

## Matthew C. Reid

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### EXECUTIVE SUMMARY

Dr. Matthew Reid is an assistant professor in the School of Civil and Environmental Engineering at Cornell University. His research program focuses on biogeochemical element cycling and the application of these coupled processes to water quality problems. His research synthesizes molecular- and mechanism-level investigations to describe contaminant dynamics in complex biogeochemical systems, and seeks to integrate quantitative descriptions of biogeochemical processes in the development of a sustainable green water infrastructure. Dr. Reid's research has been recognized with an NSF CAREER Award, and he has twice received Excellence in Teaching awards from the College of Engineering at Cornell University. Dr. Reid was a postdoctoral scientist in the Environmental Microbiology Laboratory at the Swiss Federal Institute of Technology, Lausanne (EPFL), where he was supported by a Marie Skłodowska-Curie fellowship. Dr. Reid completed his Ph.D. in Civil and Environmental Engineering at Princeton University in 2014 and received his bachelors degree in chemistry from the University of Chicago. Dr. Reid has also worked as a high school chemistry teacher with the United States Peace Corps in Tanzania.

### EDUCATION

Ph.D. (2014), Civil and Environmental Engineering, Princeton University  
Certificate in Science, Technology, and Environmental Policy, Princeton School of International and Public Affairs

B.A. (2004), Chemistry, The University of Chicago

### PROFESSIONAL EXPERIENCE

Assistant Professor School of Civil and Environmental Engineering, Cornell University Graduate Field Member, Geological Sciences Faculty Affiliate, Cornell Center for Materials Research Faculty Fellow, Atkinson Center for Sustainability	2016 -
Postdoctoral Scientist Environmental Microbiology Laboratory, Swiss Federal Institute of Technology, Lausanne (EPFL)	2014 - 2016
Staff Research Assistant Geochemistry Division, Lamont-Doherty Earth Observatory of Columbia University	2007 - 2008
High School Chemistry Teacher United States Peace Corps - Tanzania	2004 - 2006

### AWARDS AND HONORS

Community-Engaged Practice and Innovation Award, Einhorn Center for Community Engagement	2023
<b>NSF Early Career Faculty Development (CAREER) Award</b>	2023
Daniel M. Lazar '29 Excellence in Teaching Award, <i>Cornell College of Engineering</i>	2022
John Swanson '61 Excellence in Teaching Award, <i>Cornell College of Engineering</i>	2018
<b>EPFL/Marie Curie Postdoctoral Fellowship</b>	2014

Earth Institute Postdoctoral Fellowship, <i>Columbia University</i> (Declined)	2014
Science, Technology, and Environmental Policy Fellow, <i>Princeton Environmental Institute</i>	2011
New Jersey Water Resources Research Institute Award	2011
<b>National Science Foundation Graduate Research Fellowship</b>	2008
Gordon Y. S. Wu Fellowship in Engineering, <i>Princeton University</i>	2008
Francis E. Knock Prize for Achievement in Chemistry, <i>University of Chicago</i>	2004
Summer Environmental Research Award, <i>University of Chicago</i>	2003

## PUBLICATIONS

Authors directly supervised at Cornell are marked in bold. The specific relationship is annotated as follows: work from an undergraduate\*, graduate student\*\*, or postdoc\*\*\* in the Reid Lab.

