

EDUCATION

- 2018 **Doctor of Philosophy, Chemistry**
Colorado State University
- 2011 **Bachelor of Arts, Chemistry**
St. Olaf College

RESEARCH EXPERIENCE

- 2012 - 2018 **PhD Candidate**, Chemistry, Colorado State University
Advisor: Dr. Thomas Borch
Dissertation: "The role of organic matter chemistry in iron redox transformations, sorption to iron oxides, and wetland carbon storage"
- Characterized the complexation of reduced Fe(II) by organic matter using X-ray absorption spectroscopy and investigated the subsequent impact on Fe(II) oxidation by molecular oxygen.
 - Designed and conducted small-scale dynamic flow and batch experiments to determine the effect of temperature on sorption and chemical fractionation of dissolved humic substances on iron hydroxide-coated sand.
 - Collected and analyzed soil cores from subalpine wetlands in an experimental forest to determine the effects of wetland hydrology on soil carbon chemistry.
- 2011 – 2012 **Research Associate**, with Dr. Thomas Sale, Colorado State University
- Performed inorganic aqueous and solid phase analysis of samples from petrochemical-contaminated field sites and contaminant degradation laboratory experiments.
 - Developed and implemented batch experiments to test the biotic and abiotic formation of reduced iron minerals and their ability to dechlorinate trichloroethylene (TCE).
 - Assisted with other laboratory experiments and general laboratory management.
- 2011 **Student Researcher**, with Dr. Douglas Beussman, St. Olaf College
Developed a cyclic voltammetric glucose biosensor laboratory experiment for an undergraduate bioanalytical chemistry course.
- 2010 **Student Researcher**, with Drs. John Schade and Stephanie Schmidt, St. Olaf College
Performed phospholipid fatty acid (PLFA) analyses of anaerobic microbes in ephemeral and permanent wetland soils of central Minnesota
- 2009 **Undergraduate Research Assistant**, with Dr. Matt Morra, University of Idaho
Analyzed water samples from heavy metal contaminated ponds in the Coeur d'Alene River basin and evaluated *Sinapis alba* seed meal as an organic herbicide for aquatic weeds

TECHNICAL EXPERIENCE

- Chromatography:** Gas chromatography of chlorinated ethenes, ion chromatography of aqueous anions, some HPLC and capillary electrophoresis in undergraduate lab coursework
- Mass spectrometry:** Electrospray ionization time-of-flight (ESI-TOF) and Fourier transform ion cyclotron resonance (FT-ICR) mass spectrometry of dissolved organic matter, some matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) MS in undergraduate lab coursework
- Nuclear magnetic resonance (NMR) spectroscopy:** Assistance with preparation and analysis of soil samples for solid state cross-polarization magic angle spinning (CP-MAS) NMR of soil organic matter, solution state ¹H-NMR of pure organic compounds in organic analysis laboratory coursework
- X-ray absorption spectroscopy:** Iron K-edge X-ray absorption near edge structure (XANES) and extended X-ray absorption fine structure (EXAFS), performed at the Stanford Synchrotron Radiation Lightsource (SSRL), beamlines 4-1, 4-3, and 11-2. Data manipulation, linear combination and shell-by-shell fitting and wavelet transform analysis performed in SixPack, Athena, Artemis, and Igor.
- Other lab-based techniques:** Total organic carbon (TOC) and total nitrogen analysis, UV-Vis absorption spectroscopy, Fourier transform infrared (FTIR) spectroscopy, BET analysis, X-ray powder diffraction (XRD) analysis, zeta-potential

analysis, solid phase extraction, basic microbiology and molecular biology techniques from undergraduate courses in microbiology, genetics, and bioanalytical chemistry.

Field experience: Soil coring and pore water sampling in subalpine wetlands in Colorado and sampling of floodplain soils in western Washington

Data analysis: Experience analyzing data in Excel, R, and proprietary software including Mass Hunter, Chromeleon, PetroOrg, and X-ray absorption software packages SixPack, Athena, and Artemis.

TEACHING EXPERIENCE

Lead Teaching Assistant, General Chemistry Lab II, Colorado State University, August 2017 – May 2018

- Created guides and held weekly support meetings for new teaching assistants.
- Provided course feedback to laboratory course coordinator.
- Assisted the laboratory coordinator in revising curriculum to promote students' intellectual engagement with material.
- Developed ideas for new and revised labs and edited written laboratory materials.

Teaching Assistant, General Chemistry Laboratory I & II, Colorado State University, August 2012 – May 2013, August 2016 – May 2017

- Instructed a total of 5 semesters and 10 sections of general chemistry laboratory courses. Created and delivered pre-lab lectures. Administered grades.

LEADERSHIP AND OUTREACH EXPERIENCE

Graduate Women in Science, Northern Colorado Chapter, President (2016-2017), Vice President (2015)

- Coordinated a team of officers to organize professional development, educational, and networking events.
- Led an effort to train graduate students in recognizing and combating implicit biases.
- Conducted survey of members to focus the chapter's efforts on filling gaps in graduate students' experiences

Workshop leader, Expanding Your Horizons (EYH) Northern Colorado; April 2017 & 2018

- Worked on an interdisciplinary team to co-design and lead a 1-hour soil science workshop for middle school girls with original curriculum and materials.

Workshop volunteer, EYH Northern Colorado, April 2016; EYH Boulder, February 2016

- Assisted workshop leaders in conducting workshops on zooplankton reproduction (EYH N. CO) and the electromagnetic spectrum and space imagery (EYH Boulder)

Volunteer, The Growing Project – Educational Garden at Hope Farms, Fort Collins, CO; May – October 2017

- Seeded, weeded, and harvested vegetables for donation to community organizations providing food for low-income families.

