oxidation with Electrobiostimulation. 5th International Conference on Emerging Contaminants (EmCon2016) and Micropollutants (WiOW2016) in the Environment, Sydney, Australia, 09/20-09/23/2016

**Borch, T.**; Kahrilas, G.A.; Blotevogel, J. (2016): Fate of Hydraulic Fracturing Fluid Additives after Injection into Deep Unconventional Reservoirs. 5th International Conference on Emerging Contaminants (EmCon2016) and Micropollutants (WiOW2016) in the Environment, Sydney, Australia, 09/20-09/23/2016

- Hagemann N, Schmidt H-P, Joseph S, Conte P, Kammann CI, Albu M, Obst M, **Borch T**, Kappler A & Behrens S. Understanding Biochar Nitrate Capture to Tailor Nitrogen Cycling in Agroecosystems. The 2016 Goldschmidt Conference, June 26 – July 1 **2016**, Yokohama, Japan.
- Blotevogel, J.; Jasmann, J.; Sale, T.; Glezakou, V.; Myers, M.; Gedalanga, P.B.; Mahendra, S.; **Borch, T.** (2016): Abiotic and biotic catalysis of electrolytic 1,4-dioxane oxidation. 251<sup>st</sup> ACS National Meeting & Exposition, San Diego, CA, 03/13-03/17/2016
- Blotevogel, J.; **BORCH, T.** (2016): Development of a linear free-energy relationship for the reductive defluorination of perfluorooctanoic acid by zero-valent metals. 251<sup>st</sup> ACS National Meeting & Exposition, San Diego, CA, 03/13-03/17/2016
- Kahrilas, G.A.; Blotevogel, J.; **Borch, T.** (2016): Endocrine disruptors in hydraulic fracturing flowback: Downhole transformation of nonylphenol ethoxylates. 251<sup>st</sup> ACS National Meeting & Exposition, San Diego, CA, 03/13-03/17/2016
- Kanno, C.; McLaughlin, M.; Blotevogel, J.; **Borch, T.**; McCray, J. (2016): Evaluating the risks of surface spills at unconventional oil and gas production sites: A contaminant transport modeling study in the South Platte alluvial aquifer. 251<sup>st</sup> ACS National Meeting & Exposition, San Diego, CA, 03/13-03/17/2016
- McLaughlin, M.C.; **Borch, T.**; Blotevogel, J. (2016): Environmental Fate of Hydraulic Fracturing Fluid Additives after Spillage on Agricultural Topsoil. SETAC North America Focused Topic Meeting. Denton, TX, 03/17-03/19/2016.
- Borch, T.**, Daugherty, E. Temperature Controls on Preferential Adsorption of Dissolved Organic Matter on Iron Oxides. ASA, CSSA, and SSSA 2015 International Annual Meeting, Nov. 15-18, **2015**, in Minneapolis, MN.
- Pallud, C., Shilling, K., Schneider, L., **Borch, T.**, Rhoades, C. Temperature and Redox Effects on Iron Reduction Kinetics and Organic Carbon Transport in Wetland Soils. The 2015 Goldschmidt Conference, 16-21 August **2015**, Prague, Czech Republic.
- Blotevogel, J., Jasmann, J., Myers, M., Gedalanga, P., **Borch, T.**, Mahendra, S. Electrolytic Stimulation of Aerobic 1,4-Dioxane Biodegradation. Annual Meeting of the University Consortium for Field-Focused Groundwater Contamination Research Guelph, ON, June 2-4, **2015**.
- Pallud, C., Shilling, K., Schneider, L., **Borch, T.**, Rhoades, C. Biogeochemical iron cycling in subalpine wetlands: Kinetics and impact on organic carbon transport. The 2015 Joint Assembly will be held Sunday through Thursday, 3-7 May **2015** at the Palais des congrès de Montréal, Montreal, Canada.