### Journal Publications

29. **L. Abu-Ali\*\***, **S.C. Maguffin\*\*\***, J. Rohila, A. McClung, and **M.C. Reid**. Effects of Alternate Wetting and Drying on Oxyanion-Forming and Cationic Trace Elements in Rice Paddy Soils: Impacts on Arsenic, Cadmium, and Micronutrients in Rice. *Environmental Geochemistry and Health*, accepted.
28. **J.K. Israel\***, **Z. Zhang\*\***, **Y. Sang\*\***, **P.M. McGuire\*\***, S. Steinschneider, and **M.C. Reid**. Climate Change Effects on Denitrification Performance of Woodchip Bioreactors Treating Agricultural Tile Drainage. *Water Research*, in press.
27. L. Smieska, **M.C. Reid**, O. Vatamaniuk, K. Olson Hoal, and M.L. Guerinet. Synchrotron Science for Sustainability. *Metallomics*, in press.
26. P.M. McGuire\*\*, N. Butkevitch\*, A. Saksena\*, M.T. Walter, J.S. Shapleigh, and **M.C. Reid**. Oxic-Anoxic Cycling Promotes Coupling Between Complex Carbon Metabolism and Denitrification in Woodchip Bioreactors. *Environmental Microbiology*, in press.
25. **H. Yoon\*\***, A. Giometto, **X. Zhang\*\***, M. Pothier, A.J. Poulain, and **M.C. Reid**. Time-Dependent Biosensor Fluorescence as a Measure of Bacterial Arsenic Uptake Kinetics and Its Inhibition by Dissolved Organic Matter. *Applied and Environmental Microbiology*, 2022, 88 (16), e00891-22. Featured in AEM Research Spotlight.
24. **L. Abu-Ali\*\***, **H. Yoon\*\***, and **M.C. Reid**. Effects of Organic Sulfur and Arsenite/Dissolved Organic Matter Ratios on Arsenite Complexation with Dissolved Organic Matter. *Chemosphere* 2022, 302: 134770
23. K. Viacava, A. Janowczyk, S. Poudel, **M.C. Reid**, L. Jecquier, H. Shrestha, R.L. Hettich, and R. Bernier-Latmani. Meta-omics-aided isolation of an elusive anaerobic arsenic-methylating soil bacterium. *ISME Journal*, 2022, 16, 1740?1749.
22. **X. Zhang\*\*** and **M.C. Reid**. Inhibition of Methanogenesis Leads to Accumulation of Methylated Arsenic Species and Enhances Arsenic Volatilization from Rice Paddy Soil. *Science of the Total Environment*, 2022, 818:151696.
21. A.M. Schmitz, B. Pian, S. Medin, **M.C. Reid**, M. Wu, E. Gazel, and B. Barstow. Generation of a *Gluconobacter oxydans* knockout collection for improved extraction of rare earth elements. *Nature Communications*, 2021, 12, 6693.
20. **P.M. McGuire\*\***, **V. Dai\***, M. Todd Walter, and **M.C. Reid**. Labile Carbon Release from Oxic-Anoxic Cycling in Woodchip Bioreactors Enhances Nitrate Reduction without Increasing Nitrous Oxide Accumulation. *Environmental Science: Water Research and Technology*, 2021, 7, 2357-2371.
19. B. Runkle, A.L. Seyfferth, **M.C. Reid**, M.A. Limmer, B. Moreno-Garcia, C.W. Reavis, J. Pena, M.L. Reba, A.M. Adviento-Borba, S.M. Pinson, and C. Isbell. Socio-Technical Changes for Sustainable Rice Production: Rice Husk Amendment, Conservation Irrigation, and System Changes. *Frontiers in Agronomy*, 2021, 3, 81.

18. **M.C. Reid**, M.P. Asta, **S.C. Maguffin**\*\*\*, **L. Falk**\*, V. Pham, R. Bernier-Latmani, and P. Le Vo. Associations between Inorganic Arsenic in Rice and Groundwater Arsenic in the Mekong Delta. *Chemosphere* 265,129092, 2021.
17. **M.C. Reid**. Sanitation and Climate. *Nature Climate Change*, 10, pages 496 - 497, 2020. (Invited Commentary)
16. **S. Wang**\*\* and **M.C. Reid**. Kinetics of nitrous oxide mass transfer from porewater into root aerenchyma of wetland plants. *Journal of Environmental Quality* 49 (6), 1717-1729, 2020.
15. **S.C. Maguffin**\*\*\*, **L. Abu-Ali**\*\* , R.V. Tappero, J. Pena, J.S. Rohila, A.M. McClung, and **M.C. Reid**. Influence of Manganese Abundances on Iron and Arsenic Solubility in Rice Paddy Soils. *Geochimica et Cosmochimica Acta* 276, 50-69, 2020.
14. C. Fernandez-Baca, O. Amir-Eldin, **M.C. Reid**, and R.E. Richardson. Temporal lags in post-rain greenhouse gas cycling and fluxes from septic leach field soils and associated greenhouse gas cycling microbial populations. *ASCE Journal of Sustainable Water in the Built Environment* 6(2): 04020004, 2020.
13. **P.M. McGuire**\*\* and **M.C. Reid**. Nitrous Oxide and Methane Dynamics in Woodchip Bioreactors: Effects of Fluctuating Water Tables on Partitioning into Trapped Gas Phases. *Environmental Science and Technology* 53 (24), 14348-14356, 2019
12. D.S. Pal, **M.C. Reid**, K.V.R. Schäfer, and P.R. Jaffé. Simultaneous measurements of dissolved CH<sub>4</sub> and H<sub>2</sub> in wetland soils. *Environmental Monitoring and Assessment* 190 (3), 176, 2018.
11. **M.C. Reid**, J. Maillard, A. Bagnoud, L. Falquet, P. Le Vo, R. Bernier-Latmani. Arsenic Methylation Dynamics in a Rice Paddy Soil Anaerobic Enrichment Culture. *Environmental Science & Technology* 51, 10546 - 10554, 2017
10. **M.C. Reid**, D.S. Pal, and P.R. Jaffé. Dissolved Gas Dynamics in Wetland Soils: Root-Mediated Gas Transfer Kinetics Determined via Push-Pull Tracer Tests. *Water Resources Research* 51, 7343-7357, 2015  
Featured in [AGU EOS Research Spotlight](#).
9. M. Kang, C. Kanno, **M.C. Reid**, X. Zhang, M.A. Celia, D.L. Mauzerall, Y. Chen, and T.C. Onstott. Direct Measurements of Methane Emissions from Abandoned Oil and Gas Wells in Pennsylvania. *Proceedings of the National Academy of Sciences of the United States of America* 111, 18173-18177, 2014. Featured in
8. D.S. Pal, **M.C. Reid**, and P.R. Jaffé. The Impact of Hurricane Sandy on CH<sub>4</sub> Released From Vegetated and Unvegetated Wetland Microsites, *Environmental Science & Technology Letters* 1, 372-375, 2014
7. **M.C. Reid**, K. Guan, F. Wagner, and D.L. Mauzerall. Global Methane Emissions from Pit Latrines. *Environmental Science & Technology*, 48, 8727 - 8734, 2014. Featured in Conservation Magazine
6. **M.C. Reid**, R. Tripathee, K.V.R. Schäfer, and P.R. Jaffé. Tidal Marsh Methane Dynamics: Difference in Seasonal Lags in Emissions Driven by Storage in Vegetated vs. Unvegetated Sediments. *Journal of Geophysical Research: Biogeosciences*, 118 (4), 1802-1813, 2013.
5. **M.C. Reid** and P.R. Jaffé. A Push-Pull Test to Measure Root Uptake of Volatile Chemicals from Wetland Soils. *Environmental Science & Technology*, 47, 3190-3198, 2013.
4. **M.C. Reid** and P.R. Jaffé. Gas-Phase and Transpiration-driven Mechanisms for Volatilization through Wetland Macrophytes. *Environmental Science & Technology*, 46, 5344-5352, 2012.
3. E.L. Harrison, F. Veron, D.T. Ho, **M.C. Reid**, P. Orton, and W.R. McGillis. Nonlinear interaction between rain and wind induced air-water gas exchange. *Journal of Geophysical Research: Oceans*, 117 (C3), 2012.
2. E.A. Variano, D.T. Ho, V.C. Engel, P.J. Schmieder, and **M.C. Reid**. Flow and Mixing Dynamics in a Patterned Wetland: Kilometer-Scale Tracer Releases in the Everglades, *Water Resources Research*, 45 (8),