Volunteer, Wildlands Restoration Volunteers, Fort Collins, CO; 2017 – 2018

- River restoration – spread compost, broadcast native seed, applied wood straw mulch and planted native container plants along river banks.
- Tamarisk removal – manually pulled or cut and applied herbicide to invasive tamarisk plants in a restored wetland.

Volunteer, Yanapuma Foundation, Manabí, Ecuador; June – August 2010

- Worked on a family organic farm in the coastal province of Manabí, Ecuador. Assisted with farm and garden work and learned about agroecology and traditional farming methods in the context of the rainforest ecosystem.

PUBLICATIONS

- Daugherty, E. E.; Gilbert, B.; Nico, P. S.; Borch, T. Complexation and Redox Buffering of Iron(II) by Dissolved Organic Matter. *Environ. Sci. Technol.* 2017, *51*, 11096–11104.
- Daugherty, E. E. Lobo, G., Pallud, C., Borch, T. Temperature effects on sorption of dissolved organic matter to ferrihydrite under dynamic flow and batch conditions. *In preparation.*
- Daugherty, E.E., McKee, G. A., Bergstrom, R., Pallud, C., Burton, S., Kelly, E., Rhoades, C.C., Borch, T., Hydrogeomorphic controls on soil carbon composition in Colorado subalpine wetlands. *In preparation*

PRESENTATIONS

- Daugherty, E.**, Lobo, G., Pallud, C., Borch, T. “Temperature and chemical composition controls on sorption of dissolved organic matter to iron hydroxides under dynamic flow conditions.” Oral presentation. 2017 AGU Fall Meeting. Dec. 11-15, 2017.
- Borch, T., **Daugherty, E.**, Young, R., Gilbert, B., Nico, P. “New Insights into Environmental Stabilization of Iron(II) and Natural Organic Matter.” Oral presentation. AFRI and NIWQP Project Directors Meeting. Washington, D.C. Oct. 12-13, 2016.
- Borch, T., **Daugherty, E.** “Impact of Temperature and Adsorptive Fractionation on Transport of DOC in Iron-Rich Porous Media.” Oral presentation. 2015 SSSA International Annual Meeting. Minneapolis, MN. Nov 15-18, 2015.
- Borch, T., **Daugherty, E.**, Nico, P., Gilbert, B. “The role of NOM complexation in Fe(II) stabilization.” Oral presentation. 249th ACS National Meeting. Denver, CO. Mar 22-26, 2015.
- Daugherty, E.**, Borch, T. “Temperature effects on carbon sequestration by iron oxide coated mineral surfaces.” Oral presentation. 249th ACS National Meeting. Denver, CO. Mar 22-26, 2015.
- Borch, T., **Daugherty, E.**, Nico, P., Gilbert, B. “Impact of Dissolved Organic Matter Chemistry on the Fate of Iron(II) in Oxidic Environments.” Oral presentation. 2014 SSSA International Annual Meeting. Long Beach, CA. Nov 2-5, 2014.
- Borch, T., **Daugherty, E.** “Influence of Temperature on the Sorption of Humic Substances on Ferrihydrite-coated Quartz under Dynamic Flow Conditions.” Poster. 2014 SSSA International Annual Meeting. Long Beach, CA. Nov 2-5, 2014.
- Borch, T., Pallud, C., Schilling, K., **Daugherty, E.**, McKee, G., Rhoades, C., Kelly, E. “Biogeochemical Iron Cycling in Subalpine Wetlands: Impact on Fate and Transport of Organic C and Nutrients.” Poster. USDA NIFA Director’s Meeting. Washington, D.C. Nov 1, 2014.
- Daugherty, E.**, Gilbert, B., Borch, T. “Coordination and Redox Chemistry of Aqueous Fe(II) and Dissolved Organic Matter.” Oral Presentation. 2014 Goldschmidt. Sacramento, CA. June 8-15, 2014.
- Leone, V., **Daugherty, E.**, Bhattacharyya, A., Borch, T. “Temperature Controls on Sorption of Humic Substances on Iron Oxides Under Dynamic Flow Conditions”. Poster. 2013 SSSA International Annual Meeting. Tampa, FL. Nov 3-6, 2013.

AWARDS AND FELLOWSHIPS

- 2018 Colorado State University Department of Chemistry Graduate Teaching Assistant Award
- 2018 ASA, CSSA, SSSA Future Leaders in Science Award
- 2017 Colorado State University Graduate Student Council Student Travel Award
- 2017 Colorado State University Department of Chemistry Student Travel Award
- 2016 Colorado Mountain Club Foundation Fellowship
- 2015 Sustainability Leadership Fellow, Colorado State University School of Global Environmental Sustainability
- 2014 Goldschmidt Student Travel Award

PROFESSIONAL AFFILIATIONS

- 2015 – present **Graduate Women in Science, Northern Colorado Chapter**
- 2015 Vice President
- 2016 – 2017 President
- 2017 – present **American Geophysical Union**
- 2015 – present **Soil Science Society of America**
- 2014 – 2017 **Geochemical Society**
- 2012-2013, **American Chemical Society**

Ellen E. Daugherty

Colorado State University, Fort Collins, CO
daughertyee@gmail.com
www.linkedin.com/in/ellen-daugherty

2015 – 2016

2011 – present

Phi Beta Kappa

2011 – present

Phi Lambda Upsilon

LANGUAGES

English: Native

Spanish: Intermediate proficiency