- Bhattacharyya, A., Campbell, K.M., Weyer, S., **Borch, T.** Elucidating the role of monomeric U(IV) in uranium ore deposit genesis. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO.
- Kahrilas, G., Blotevogel, J., Borch, T. Transformation kinetics and pathways of hydraulic fracturing biocides under downhole conditions: Focus on glutaraldehyde. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO.
- Daugherty, E., **Borch, T.** Temperature effects on carbon sequestration by iron oxide coated mineral surfaces. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO.
- McLaughlin, M., **Borch, T.**, Blotevogel, J. Fate of hydraulic fracturing chemicals in agricultural topsoil. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO.
- McKee, G., Rhoades, C., Borch, T. Using Fourier transform ion cyclotron resonance mass spectrometry to identify potential disinfection byproduct precursors in leaf litter leachate. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO.
- Thurman, E.M., Ferrer, I., Blotevogel, J., **Borch, T.** Analysis of hydraulic fracturing flowback and produced waters using accurate mass: Identification of ethoxylated surfactants. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO.
- Heyob, K., Blotevogel, J., **Borch, T.**, Mouser, P. Anaerobic biodegradation of polypropylene glycols within hydraulic fracturing fluid. 249th ACS National Meeting & Exposition. March 22-26, **2015**, Denver, CO
- Kahrilas, G., Blotevogel, J., Corrin, E., **Borch, T.** Geochemical Impacts on the Degradation of the Hydraulic Fracturing Biocide Glutaraldehyde Under Downhole Conditions at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.
- Bhattacharyya, A., **Borch, T.** Biogeochemical Characterization of Uranium from a Pre-Mining and Post-Mining Uranium in-Situ Recovery Mine at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.
- Schilling, K., Richards, C., **Borch, T.**, Pallud, C. Microbial Fe(III) Reduction in Subalpine Wetlands: Key Process Governing the Fate of Organic Carbon at the ASA, CSSA, and SSSA International Annual Meetings, Nov. 2-5, **2014**, in Long Beach, CA.
- Borch, T.**, Gough, M. Impact of Hormones in Runoff from the Land Application of Biosolids. WEFTEC 2014, New Orleans, September 27 – October 1, **2014**.

- Stone, J.J., **Borch, T.**, Bhattacharyya, A., Johnson, T., Ruedig, E., Johnson, R. Restoration challenges for in-situ recovery uranium mining. The 7<sup>th</sup> Conference of Uranium Mining and Hydrogeology, Freiberg, Germany, September 21-25, **2014**.
- Jasmann, J., **Borch, T.**, Sale, T.C., Blotevogel, J. Electrolytic Degradation of Aqueous Contaminants Catalyzed by Novel Titanium Dioxide Pellets. 4<sup>th</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2014), University of Iowa, Iowa City, Iowa, August 19-22, **2014**.
- Young, R.B. Chefetz, B., Liu, A., Desyaterik, Y., **Borch, T.** Photodegradation of Lamotrigine (an Antiepileptic) in Simulated Sunlight – pH-influenced Rates and Products. 4<sup>th</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2014), University of Iowa, Iowa City, Iowa, August 19-22, **2014**.
- Daugherty, E., Gilbert., B., Nico, P., **Borch, T.** Coordination and redox chemistry of aqueous Fe(II) and dissolved organic matter. Goldschmidt2014 in Sacramento, California, June 8-13, **2014**.
- Truax, R., Stone, J., **Borch, T.**, Johnson, T., Johnson, R. Geochemical Modeling of Uranium In-situ Recovery (ISR) Post-Mining Site Conditions. GSA Rocky Mountain Section (*66th Meeting*). Bozeman, Montana, USA, on 19–21 May **2014**.
- McKee, G.A., Rhoades, C.C., **Borch, T.** Effect of Vegetation Type on Dissolved Organic Matter Chemistry and Disinfection Byproduct Formation. Joint Aquatic Sciences Meeting. Portland, Oregon, USA, 18-23 May **2014**.
- Stone, J., **Borch, T.**, Bhattacharyya, A., Johnson, T., Ruedig, E., Johnson, R. In-situ recovery uranium mining restoration challenges. 2014 Western South Dakota Hydrology Meeting. Rushmore Plaza Civic Center, April 9, **2014**.
- Truax, R., Stone, J., **Borch, T.**, Johnson, T., Johnson, R. In-situ recovery uranium mining restoration challenges: geochemical modeling of post-mining site conditions. 2014 Western South Dakota Hydrology Meeting. Rushmore Plaza Civic Center, April 9, **2014**.
- Stone, J.J., **Borch, T.**, Bhattacharyya, A., Johnson, T., Ruedig, E., Johnson, R. In-situ recovery uranium mining restoration challenges. The 2014 Environmental and Groundwater Quality Conference, Ft. Pierre, SD, March 19-20, **2014**.
- Blotevogel, J., Kahrilas G., Corrin E.R., Landry, C.F., **Borch T.** Degradation of the biocide glutaraldehyde under down-hole conditions. 247<sup>th</sup> ACS National Meeting Dallas, TX, March 16-20, **2014**.

