Meret Aeppli

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Current Position

EPF Lausanne, Switzerland, Tenure Track Assistant Professor 09/2022 - present
Head of Soil Biogeochemistry Laboratory (SOIL)

Education and Training

Stanford University, United States, Postdoctoral Fellow 09/2019 - 08/2022
Topic: Carbon Cycling in Soils: Effects of Mineral Redox Reactivity on Anaerobic Microbial Respiration
Advisor: Prof. Dr. S. Fendorf

ETH Zürich, Switzerland, Doctor of Sciences 01/2015 - 12/2018
Dissertation: Assessing the Control of Reduction Thermodynamics on Electron Transfer to Iron (Oxyhydr-)Oxides (Diss. Nr. 25'699)
Defense date: 07.12.2018
Advisor: Dr. T.B. Hofstetter
Committee: Dr. M. Sander, Dr. A. Voegelin, Prof. Dr. K. McNeill, Prof. Dr. J. Peña

ETH Zürich, Switzerland, M.Sc. in Environmental Sciences 09/2012 - 01/2015
Concentration: Biogeochemistry and Pollutant Dynamics
Thesis: Interactions of Bacteriophages with Natural Organic Matter and Model Sorbent Surfaces
Advisor: Dr. M. Sander

ETH Zürich, Switzerland, B.Sc. in Environmental Sciences 09/2009 - 10/2012
Thesis: Soil Structure of an Alpine Fen and Its Implications on Below-Ground Methane Concentrations
Advisor: Prof. Dr. J. Zeyer

London Music School, England, Diploma in Music Performance and Production 04/2009 - 09/2009
Concentration: Piano and Vocals

Research Experience

Stanford University, United States, Postdoctoral Fellow in Soil and Environmental Biogeochemistry 09/2019 - present
Linked carbon dioxide production during anaerobic microbial respiration to mineral redox reactivity in floodplain soils.

Eawag, Switzerland, Postdoctoral Fellow in Environmental Chemistry 07/2021 - 08/2021
Characterized redox-buffering properties of synthetic clay minerals using a mediated electrochemical approach.

ETH Zürich, Switzerland, Field Researcher in Environmental Chemistry 07/2019
Quantified electron donating properties of particulate organic matter using a push-pull approach in wetlands near Filipstad, Sweden.

Eawag, Switzerland, Research Assistant in Environmental Chemistry 01/2019 - 06/2019

Adapted procedure to analyze compound specific stable isotope data for nitroaromatic explosives.

Eawag and ETH Zürich, Switzerland, Doctoral Candidate in Environmental Chemistry 01/2015 - 12/2018
Developed mediated electrochemical approach to characterize redox properties of iron oxides; linked rates and extents of iron oxide reduction to thermodynamic driving force of reaction; quantified changes in redox reactivity of iron oxides during abiotic and microbially mediated iron oxide transformations.

ETH Zürich, Switzerland, Graduate Researcher in Environmental Chemistry 09/2013 - 04/2014
Quantified bacteriophage adsorption to natural organic matter and model sorbent surfaces using quartz crystal microbalance with dissipation monitoring.

ETH Zürich, Switzerland, Research Assistant in Environmental Microbiology 06/2012 - 08/2012
Analyzed methane production in wetland soil incubations.

ETH Zürich, Switzerland, Undergraduate Researcher in Environmental Microbiology 02/2012 - 06/2012
Collected wetland soil cores and quantified leaf, moss, and root surface areas along core depths.

Honors

Early Postdoc Mobility Fellowship 09/2019 - 02/2021
Fellowship for postdoctoral research at Stanford University; sponsored by the *Swiss National Science Foundation*; CHF 120'000.

Rising Environmental Leaders Program 01/2020 - 06/2020
Run by the *Stanford Woods Institute for the Environment*; aimed at honing participant's leadership and communication skills to maximize their research impact and connect research to policy and people; one of 20 participants selected from a field of applicants from all seven schools at Stanford.

ETH Medal for Outstanding Doctoral Thesis 09/2019
Awarded for "solving important knowledge gaps in the redox reactivity of iron using an interdisciplinary approach". ETH Zürich awards the medal and CHF 2'000 to the top 8% of doctoral candidates.