2009.

1. M.J. Krisch, **M.C. Reid**, L.R. McCunn, L.J. Butler, and J. Shu. Photofragment Translational Spectroscopy of Nitric Acid at 248 nm with VUV Photoionization Detection of Products, *Chemical Physics Letters*, 397, 21-25, 2004

### **Journal Publications - In Review**

5. H. Yoon\*\*, B. Stenzler, M.P. Asta, L. Abu-Ali\*\*, A. Poulain, and **M.C. Reid**. Effects of Iron and Dissolved Organic Matter on Bioavailability of Arsenite under Anaerobic Conditions. Submitted to *Environmental Science and Technology: Water*

4. Y. Sang\*\*, B. Azimzadeh, J. Olsen\*, J. Rappaport\*, C.E. Martinez, and **M.C. Reid**. Iron-Modified Biochar as an Adsorbent for Arsenic and Cadmium: Effects of Iron-Impregnation Methods on Adsorbent Properties and Longevity in Flooded Soils. Submitted to *Environmental Science and Pollution Research*

3. Yuan, Z, Kang, D., Li, G., Lee, J., Han, I., Wang, D., Zheng, P., Reid, M.C., and Gu, A.Z. New Strategy to Combine Enhanced Biological Phosphorus Removal and Short-cut Nitrogen Removal for Treating High-strength Wastewater. In revision at *Environmental Science and Technology*.

2. S. Medin, E. Gazel, **M.C. Reid**, M. Wu, and B. Barstow. Genomic Characterization of Rare Earth Binding by *Shewanella oneidensis*. In review at *Scientific Reports*

1. A. Sanchez\*\* and **M.C. Reid**. Equilibrium and Kinetic Studies of Arsenite Sorption on a Thiol-Functionalized Resin as Model for Arsenite Interactions with Natural Organic Matter. In Review at *Chemosphere*.

### **Journal Publications – In Preparation with Submission Expected in 2023**

3. M.C. Reid, N. Napp, and B. Kerkez. Real-time control of nature-based water treatment systems: Opportunities for enhanced biological removal of nonpoint source pollutants. In prep. for *PLoS Water*.