- Blotevogel, J., Kahrilas, G., Corrin, E.R., **Borch T.** Fate of hydraulic fracturing chemicals under down-hole conditions. American Geophysical Union's 47th annual Fall Meeting. San Francisco, California, 9-13 December **2013**.
- Roosendaal, D., McKee, G.A., Rhoades, C.C., **Borch, T.** Impact of Vegetation-Derived Dissolved Organic Carbon on Disinfection Byproduct Formation During Drinking Water Treatment. ASA, CSSA & SSSA International Annual Meeting, Tampa, Florida, 3-6 November **2013**.
- McKee, G.A., Roosendaal, D., Rhoades, C.C., **Borch, T.** Linking vegetation-derived carbon to disinfection byproducts in litter and stream water in bark beetle-infested forests. Geological Society of America Annual Meeting, Denver, Colorado, 27-30 October, **2013**.
- Bergstrom, R.M., Rhoades, C.C., Melzer-Drinnen, S., **Borch, T.**, Hubbard, R., Elder, K., Kelly, E.F. Key elements of landscapes condition the storage and mobility of soil nutrients in mountainous ecosystems of the western U.S. Geological Society of America Annual Meeting, Denver, Colorado, 27-30 October, **2013**.
- Bhattacharyya, A., Johnson, T., Stone, J. and **Borch, T.** Biogeochemical Characterization of Uranium from Baseline- and Post-Mining Site Conditions at an In-situ Recovery Uranium Mine. U-2013 Global Uranium Symposium, Corpus Christi, TX, Sep 29 – Oct 3, **2013**.
- Stone, J., Truax, R., Borch, T., Johnson, T., Johnson, R. Geochemical Characterization of Uranium from Baseline – and Post-Mining Site Conditions at an In-situ Recovery Uranium Mine. The 58th Annual Midwest Groundwater Conference and Bakken Oil Field Tour in Bismarck, ND, September 23-25, **2013**.
- Kahrilas G., Blotevogel J., Corrin E.R., **Borch T.** Fate of hydraulic fracturing chemicals under down-hole conditions. Abstracts of Papers of the American Chemical Society. 2013;246:1. 246th National Meeting of the American-Chemical-Society (ACS). Indianapolis, IN, SEP 08-12, **2013**.
- Troyer, L. D., Stone, J.J., **Borch, T.** Impact of As(V) on abiotic reduction of U(VI) by mackinawite. Troyer L, Stone J & **Borch T** (2013) *Mineralogical Magazine*, **77(5)** 2359. Goldschmidt 2013. Florence, Italy, August 25-30, **2013**.
- Blotevogel, J.; Jasmann, J.; **Borch, T.**; Sale, T.C.; (2013): Electrolytic Degradation of 1,4-Dioxane. University Consortium for Field-Focused Groundwater Contamination Research, Annual Progress Meeting. Guelph, ON, Canada, May 29-31, **2013**.
- Gabel, D., Jordahl, J., Bauer, H., Meyer, K., Meyer, D., Woodard, T., Brugler, K., **Borch, T.** Too much Nitrogen? The WEF 27<sup>th</sup> Annual Residuals and Biosolids conference was held in Nashville, TN May 5-8, **2013**.



Jasmann, J.; **Borch, T.**; Sale, T.C.; Blotevogel, J. Catalyzed Electrolytic Degradation of 1,4-Dioxane in Contaminated Water. AGU Hydrology Days 2013. Fort Collins, CO, 03/25-03/27/2013.

**Borch, T.** Shimizu, M., Zhou, J., Obst, M., Schröder, C., Kappler, A. Dissimilatory reduction and transformation of ferrihydrite-natural organic matter co-precipitates. 245th ACS National Meeting that will be held in New Orleans, Louisiana, April 7-11, 2013.

Troyer, L., Stone, J.J., **Borch, T.** Impact of biogeochemical redox processes on arsenic and uranium dynamics in mine tailings contaminated sediments. 245th ACS National Meeting that will be held in New Orleans, Louisiana, April 7-11, 2013.

**Borch, T.** Shimizu, M., Obst, M., Zhu, M., Kappler, A. Structure and reactivity of ferrihydrite-organic matter coprecipitates. 245th ACS National Meeting that will be held in New Orleans, Louisiana, April 7-11, 2013.

Gough, M., **Borch, T.** Impact of Hormones/EDCs in Runoff from the Land Application of Biosolids. 2012 RMSAWWA / RMWEA Joint Annual Conference. Copper Mountain Resort, Colorado September 9-12, 2012.

**Borch, T.** Impact of organic matter on Fe reduction and transformation: lab to field. Biogeochemistry and Redox Transformations of Iron. Telluride Science Research Center Workshop, Telluride Colorado, August 6-10, 2012.