Chemistry Travel Award 05/2017
Travel award for the attendance of *Goldschmidt Conference* 2017; sponsored by the *Swiss Chemical Society* and *Platform Chemistry* of the *Swiss Academy of Sciences*; CHF 1'000.

Peer-Reviewed Publications

Aeppli, M; Thompson, A; Dewey, C; Fendorf, S. Redox Properties of Solid Phase Electron Acceptors Affect Anaerobic Microbial Respiration under Oxygen-Limited Conditions in Floodplain Soils. *Environmental Science & Technology*, **2022**, XXXX, XXX, XXX-XXX, doi:10.1021/acs.est.2c05797.

Lopez, AM; Nicolini, CM; **Aeppli, M**; Luby, SP; Fendorf, S; Forsyth, JE. Assessing Analytical Methods for the Rapid Detection of Lead Adulteration in the Global Spice Market. *Environmental Science & Technology*, **2022**, XXXX, XXX, XXX-XXX, doi:10.1021/acs.est.2c03241.

Aeppli, M; Babey, T; Engel, M; Fendorf, S, Bargar, JR; Boye, K. Export of Organic Carbon From Reduced Fine-Grained Zones Governs Biogeochemical Reactivity in Simulated Aquifer. *Environmental Science & Technology*, **2022**, 56 (4), 2738-2746, doi:10.1021/acs.est.1c04664.

Aeppli, M; Giroud, S; Vranic, S; Voegelin, A; Hofstetter, TB; Sander, M. Thermodynamic Controls on Rates of Iron Oxide Reduction by Extracellular Electron Shuttles. *Proceedings of the National Academy of Sciences of the United States of America*, **2022**, 119 (3), e2115629119, doi:10.1073/pnas.2115629119.

Biswakarma, J; Rushworth, D; Srivastava, G; Singh, G; Kang, K; Das, S; Anantharaman, SB; **Aeppli, M**; Popp, AL; Bhuyan, DJ. Organizational Level Responses to the COVID-19 Outbreak: Challenges, Strategies and Framework for Academic Institutions. *Frontiers in Communication*, **2021**, 6:573585, doi:10.3389/fcomm.2021.573585.

Aeppli, M; Vranic, S; Kaegi, R; Kretzschmar, R; Brown, AR; Voegelin, A; Hofstetter, TB; Sander, M. Decreases in Iron Oxide Reducibility during Microbial Reductive Dissolution and Transformation of Ferrihydrite. *Environmental Science & Technology*, **2019**, 53 (15), 8736–8746, doi:10.1021/acs.est.9b01299.

Aeppli, M; Kaegi, R; Kretzschmar, R; Voegelin, A; Hofstetter, TB; Sander, M. Electrochemical Analysis of Changes in Iron Oxide Reducibility during Abiotic Ferrihydrite Transformation into Goethite and Magnetite. *Environmental Science & Technology*, **2019**, 53 (7), 3568-3578, doi:10.1021/acs.est.8b07190.

Aeppli, M; Voegelin, A; Gorski, CA; Hofstetter, TB; Sander, M. Mediated Electrochemical Reduction of Iron (Oxyhydr-)Oxides under Defined Thermodynamic Boundary Conditions. *Environmental Science & Technology*, **2018**, 52 (2), 560-570, doi:10.1021/acs.est.7b04411.

Armanious, A; **Aeppli, M**; Jacak, R; Refardt, D; Sigstam, T; Kohn, T; Sander, M. Viruses at Solid-Water Interfaces: A Systematic Assessment of Interactions Driving Adsorption. *Environmental Science & Technology*, **2016**, 50 (2), 732-743, doi:10.1021/acs.est.5b04644.

Franchini, AG; Henneberger, R; **Aeppli, M**; Zeyer, J. Methane Dynamics in an Alpine Fen: A Field-Based Study on Methanogenic and Methanotrophic Microbial Communities. *FEMS Microbiology Ecology*, **2015**, 91 (3), doi:10.1093/femsec/fiu032.

Armanious, A; **Aeppli, M**; Sander, M. Dissolved Organic Matter Adsorption to Model Surfaces: Adlayer Formation, Properties and Dynamics at the Nanoscale. *Environmental Science & Technology*, **2014**, 48 (16), 9420-9429, doi:10.1021/es5026917.

