

Meret Aeppli

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soil.epfl.ch

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; 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1021/es5026917).

Invited Talks

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

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

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

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

Redox Reactions In the Environment: What Can We Learn From Mediated Electrochemical Analyses? Virtual Seminar, *Indiana University-Purdue University Indianapolis*, **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 <i>Goldschmidt Conference</i>	07/2022
Co-Supervisor of Doctoral Candidate Emily Lacroix, Stanford University	01/2022 - present
Mentor at <i>Goldschmidt Conference</i>	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 <i>Association for Women in Science</i>	09/2019 - 09/2020
Mentor at <i>Goldschmidt Conference</i>	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 <i>Goldschmidt Conference</i> , Session 12g	07/2022
Session 12 g (Theme 12): Environmental redox reactions and their impact on metal and nutrient dynamics.	
Convener at <i>Goldschmidt Conference</i> , Session 11g	07/2021
Session 11g (Theme 11): Redox-Driven Transformation and Mobility of Contaminants and Nutrients.	
Convener at <i>American Geophysical Union Fall Meeting</i> , Symposium 103775	12/2020
Symposium 103775: Soils of the Anthropocene: Ecosystem Scale Implications of Pore-Scale Redox Heterogeneities in Soils.	
Convener at <i>Goldschmidt Conference</i> , 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 <i>Thermodynamic Controls on Rates of Iron Oxide Reduction by Extracellular Electron Shuttles</i> , Physics World Magazine	02/2022
Lichtinger, S. The first electron counts – how anaerobic microbes ‘breathe’ iron . <i>Physics World magazine</i> , 2022 .	
Press Release for Publication <i>Thermodynamic Controls on Rates of Iron Oxide Reduction by Extracellular Electron Shuttles</i> , Eawag News Portal	01/2022
Bryner, A. It all comes down to the first electron . <i>Eawag News Portal</i> , 2022 .	

Media Coverage of Field Research in Sweden, ETH Globe Magazine Rüegg, P. Waiting for Oxygen . <i>ETH Globe magazine</i> , 2019 , 3, 36-41.	09/2019
Scientifica Research Fair, ETH Zürich and University of Zürich Designed and presented exhibition booth on the degradation of plastics in the environment.	09/2017

Languages

German: native

English: fluent (CEFR level C2)

French: very good command (CEFR level B2)

Spanish: working knowledge (CEFR level A2)