Lavellee, J., Conant, R., **Borch, T.** Is Mineral-Bound Soil Organic Matter Sensitive to Temperature Changes? 4th International Congress EUROSIL 2012, Fiera del Levante, Bari Italy - 2-6 July 2012.

McKee, G.A., Lavellee, J., Conant, R.T., **Borch, T.** Predicting the effect of a changing climate: Temperature effects on mineral adsorption to soil organic matter from Colorado Rocky Mountains using nuclear magnetic resonance spectroscopy. 4th International Congress EUROSIL 2012, Fiera del Levante, Bari Italy - 2-6 July 2012. (accepted but withdrawn).

Shimizu, M., Obst, M., Kappler, A., **Borch, T.** The Structure and reactivity of iron-organic matter coprecipitates. Goldschmidt 2012, June 24-29, 2012 - Montreal, Canada.

Lavellee, J.M., Conant, R.T., Obst, M., **Borch, T.**, Regier, T. The influence of temperature on carbon chemistry of organo-mineral complexes. Goldschmidt 2012, June 24-29, 2012 - Montreal, Canada.

Jasmann, J.; **Borch, T.**; Sale, T.C.; Blotevogel, J. (2012): Desorption and Degradation of Hydrophobic Contaminants in Non-aqueous Media. University Consortium for Field-

Focused Groundwater Contamination Research, Annual Progress Meeting. Guelph, ON, Canada, June 12-14, **2012**.

Blotevogel, J.; Jasmann, J.; Sale, T.C.; **Borch, T.** (2012): Electrolytic treatment of new and emerging groundwater contaminants. University Consortium for Field-Focused Groundwater Contamination Research, Annual Progress Meeting. Guelph, ON, Canada, June 12-14, **2012**.

Thurman, E.M.; Ferrer, I.; Blotevogel, J.; **Borch, T.** (2012): Accurate Mass Analysis of Hydraulic Fracturing Waters: Tracer Identification by LC/Q-TOF/MS/MS Using the Kendrick Mass Defect. 60th ASMS Conference on Mass Spectrometry and Allied Topics. Vancouver, BC, Canada, 05/20-05/24/2012

Jasmann, J.; **Borch, T.**; Sale, T.C.; Blotevogel, J. (2012): Desorption and Degradation of Hydrophobic Contaminants in Non-aqueous Media. AGU Hydrology Days 2012. Fort Collins, CO, March 21-23, **2012**.

Shimizu, M. and **Borch, T.** Iron-Organic Matter Coprecipitates: Reactivity and Morphology. ASA, CSSA, and SSSA International Annual Meetings "Fundamental for Life: Soil, Crop, & Environmental Sciences," Oct. 16-19, **2011**, San Antonio, TX

Nadine, K., Thompson, A., **Borch, T.**, Shimizu, M. Surface Charge Characterization of Organo-Mineral Complexes. ASA, CSSA, and SSSA International Annual Meetings "Fundamental for Life: Soil, Crop, & Environmental Sciences," Oct. 16-19, **2011**, San Antonio, TX.

Ham, J., Williams, C., Stratton, J., **Borch, T.** Weather-Based Conditional Sampling of Ammonia Using Robotic Diffusive Samplers. ASA, CSSA, and SSSA International Annual Meetings "Fundamental for Life: Soil, Crop, & Environmental Sciences," Oct. 16-19, **2011**, San Antonio, TX.

Blotevogel, J., Mayeno, A.N., Sale, T.C., **Borch, T.** Quantum chemical prediction of degradation mechanisms, kinetics, and pathways for aqueous phase contaminants. 242nd ACS National Meeting, August 28 - September 1, **2011**, Denver, Colorado.

Ham, J., Williams, C., Stratton, J., **Borch, T.** Weather-based conditional sampling of ammonia near livestock operations using passive samplers. 242nd ACS National Meeting, August 28 - September 1, **2011**, Denver, Colorado.

Burgos, W., **Borch, T.**, Troyer, L., Luan, F. Schwertmannite formed by biological low-pH Fe(II) oxidation versus abiotic neutralization. Goldschmidt 2011. August 14-19, **2011** in Prague, Czech Republic.

Blotevogel, J., Borch, T. (2011): Thermodynamics and Kinetics of the Reductive Defluorination of Perfluorooctanoic Acid (PFOA). University Consortium for Field-Focused Groundwater Contamination Research, Annual Progress Meeting, June 1-3, **2011**, Guelph, ON, Canada.