2. Y. Sang, E. Christiansen\*, O. Pietz\*, R. Johnston, and M.C. Reid. Geochemical and Hydrological Controls on Manganese in a Stratified Drinking Water Reservoir. In prep. for *Environmental Science and Technology: Water*

1. Z. Zhang\*\*, Y. Sang\*\*, S. Echaravaria\*, N. Napp, and **M.C. Reid**. Real-Time Feedback Control of Exogenous Carbon Dosing in a Denitrifying Bioreactor Treating Agricultural Stormwater. In prep. for *Environmental Science and Technology: Engineering*

### **Other Publications**

3. B. Runkle, A. Seyfferth, M. Reid, M. Reba, M. Limmer, and B. Moreno-Garcia (2023). Opportunities for a Circular Bioeconomy in Rice Production. Resource Magazine, America Society of Agricultural and Biological Engineers.

2. S. Brink, H. Godfrey, M. Kang, S. Lyser, J. Majkut, S. Mignotte, W. Peng, **M. Reid**, M. Sengupta, and L. Singer (2013). Methane Mitigation Opportunities in China. Report Prepared for the Global Methane Initiative.

1. **M.C. Reid** Guide to Chemistry Practicals: Questions and Answers to Selected NECTA Practicals 1990 - 2006. Available at: <https://maktaba.tetea.org/study-aids/A-Level%20Chemistry%20Practical%20Manual.pdf>

## **RESEARCH FUNDING**

Total Research Funding as PI or co-PI: \$2.9M from external sponsors; \$550K from internal sponsors  
Funding with Reid as lead or sole PI: \$1.3M from external sponsors  
Funding to Reid Lab: \$1.8M from external sponsors; \$380K from internal sponsors

### **Federal**

**National Science Foundation.** CAREER: Unlocking Recalcitrant Carbon to Enhance Denitrification of Nonpoint Source Nitrogen in Woodchip Bioreactors. 2023 - 2028. \$545,946.

**Strategic Environmental Research and Development Program (SERDP).** A systematic evaluation of precursor fate and transformation in wetland systems across physical scales and biogeochemical gradients. Lead PI: Damian Helbling; Co-PIs: Matthew Reid, Paul Koster van Groos. 2023 - 2025. \$1,200,000 (\$425,000 to Reid Lab)

**USGS 104b Program.** Effects of Iron and Manganese on the Decomposition of Plant Litter in Tidal Wetlands. 2022-2023. \$30,000 (\$30,000 to Reid Lab)

**Natural Resources Canada.** Long-term variability of methane emissions from abandoned oil and gas wells. Single PI Award. 2020 - 2021. \$19,081 (\$19,081 to Reid Lab).

**USGS 104b Program.** Sources and Speciation of Elevated Manganese in a Surface Water Supply Reservoir. 2020-2021. \$15,000 (\$15,000 to Reid Lab).

**NSF Environmental Chemical Sciences Program, Division of Chemistry.** Arsenic Complexation with Reduced Organosulfur Moieties in Soil Organic Matter: Implications for Arsenic Oxidation via Biotic and Abiotic Pathways. Single PI Award. 2019 - 2022. \$355,147 (\$355,147 to Reid Lab).

**NSF Environmental Engineering Program, Division of Chemical, Bioengineering, Environmental, and Transport Systems.** Biotic and Abiotic Controls on Nitrous Oxide Dynamics in Denitrifying Bioreactors. Lead PI: Matthew Reid. Co-PIs: M. Todd Walter and James Shapleigh. 2018 - 2021. \$329,841 to Cornell (\$315,000 to Reid Lab).

**USDA-NIFA Bioenergy, Natural Resources, and Environment Program.** Closing The Si Cycle In Rice Agroecosystems To Sustainably Control As And Cd Uptake By Rice Grown Under Alternate Wetting And Drying (AWD). Lead PI: Angelia Seyfferth (University of Delaware). Co-PIs: Ben Runkle (University of Arkansas) and Matthew Reid. 2018 - 2021. \$495,252 (\$138,885 to Cornell and Reid Lab).

### **Internal**

**Cornell Global Strategic Collaboration Award.** Microbial Community Characterization of Gold Bleaching Reactors During Various Stages of Operation. PIs: Matthew Reid and Melany Ruiz Uriguen (Universidad San Francisco de Quito, Ecuador). 2022-2023. \$10,000 (\$5,000 to Reid Lab).

**Atkinson Center for Sustainability.** Mineral Resources and Sustainability: Environmental and Social Considerations for Mineral Resource Development in Ecuador. Lead PI: Matthew Reid. Co-PIs: Karin Olson Hoal (Cornell EAS), Ken Roberts (Cornell Government), and Louisa Smieska (CHESS). 2022-2024. \$185,000.

**Cornell Institute for Digital Agriculture (CIDA).** Real-time Control of On-farm Water Treatment Infrastructure to Enhance Biological Removal of Nonpoint Source Nitrogen Pollution. Lead PI: Matthew Reid. Co-PIs: Scott Steinschneider (Cornell BEE) and Nils Napp (Cornell ECE). 2021-2023. \$150,000 (\$100,000 to Reid Lab).