Invited Talks

Follow the electrons: redox-active minerals in biogeochemical processes, *Swiss Geoscience Meeting*, Lausanne, Keynote, **2022**.

Follow the electrons: insights into soil carbon cycling. *Swiss Federal Institute of Technology Lausanne*, Lausanne, Seminar, **2022**.

Redox properties of iron minerals: insights from electrochemical analyses and thermodynamic considerations. *German Research Centre for Geosciences*, Virtual Seminar, **2022**.

Exploring Mechanisms of Soil Organic Carbon Stabilization by Tracking Electron Flows in Soils. *Technical University of Munich*, Virtual Public Lecture, **2021**.

Tracking Electrons in Soils: How Electro-Active Minerals Affect Soil Carbon Turnover. *Swiss Federal Institute of Technology Lausanne*, Virtual Public Lecture, **2020**.

Follow the Electrons: How Redox-Active Minerals Affect Soil Carbon. *University of California, Davis*, Virtual Seminar, **2020**.

Redox Reactions In the Environment: What Can We Learn From Mediated Electrochemical Analyses? *Indiana University-Purdue University Indianapolis*, Virtual Seminar, **2020**.

Conference Presentations

Iron Reduction In Profundal Sediments Of Ultra-oligotrophic Lake Tahoe Under Oxygen-limited Conditions. Oral presentation. *Goldschmidt Conference*, Honolulu, Hawaii, United States, **2022**.

Redox Properties of Particulate Electron Acceptors Affect Anaerobic Respiration in Floodplain Soils. Poster presentation. *Gordon Research Conferences on Environmental Science: Water*, Plymouth, New Hampshire, United States, **2022**.

Redox properties of particulate electron acceptors affect anaerobic microbial respiration under oxygen-limited conditions in floodplain soils. Oral presentation, virtually delivered. *European Geosciences Union General Assembly*, **2022**.

Thermodynamic Limitations on Microbial Respiration Using Ferric Iron as Terminal Electron Acceptor. Poster presentation. *American Geophysical Union Fall Virtual Meeting*, **2021**.

Organic Matter Mineralization in Redox-Dynamic Environments: How Does the Redox Reactivity of Particulate Electron Acceptors Affect Microbial Respiration Rates? Oral presentation, virtually delivered. *Virtual Goldschmidt Conference*, **2021**.

Soil Organic Matter Stabilization in Floodplain Soils: Role of Particulate Terminal Electron Acceptors. Poster presentation. *American Geophysical Union Fall Virtual Meeting*, **2020**.

Is Carbon Mineralization In Floodplains Controlled by the Redox Reactivity of Iron Minerals? Oral presentation, virtually delivered. *American Chemical Society Fall 2020 Virtual Meeting*, **2020**.

How Does the Redox Reactivity of Iron Minerals Affect Carbon Mineralization in Floodplains? Oral presentation, virtually delivered. *Virtual Goldschmidt Conference*, **2020**.

Mediated Electrochemical Reduction of Iron (Oxyhydr-)Oxides under Defined Thermodynamic Boundary Conditions. Poster presentation. *Gordon Research Conferences on Environmental Science: Water*, Plymouth, New Hampshire, United States, **2018**.

Ferrous Iron-Induced Transformation of Ferrihydrite: Linking Changes in Oxide Mineralogy and Reducibility. Oral presentation. *Interfaces Against Pollution Conference*, La Grande-Motte, France, **2018**.

Investigating Iron Oxide Reduction Using Mediated Electrochemical Analysis. Oral presentation. *Goldschmidt Conference*, Paris, France, **2017**.

Investigating Iron Oxide Reduction Using Mediated Electrochemical Analysis. Oral presentation. *International Conference on the Biogeochemistry of Trace Elements*, Zürich, Switzerland, **2017**.

Thermodynamics of Electron Transfer to Iron Oxides Assessed by Mediated Electrochemical Reduction. Oral presentation. *Swiss Geoscience Meeting*, Geneva, Switzerland, **2016**.

Mediated Electrochemical Reduction of Iron Oxides: Effects of pH and Potential on Electron Transfer to the Oxides. Oral presentation. *European Mineralogical Conference*, Rimini, Italy, **2016**.

Teaching Experience and Training

Stanford University, United States, Teaching Assistant 03/2022 - 06/2022
Science of Soils (ESS-155), weekly classes in the field and laboratory.