Galles, K.J., Ham, J., Stratton, J.J., **Borch, T.** Effect of Pen Surface Conditions on Ammonia Volatilization from Cattle Feedlot Pens: A laboratory Chamber Analysis. International Symposium on Air Quality and Manure Management for Agriculture. September 13-16, **2010**, Dallas, Texas USA

**Borch, T.**, Amstaetter, K., Larese-Casanova, P., Posth, N., Kappler, A. Redox Transformation of Arsenic by Fe(II)-Activated Goethite: Impact of Humic Acids and Fe(II). Goldschmidt 2010 - *Earth, Energy, and the Environment*. June 13-18, **2010**. Knoxville, TN.

**Borch, T.** Steroid hormone runoff from an agricultural field applied with biosolids. W2170 Multistate Workgroup Annual Meeting. Soil-Based Use of Residuals, Wastewater and Reclaimed Water. Metropolitan Water Reclamation District of Greater Chicago, June 6-8, **2010**. Chicago, IL.

Blotevogel, J., **Borch, T.**, Mayeno, A., Sale, T. Quantum Chemical Prediction of Redox Reactivity and Degradation Pathways of Aqueous Phase Contaminants. University Consortium for Field-Focused Groundwater Contamination Research **2010** Annual Meeting, May 19-21, Guelph, Ontario

Troyer, L., **Borch, T.**, Larson, L., Stone, J. Impact of Redox Chemistry on the Environmental Fate and Transport of Arsenic and Uranium at Abandoned Uranium Mines in Harding County, SD. The Geological Society of America - Rocky Mountain - 62nd Annual Meeting, 21-23 April **2010**, Rapid City, SD.

Larson, L., Stone, J., Stetler, L., Troyer, L., **Borch, T.** Sediment Pore-Water Equilibrium Interactions Associated with Arsenic and Uranium Transport within a Historical Uranium Mining Impacted Watershed, Harding County, SD. The Geological Society of America - Rocky Mountain - 62nd Annual Meeting, 21-23 April **2010**, Rapid City, SD.

**Borch, T.**, Amstaetter, K., Larese-Casanova, P., Kappler, A. Redox transformation of arsenic by Fe(II)-activated goethite (a-FeOOH). 239th American Chemical Society (ACS) National Meeting & Exposition March 21-25, **2010**, San Francisco, CA.

Blotevogel, J., **Borch, T.**, Mayeno, A., Sale, T. Quantum Chemical Degradation Pathway Prediction for New and Emerging Contaminants. 30th Annual American Geophysical Union (AGU) Hydrology Days **2010**, March 23, Fort Collins, CO

Ham, J., Stratton, J.J., Galles, K., **Borch, T.** Measuring and Modeling Ammonia Emissions from Cattle Feedlots: Can We Reduce Nitrogen Losses? The Great Plains Soil Fertility Conference March 2-3, **2010**, Denver, CO

Young, R.B., **Borch, T.**, Snyder, S.A. Photochemical Transformation of Steroid Sex Hormones in the Presence of Ultraviolet (UV) Light and Selected Natural

Photosensitizers. 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2009), August 4-7, **2009**, Fort Collins, Colorado, USA.

Yang, Y-Y., **Borch, T.**, Young, R.B., Davis, J.G., Goodridge, L.D. Biodegradation of Steroid Hormones in Swine Manure. 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2009), August 4-7, **2009**, Fort Collins, Colorado, USA.

Blotevogel, J., **Borch, T.**, Mayeno, A., Sale, T.C. Quantum Mechanical Degradation Pathway Prediction for New and Emerging Contaminants. 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2009), August 4-7, **2009**, Fort Collins, Colorado, USA.

Lyons, C.E., Klingenstein, S., Gaulke, R., Lade, S.B., Smith, E., Rice, P., Young, R.B., **Borch, T.** Addressing Pharmaceuticals and Personal Care Product Contamination: A Unique Opportunity to Link Science to Effective Policy and Action. 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2009), August 4-7, **2009**, Fort Collins, Colorado, USA.

**Borch, T.**; Masue, Y.; Kukkadapu, R. K.; Fendorf, S., Phosphate interactions with iron (hydr)oxides: Mineralization pathways and phosphorus retention upon bioreduction. *Geochim. Cosmochim. Acta* **2009**, 73, A139-A139. Goldschmidt 2009 - "*Challenges to Our Volatile Planet*". June 21 - 26 in Davos, Switzerland.