**Engaged Cornell Program.** Partnering with the City of Ithaca Water Treatment Plant to Understand Sources of Elevated Manganese in the Ithaca Reservoir. Single PI Award. 2020-2021. \$60,000 (\$47,000 to Reid Lab; balance to City of Ithaca Water Treatment Plant).

**Cornell Center for Materials Research (CCMR) JumpStart Program.** Evaluation of iron-impregnated

biochar for removal of arsenic from water. Single PI Award. 2018-2020. \$25,000

**Atkinson Center for Sustainability Academic Venture Fund.** Reducing Inorganic Arsenic Levels in Rice by Appropriate Water Management. Lead PI: Louis Derry. Co-PI: Matthew Reid. 2017. \$84,669 (\$6,857 to Reid Lab).

**Atkinson Center for Sustainability Academic Venture Fund.** Assessing Mercury Use in Indonesian Gold Mining: Socio-Political Interventions and Impacts on Ecosystem and Human Health. Lead PI: Jenny Goldstein. Co-PIs: Tom Pepinsky and Matthew Reid. 2017 - 2019. \$127,000 (\$51,500 to Reid Lab).

#### **Gifts/Private Research Contracts**

**VeriCarbon.** Gift to Reid Lab. 2022. \$7,500

#### **Proposals in Review or in Preparation**

3. Real-Time Control of Edge-of-Field Biofiltration Systems for Nonpoint Source Nutrient Control. \$650,000. To be submitted to USDA-NIFA Agricultural Engineering Program in October 2023. Lead PI: Matthew Reid, Co-PIs: Nils Napp (Cornell), Scott Steinschneider (Cornell).

2. Co-Treatment of Nitrogen and Phosphorus in Lignocellulosic Bioreactors: Simultaneous Redox Control of Denitrification and Polyphosphate Accumulation. \$160,000. New Jersey Sea Grant Consortium. Lead PI: Matthew Reid. Co-PIs: April Gu (Cornell), Ruth Richardson (Cornell)

1. Identification and Biological Mitigation of Methane Emissions from Orphaned and Abandoned Oil and Gas Wells. \$500,000. To be submitted to NSF Environmental Sustainability Program in November 2023. Lead PI: Matthew Reid. Co-PIs: John Albertson (Cornell), Ruth Richardson (Cornell), Azer Yalin (Colorado State University)

#### **Supported Proposals to National User Facilities**

Characterizing Distributions of Arsenic and Sulfur in Rice Plant Material. Cornell High Energy Synchrotron Source (CHESS). 2016 - 2018.

Persistence of Methylarsenic Species in Agricultural Soils. Cornell High Energy Synchrotron Source (CHESS). 2017 - 2019.

Arsenite Complexation by Soil Organic Matter and Implications for Arsenite Oxidation in Rice Paddy Soils. National Synchrotron Light Source II (NSLS-II). 2019-2020.

Couplings between Nitrogen and Carbon Metabolism in Denitrifying Woodchip Bioreactors. Joint Genome Institute Community Science Program. 2020-2022.

Water-soluble organic matter leached from thiol-functionalized biochars: Implications for Arsenic speciation in environmental waters. National High Magnetic Field Laboratory. 2021-2022.

The Role of Iron and Manganese in Degradation of Woody Biomass: Implications for Carbon Availability for Denitrifying Microbes in Denitrifying Bioreactors. National Synchrotron Light Source II (NSLS-II). 2023-2024.

#### **Selected Funding Awarded to Students/Postdocs**

Atkinson Postdoctoral Fellowship in Sustainability awarded to Michael Vega. 2023-2025. \$148,000

NSF Earth Science Postdoctoral Fellowship awarded to Scott Maguffin. 2017 - 2019. \$174,000

Cornell University Cross-Scale Biogeochemistry and Climate IGERT Fellowship awarded to Philip McGuire. 2016 - 2017. \$52,172

## **TEACHING**

CEE/ENGRI 1130: Sustainable Engineering of Energy, Water, Soil, and Air Resources  
Fall 2016, 2017

CEE 6530: Biological Processes  
Spring 2017, 2018

CEE 6530: Water Chemistry for Environmental Engineering  
Fall 2018-2024

CEE 6585: Biogeochemical Reaction Modeling  
Spring 2020

CEE 4530: Laboratory Research in Environmental Engineering  
Spring 2021-2024

ENGRG 1050: Engineering seminar.  
Fall 2017, 2019, 2021

**Nominated for McCormick Advising Award, 2020, 2022.**

## PRESENTATIONS

### Invited Talks and Seminars

18. Effects of Organic Matter on Microbial Arsenic Transformations. CEE Seminar. University of Michigan, Ann Arbor, MI, October 2023.