Stanford University, United States, Postdoc Teaching Certificate 10/2020
Comprises teaching training, elective courses and workshops, teaching practice, and teaching portfolio (minimum in-class time: 100 h).

Stanford University, United States, Lecturer 10/2020
Postdoc Journal Club on Pedagogical Approaches to Doctoral Supervision, one hour seminar.

Stanford University, United States, Lecturer 10/2020
SkillShare Stanford Earth on Electronic Lab Notebooks, one hour seminar.

Indiana University-Purdue University Indianapolis, United States, Lecturer 09/2020
Advanced Geology Seminar (GEOL-G 690), two hour seminar.

ETH Zürich, Switzerland, Teaching Assistant 01/2015 - 12/2018
Laboratory Course: Elementary Chemical Techniques (529-0030-00L), yearly three week intensive course.

ETH Zürich, Switzerland, Teaching Assistant 09/2011 - 09/2012
Exercises in Mathematics III: Systems Analysis (701-0071-00L), weekly classes.

Mentoring Experience

Mentor at *Goldschmidt Conference* 07/2022

Co-Supervisor of Doctoral Candidate Emily Lacroix, Stanford University 01/2022 - present

Mentor at *Goldschmidt Conference* 07/2021

Co-Supervisor of Research Assistant Carla Nicolini, Stanford University 05/2021 - 07/2021

Supervisor of Research Assistant Sanja Vranic, ETH Zürich 06/2018 - 08/2018

Mentor in the *Association for Women in Science* 09/2019 - 09/2020

Mentor at *Goldschmidt Conference* 06/2020

Supervisor of Undergraduate Student Sébastien Giroud, ETH Zürich 02/2018 - 06/2018

Supervisor of Graduate Student Sanja Vranic, ETH Zürich 09/2017 - 04/2018

Memberships and Reviewing Activities

Member

American Chemical Society, *American Geophysical Union*, *Association for Women in Science*, *ETH Women Professors Forum*, *European Association of Geochemistry*.

Reviewer

Applied and Environmental Microbiology, *Applied Geochemistry*, *Biogeochemistry*, *Biogeosciences*, *Environmental Science: Nano*, *Environmental Science & Technology*, *Environmental Science: Processes & Impacts*, *Journal of Geophysical Research: Biogeosciences*, *Nature Reviews Earth & Environment*. Complete list available on Publons.

Conference Organization

Convener at *Goldschmidt Conference*, Session 12g 07/2022
Session 12 g (Theme 12): Environmental redox reactions and their impact on metal and nutrient dynamics.

Convener at *Goldschmidt Conference*, Session 11g 07/2021
Session 11g (Theme 11): Redox-Driven Transformation and Mobility of Contaminants and Nutrients.

Convener at *American Geophysical Union Fall Meeting*, Symposium 103775 12/2020
Symposium 103775: Soils of the Anthropocene: Ecosystem Scale Implications of Pore-Scale Redox Heterogeneities in Soils.

Convener at *Goldschmidt Conference*, Session 12b 06/2020
Session 12b: Coupled Redox Cycling of S, Mn, and Fe: Impacts on Nutrient and Contaminant Dynamics.

Media and Outreach

Media Coverage of Publication *Thermodynamic Controls on Rates of Iron Oxide Reduction by Extracellular Electron Shuttles*, Physics World Magazine 02/2022
Lichtinger, S. The first electron counts – how anaerobic microbes 'breathe' iron. *Physics World magazine*, **2022**.

Press Release for Publication *Thermodynamic Controls on Rates of Iron Oxide Reduction by Extracellular Electron Shuttles*, Eawag News Portal 01/2022
Bryner, A. It all comes down to the first electron. *Eawag News Portal*, **2022**.

Media Coverage of Field Research in Sweden, ETH Globe Magazine 09/2019
Rüegg, P. Waiting for Oxygen. *ETH Globe magazine*, **2019**, 3, 36-41.

Scientifica Research Fair, ETH Zürich and University of Zürich 09/2017
Designed and presented exhibition booth on the degradation of plastics in the environment.

Languages

German: native
English: fluent (CEFR level C2)
French: very good command (CEFR level B2)
Spanish: working knowledge (CEFR level A2)