Blotevogel, J., **Borch, T.**, Mayeno, A.N., Sale, T. Quantum mechanical degradation pathway prediction for emerging contaminants. University Consortium for Field-Focused Groundwater Contamination Research, Annual Progress Meeting. Guelph, ON, Canada, May 19-20, **2009**.

Blotevogel, J., **Borch, T.**, Mayeno, A., Sale, T.C. Quantum Mechanical Degradation Pathway Prediction for New and Emerging Contaminants. 29th Annual American Geophysical Union (AGU) Hydrology Days, March 25-27, **2009**, Fort Collins, Colorado, USA.

Gray, J.L., **Borch, T.**, Young, R.B., Foreman, W.T., Yang, Y-Y. Presence and Fate of Steroid Hormones in a Colorado River. The Society of Environmental Toxicology and Chemistry (SETAC) North America 29th Annual Meeting, November 16-20, **2008**, Tampa, Florida, USA.

Young, R.B., **Borch, T.**, Gray, J.L., Foreman, W.T., Davis, J.G., Yang, Y-Y. Presence and Fate of Steroid Hormones in a Colorado River. The GSA-ASA-CSSA-SSSA Joint Annual Meeting, October 5-9, **2008**, Houston, TX.

**Borch, T.,** Young, R.B., Gray, J.L., Foreman, W.T., Yang, Y-Y. Presence and Fate of Steroid Hormones in a Colorado River. Division of Environmental Chemistry - American Chemical Society Meeting August 17-21, **2008**, Philadelphia, PA.

Blotevogel, J., **Borch, T.,** Gilbert, D., Sale, T. Development of a Toolbox for Predicting Properties and Fate of Organic Contaminants. University Consortium for Field-Focused Groundwater Contamination Research **2008** Annual Meeting, May 6-8, Hockley Valley Resort, Toronto, Canada.

Young, R.B., **Borch, T.,** Yang, Y-Y. Occurrence and Fate of Steroid Hormones in the Environment. CSU Global Water Colloquium, March 26-28, **2008**, Colorado State University, Fort Collins, CO.

Blotevogel, J., **Borch, T.,** Gilbert, D. Development of a Toolbox for Property and Fate Prediction of New and Emerging Contaminants Based on Thermodynamic Modeling. CSU Global Water Colloquium, March 26-28, **2008**, Colorado State University, Fort Collins, CO.

Davis, J.G., **Borch, T.,** Marcillac, N.M. Agriculture's Contribution to Nitrogen Deposition in Rocky Mountain National Park. The Great Plains Soil Fertility Conference March 4-5, **2008**, Denver, CO.

Archibeque, S.L., **Borch, T.,** Davis, J.G. Impact of Growth Hormones on Nutrient Excretion. The Great Plains Soil Fertility Conference March 4-5, **2008**, Denver, CO.

Archibeque, S.L., **Borch, T.,** Engle, T.E., Wagner, J.J., Han, H. Potential endocrine disruptors from dairies and feedlots, and environmental implications. 2008 Intermountain Nutrition Conference January 29-30, **2008**, Salt Lake City, UT.

**Borch, T.,** Young, R.B., Jones, J.M., Davis, J.G., Simpson, C.R. Degradation of Steroid Hormones in the Environment. The ASA-CSSA-SSSA International Annual Meetings November 4-8, **2007**, New Orleans, LA.

Archibeque, S.L., **Borch, T.,** Engle, T.E., Wagner, J.J., Han, H. Endocrine Disruptor Residues in Feedlot and Dairy Waste Streams. 68th Minnesota Nutrition Conference and University of Minnesota Research and Update Session: *Modern Concepts in Livestock Production for 2007*. September 18-19, **2007**, Minneapolis, MN.

Young, R.B., **Borch, T.** Impact of Photolysis and Photosensitizers on the Fate of 17 $\beta$ -Estradiol, Progesterone and Testosterone. American Chemical Society 20th Rocky Mountain Regional Meeting - Chemistry and Engineering for Sustainability. August 29 - September 1, **2007**, Denver, CO.

**Borch, T.,** Davis, J.G., Simpson, C.R., Young, R.B., Jones, J.M. Impact of Photolysis and Manure-Borne Bacteria on the Fate of Steroid Hormones. The AWRA Summer Specialty Conference on *Emerging Contaminants of Concern in the Environment*:

*Issues, Investigations and Solutions*, June 25-27, **2007**, Vail Cascade Resort & Spa, Vail, CO.

**Borch, T.**, Assefa Mulisa, Y., Ippolito, J.A., Hansen, N.C., and Jones, J.M.. Fate and Transport of Phosphorus in Biosolids and Water Treatment Residuals Amended Soils under Anaerobic Conditions. The ASA-CSSA-SSSA International Annual Meetings November 12-16, **2006**, Indianapolis, IN.