17. Effects of Dissolved Organic Matter on Arsenic Bioavailability and Biotransformation In Rice Paddy Soils. CEE Seminar. Princeton University, Princeton, NJ, September 2023.

16. Managing Hydrological Variability in Denitrifying Bioreactors through Real-Time Control. Biogeochemistry and Ecosystem Science Seminar, Cornell University, Ithaca, NY, March 2023.

15. Overcoming Carbon Limitation in Subsurface Denitrifying Biofilters for Nonpoint Source Nitrogen Control. Environmental and Water Resources Seminar, University of California - Davis, Davis, CA, February 2023 (virtual).

14. Hydrological and Geochemical Processes Governing Manganese Solubility in the Ithaca Reservoir, Applied Water Research in New York State Seminar Series, New York State Water Resources Institute, Ithaca, NY, February 2023.

13. Overcoming Carbon Limitation in Subsurface Denitrifying Biofilters for Nonpoint Source Nitrogen Control. Environmental Engineering Seminar Series, Syracuse University, Syracuse, NY, December 2022.

12. Nonpoint Source Nutrient Pollution in Agricultural Watersheds: Challenges and Opportunities, Korea Advanced Institute of Science and Technology (KAIST), October 2022 (virtual).

11. Overcoming Carbon Limitation in Denitrifying Biofilter Systems. Environmental Engineering Seminar Series, University of California - Berkeley, Berkeley, CA, October 2022.

10. Redox Oscillations and Nitrogen Removal in Woodchip Bioreactors. Environmental Engineering Seminar Series, Stanford University, Stanford, CA, March 2021 (virtual).

9. Controls on Arsenic Speciation and Bioavailability in Rice Paddy Soils. Earth and Atmospheric Science Colloquium, Cornell University, Ithaca, NY, October, 2019.

8. Effects of Alternate Wetting and Drying on Redox Cycling of Iron and Manganese in Paddy Soils: Implications for (Im)mobilization of Arsenic. USDA Dale Bumpers National Rice Research Center, Stuttgart, AR, February, 2019.

7. Arsenic Biotransformation in Anaerobic Environments, Environmental Science Graduate Program Seminar Series, The Ohio State University, Columbus, OH, March 2017.
6. Methylated Arsenic in Rice and its Origins in the Paddy Soil Microbial Community. Biogeochemistry and Ecosystem Science Seminar, Cornell University, Ithaca, NY, October 2016.
5. Nutrient Dynamics in Soil-Based Wastewater Treatment Systems: Implications for Greenhouse Gas Emissions. Institut des Sciences de la Terre, Université Rhone-Alpes, Grenoble, France, October 2015.
4. Soil-Plant-Microbe Interactions: Implications for Contaminant Removal from Wetland Soils. Department of Civil and Environmental Engineering, Colorado State University, Fort Collins, CO, March 2015.
3. Biogeochemistry of Flooded Soils: Applications to Ecological Engineering. School of Civil and Environmental Engineering, Cornell University, Ithaca, NY, March 2015.
2. Arsenic Dynamics in Aquifers and Rice Paddies of the Mekong Delta. Colloquium on Water Sharing: Development Issues in the Mekong Region, Ho Chi Minh City, Vietnam, November 2014.
1. Dynamics of Volatile Contaminants in Saturated Near-Surface Soils: New Measurement Techniques with Dissolved Gas Tracers. Near-Surface Geophysics Seminar Series. Rutgers University, Newark, NJ, October 2012.