Jones, J.M., **Borch, T.**, Hansen, N.C., Davis, J.G., and Simpson, C.R. Photodegradation of Manure-Borne Steroid Hormones. The ASA-CSSA-SSSA International Annual Meetings November 12-16, **2006**, Indianapolis, IN. (**Won 2<sup>nd</sup> place in the American Society of Agronomy Undergraduate Research Symposium Contest**).

Sani, R., Moberly, J., Parveen, R., Barua, S., Sengor, S., Peyton, B., Ginn, T., **Borch, T.**, Spycher, N. The Diversity of Microorganisms and Their Interactions with Toxic Metals in Sediments of Lake Coeur d'Alene. INRA Environmental & Subsurface Science Symposium, September 24-27, **2006**, Seattle, WA.

Masue, Y., **Borch, T.**, Kocar, B., Fendorf, S. Arsenic Attenuation Upon Bioreduction of Ferrihydrite. The 19th General Meeting of the International Mineralogical Association, July 23-28, **2006**, Kobe, Japan

**Borch, T.**, Masue, Y., Fendorf, S. Impact of Phosphate on Iron Oxide Bioreducibility and Mineralization. Paper #158-18. The 18th World Congress of Soil Science, July 9-15, **2006**, Philadelphia, PA

Masue, Y., **Borch, T.**, Kocar, B., Fendorf, S. Arsenic Attenuation upon Bioreduction of Ferrihydrite. The 18th World Congress of Soil Science, July 9-15, **2006**, Philadelphia, PA

Kocar, B., Masue, Y., Tufano, K., Ying, S., Polizzotto, M., **Borch, T.**, Fendorf, S. Iron (Hydr)oxide Transformation and Release of Arsenic From Ferrihydrite and Tropical Soils During Sulfate Reduction. The 18th World Congress of Soil Science, July 9-15, **2006**, Philadelphia, PA

Masue, Y., **Borch, T.**, Fendorf, S. Factors Affecting Arsenic Retention Under Anaerobic Conditions. 4th International Symposium of the Kanazawa University 21st-Century COE Program, Promoting Environmental Research in Pan-Japan Sea Area, March 8-10, **2006**, Kanazawa, Japan

**Borch, T.**, Masue, Y., Kocar, B., Fendorf, S. Phosphate Dynamics Upon the Biomineralization of Iron Oxides. November 6 - 10, **2005**. ASA-CSSA-SSSA International Annual Meetings, Salt Lake City, UT.

Kocar, B.D., **Borch, T.**, Fendorf, S. Release of Arsenic and Transformation of Iron (Hydr)Oxides During Sulfidogenesis. November 6 - 10, **2005**. ASA-CSSA-SSSA International Annual Meetings, Salt Lake City, UT.

Masue, Y., **Borch, T.**, Fendorf, S. Arsenic Retention on Ferrihydrite: Stability Under Aerobic and Anaerobic Conditions. November 6 - 10, **2005**. ASA-CSSA-SSSA International Annual Meetings, Salt Lake City, UT.

Ginder-Vogel, M., **Borch, T.**, Fendorf, S. Reduction and Retention Processes Within Arid Subsurface Environments. September 19-21, **2005**. Synchrotron Environmental Science III. Brookhaven National Laboratory, Upton, New York.

Kocar, B.D., **Borch, T.**, Fendorf, S. Sulfidogenesis controls on iron (hydr)oxide transformation and release of arsenic. August 28 – September 1, **2005**. The 230<sup>th</sup> American Chemical Society National Meeting. Washington, DC, USA.

**Borch, T.**, Masue, Y., Kocar, B., Fendorf, S. Poisoning of the Biogeochemical Cycle of Iron by Surface Compositional Changes. August 14 – 19, **2005**. The Joint International Symposia for Subsurface Microbiology (ISSM 2005) and Environmental Biogeochemistry (ISEB XVII). Abstract p. 28. Jackson Hole, Wyoming, USA.

Gerlach, R., **Borch, T.**, Ballor, N.R., Cunningham, A.B., Peyton, B.M., Apel, W.A. Fermenters and Reductive Contaminant Transformation Processes in the Subsurface. August 14 – 19, **2005**. The Joint International Symposia for Subsurface Microbiology (ISSM 2005) and Environmental Biogeochemistry (ISEB XVII). Abstract p. 29. Jackson Hole, Wyoming, USA.