### **Other Oral Presentations**

14. **M.C. Reid**. Effects of Dissolved Organic Matter on Microbial Arsenic Transformations: The Role of Carbon Catabolite Repression. Goldschmidt Conference, Lyon, France, July 2023.
13. **M.C. Reid**. Biogeochemical Factors Associated with Mobilization of Labile Carbon from Woodchips in Denitrifying Bioreactors. AEESP Meeting, St. Louis, MO, June 2022.
12. **M.C. Reid, H. Yoon\*\***, M. Pothier, and A. Poulain. Effect of Thiols and Small Molecules on Kinetics of Arsenite Uptake into Bacteria. Goldschmidt Conference, Honolulu, HI, June 2020. (Cancelled due to Covid-19).
11. **M.C. Reid**. Arsenite complexation by dissolved organic matter and implications for uptake by microorganisms. American Chemical Society National Meeting, Spring 2020, Philadelphia, Pennsylvania, March, 2020. (Cancelled due to Covid-19).
10. The Role of Manganese Abundances in Controlling Arsenic Mobility in Paddy Soils. ASA, CSSA and SSSA International Annual Meeting, San Antonio, TX, November 2019.
9. **P.M. McGuire\*\*** and **M.C. Reid**. Production, Consumption, and Transport of Nitrous Oxide and Methane in Denitrifying Woodchip Bioreactors. AEESP Research and Education Conference, Tempe, Arizona, June 2019.
8. **S.C. Maguffin\*\*\***, **L. Abu-Ali\*\***, A. Woll, L. Smieska, J. Rohila, A. McClung, and **M.C. Reid**. The Role of Manganese Redox Dynamics in Controlling Arsenic Mobility in Paddy Soils, Soil Science Society of America, San Diego, California, January 2019.
7. **P.M. McGuire\*\***, **S. Wang\*\***, and **M.C. Reid**. Pathways for Nitrous Oxide Evasion from Ecosystems at Land-Water Boundaries, Goldschmidt Conference, Boston, MA, August 2018.
6. **M.C. Reid**. Arsenic Methylation under Differing Biogeochemical Regimes, Association of Environmental Engineering and Science Professors (AEESP) Meeting, Ann Arbor, Michigan, June 2017.
5. **M.C. Reid**, P.L. Vo, F. Vallat, L. Falquet, A. Gayout, and R. Bernier-Latmani. The Role of Sulfate-Reducing Bacteria in Arsenic Biomethylation in Rice Paddies: Implications for Uptake into Rice Plants. Goldschmidt Conference, Prague, Czech Republic, August 2015.



4. M. Kang, **M.C. Reid**, M.A. Celia, and D.L. Mauzerall. Influence of abandoned oil and gas wells on methane fluxes between the surrounding soil and the atmosphere. Computational Methods in Water Resources, Stuttgart, Germany, June 2014
3. M. Kang, X. Zhang, **M.C. Reid**, C. Kanno, M. Celia, D. Mauzerall, D. Miller, K. Sun, M. Zondlo, Y. Chen, TC Onstott. Significant methane emissions from abandoned oil and gas wells in northwest Pennsylvania. AGU Fall Meeting, San Francisco, CA, December 2013
2. **M.C. Reid**, R. Tripathee, K.V.R. Schäfer, and P.R. Jaffé. Tidal Influences on Belowground Methane Dynamics in a Mesohaline Coastal Marsh. AGU Fall Meeting, San Francisco, CA, December 2012.
1. **M.C. Reid**, K.V.R. Schäfer, R. Tripathee, and P.R. Jaffé. Linking Porewater Dynamics and Atmospheric Fluxes of Methane in a Tidal Estuarine Marsh. EcoSummit, Columbus, OH, September 2012.

### **Oral Presentations by Students and Postdocs**

Presenting author is underlined. Authors directly supervised at Cornell are marked in **Bold**. The specific relationship is annotated as follows: work from an undergraduate\*, graduate student\*\*, or postdoc\*\*\* in Reid Lab.

5. Y. Sang and **M.C. Reid**. Elevated Manganese in a water-supply reservoir: Spatial-temporal variability, geochemistry, and forecasting. ACS Conference, Chicago, IL, August 2022.
4. H. Yoon and **M.C. Reid**. Kinetic study of microbial arsenite uptake using whole-cell biosensor: Inhibitory effects of thiols and low molecular weight organic molecules. ACS Conference, April 2021 (Virtual).
3. L. Abu-Ali and **M.C. Reid**. Characterization of Rice Grown Under Traditional and Alternative Irrigation Strategies: As, Cd, and Zn Dynamics across Multiple Varieties, Growing Seasons, and Pore Water Chemical Conditions. Soil Science Society of America Annual Meeting, Salt Lake City, UT, November 2021.
2. S.C. Maguffin\*\*\*, J. Rohila, A. McClung, and **M.C. Reid**. Persistence and Plant Uptake of Methylarsenic in Continuously- and Intermittently-Flooded Rice Paddies, 7th International Congress on Arsenic in the Environment, Beijing, China, July 2018.
1. S.C. Maguffin\*\*\*, J. Rohila, A. McClung, and **M.C. Reid**. Effects of Intermittent Draining of Rice Fields on Biogeochemical Redox Processes and Arsenic Mobility, Goldschmidt Conference, Boston, MA, August 2018.