Yoon, T.H., **Borch, T.**, Benzerara, K., Fendorf, S., Tyliszczak, T., Brown, Jr., G.E. Soft X-ray Spectromicroscopy Study on Chemical Heterogeneities in Iron Precipitates Formed at or Near Bacterial Cells. May 20-25, **2005**. Goldschmidt Geochemistry Conference. Moscow, Idaho. *Geochimica et Cosmochimica Acta*, 69 (10), A598.

Ginder-Vogel, M., **Borch, T.**, Fendorf, S. Reduction and Retention Processes Within Arid Subsurface Environments. May 20-25, **2005**. Goldschmidt Geochemistry Conference. Moscow, Idaho. *Geochimica et Cosmochimica Acta*, 69 (10), A619.

**Borch, T.**, Inskeep, W.P., Gerlach, R. Iron (Hydr)Oxides and Electron Shuttles Govern the Fate of 2,4,6-Trinitrotoluene by a Soil Bacterium. June 5-11, **2004**. Goldschmidt Geochemistry Conference. Copenhagen, Denmark. *Geochimica et Cosmochimica Acta*, 68 (11), A451.

Gerlach, R., **Borch, T.**, Cunningham, A.B., Viamajala, S., Peyton, B.M., Apel, W.A. Influence of Electron Shuttling Compounds and Iron Minerals on the Reduction of Metals and Organics. May 24-27, **2004**. 4th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, USA.

**Borch, T.** Iron(III)Minerals Can Impact the Microbial Reduction of 2,4,6-Trinitrotoluene. October 5-8, **2003**. The Third Annual INRA Subsurface Science Symposium, Salt Lake City, Utah, USA.

Gerlach, R., **Borch, T.**, Cunningham, A.B., Viamajala, S., Peyton, B.M., Apel, W.A. Influence of Electron Shuttling Compounds on the Reduction of Metals and Organics. October 5-8, **2003**. The Third Annual INRA Subsurface Science Symposium, Salt Lake City, Utah, USA.

**Borch, T.**, Cunningham, A.B., Gerlach, R. 2,4,6-Trinitrotoluene (TNT) Biodegradation By a Novel Gram-Positive Iron-Reducing Bacterium. June 2-5, **2003**. In Situ and On-Site Bioremediation. The Seventh International Symposium, Orlando, Florida, USA.

Gerlach, R., **Borch, T.**, Cunningham, A.B. Biofilm-Based Technologies for Mixed-Waste Remediation. April 27-30, **2003**. U.S. Army Research Office Workshop. High Hampton Inn. Cashiers, North Carolina, USA.

**Borch, T.**, Gerlach, R., Cunningham, A.B., Peyton, B.M., Apel, W.A. Influence of Biogenically Produced Fe(II) and Humic Acid Analogs on the Fate of 2,4,6-trinitrotoluene (TNT). (December 6-10, 2002. Fall Meeting, American Geophysical Union, San Francisco, California). *Eos Trans. AGU*, 83(47), Fall Meet. Suppl., Abstract B22E-11, **2002**.

**Borch, T.**, Biederman, J.A., Mogk, D.W., Butterfield, P.W., Camper, A.K., Jordan, R.N. Characterization of Two Iron Oxide Models for Environmental Research: Microscopic and Spectroscopic Studies. October 13-16, **2002**. The Second Annual INRA Subsurface Science Symposium, Boise, Idaho.

## **Poster Presentations and other Abstracts:**

### INVITED:

**Borch, T.**, Blotevogel, J. Understanding the Transformations and Interactions of Hydraulic Fracturing Fluid Additives: A Critical Step Towards Optimizing Extraction Efficacy While Reducing the Environmental Footprint. 19th Annual Green Chemistry & Engineering Conference that will be held in North Bethesda, Maryland, July 14-16, **2015**.

**Borch, T.**, Pallud, P., Schilling, K., Daugherty, E., McKee, G.A., Rhoades, C., Kelly, E.F. Biogeochemical Iron Cycling in Subalpine Wetlands: Impact on Fate and Transport of Organic C and Nutrients. NIWQP/AFRI PD meeting in Washington DC, October 28-29, **2014**.

Yang, Y-Y., **Borch, T.**, Furlong, E.F., Yager, T., Davis, J.G., Gray, J. Steroid Hormone Runoff from an Agricultural Field Applied with Biosolids. U.S. Geological Survey Science Day 2009: New challenges, new approaches to understand Colorado Water,



Tuesday, June 2, 2009, Denver Federal Center, Lakewood, Colorado

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VOLUNTEERED:

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