### **Poster Presentations**

30. **S. Echavarria \***, Z. Zhang, S. Steinschneider, N. Napp, and **M.C. Reid**. IoT Control of Denitrifying Woodchip Bioreactors. American Geophysical Union Fall Meeting, Chicago, IL, December 2022.
29. **Z. Zhang \***, S. Echavarria, S. Steinschneider, N. Napp, and **M.C. Reid**. Real-Time Control of a Denitrifying Woodchip Bioreactor. American Geophysical Union Fall Meeting, Chicago, IL, December 2022.
28. **M.C. Reid**, Z. Zhang, P.M. McGuire, S. Steinschneider, N. Napp Complementary Aerobic and Anaerobic Processes Enhance Denitrification at Terrestrial-Aquatic Interfaces by Increasing the Supply of Labile Carbon for Denitrifying Microbes. American Geophysical Union Fall Meeting, Chicago, IL, December 2022.
27. **M.C. Reid**. Links Between Complex Carbon Metabolism and Denitrification in Woodchip Bioreactors. Gordon Research Conference, Environmental Sciences: Water. Holderness, NH, June 2022.
26. L. Abu-Ali, H. Yoon, S Maguffin, J. Rohila, A. McClung, and M.C. Reid. Characterization of Rice Grown Under Traditional and Alternative Irrigation Strategies: As, Cd, and Zn Dynamics across Multiple

Varieties, Growing Seasons, and Pore Water Chemical Conditions. Tri-Societies Annual Meeting, Salt Lake City, Utah, November 2021.

25. **J.K. Israel \***, **P.M. McGuire\*\***, and **M.C. Reid**. Development of a Parsimonious Model for Nitrate Removal in Woodchip Bioreactors under Dynamic Hydrologic and Temperature Conditions. American Chemical Society National Meeting, Philadelphia, PA, March 2020. (Cancelled due to Covid-19)

24. **L. Abu-Ali \*\*** and **M.C. Reid**. Arsenic Complexation By Sulfur Groups in Dissolved Organic Matter. ASA, CSSA and SSSA International Annual Meeting, San Antonio, November, 2019.

23. **P.M. McGuire\*\*** and **M.C. Reid**. Biofilter Woodchip Media Harbor Trapped Gas Phases in the Internal Woodchip Pore Structure that Affect Transport and Atmospheric Flux of Biogenic Greenhouse Gases. AGU Fall Meeting, San Francisco, CA, December 2019.

22. **S.C. Maguffin\*\*\***, **L. Abu-Ali\*\***, A. Woll, L. Smieska, J. Rohila, A. McClung, and **M.C. Reid**. Periodic Dry-downs Affect Interactions between Manganese Redox Dynamics and Arsenic Mobility in Rice Paddy Soils. AGU Fall Meeting, Washington, D.C., December 2018.

21. **P. McGuire\*\***, **J. Israel\***, C. Peterson, M.T. Walter, and **M.C. Reid**. Impacts of Variable Hydrologic Regimes upon Denitrifying Bioreactor Performance. AGU Fall Meeting, Washington, D.C., December 2018.

20. **Simiao Wang\*\*** and **M.C. Reid**. Root-Mediated Gas Transport and Implications for Nitrous Oxide Reduction in Wetland Systems. AGU Fall Meeting, Washington, D.C., December 2018.

19. **P.M. McGuire\*\***, **L. Falk\***, and **M.C. Reid**. Effects of Bubble-Mediated Processes on Nitrous Oxide Dynamics in Denitrifying Bioreactors. AGU Fall Meeting, New Orleans, Louisiana, December 2017.

18. **S.C. Maguffin\*\*\***, A. McClung, J. Rohila, L. Derry, R. Huang, L. Abu-Ali, P.M. McGuire, and **M.C. Reid**. Microbial-driven arsenic cycling in rice paddies amended with monosodium methanearsonate. AGU Fall Meeting, New Orleans, Louisiana, December 2017.

17. **M.C. Reid**, F. Vallat, Y. Wang, R. Bernier-Latmani, and J. Pena. Methylarsenic Sorption to Mackinawite (FeS) and Implications for Methylarsenic Mobility in Wetland Environments. AGU Fall Meeting, New Orleans, Louisiana, December 2017.

16. **M.C. Reid**, L. Falquet, P. Le Vo, Vu Pham, and R. Bernier-Latmani. Field Scale Relationships between Soil Chemistry and Arsenic Abundance and Speciation in Rice . Goldschmidt Conference, Paris, France, August 2017

15. **M.C. Reid** and P.R. Jaffé. Characterizing Gas Transport in Wetland Soil-Root Systems with Dissolved Gas Tracer Techniques. AGU Fall Meeting, San Francisco, CA, December 2016

14. **M.C. Reid**, K. Meibom, L. Donatsch, L. Falquet, A. Mestrot, and R. Bernier-Latmani. Arsenic Methylation by the Sulfate-Reducing Bacterium *Desulfotomaculum acetoxidans*. Goldschmidt Conference, Yokohama, Japan, June 2016

13. **M.C. Reid**, S. Ferrón, and D.T. Ho. Methane Dynamics in two South Florida Mangrove Estuaries: Water-Air Fluxes and Export to the Coastal Ocean. AGU Ocean Sciences Meeting, New Orleans, LA, February 2016

12. **M.C. Reid**, K. Guan, and D.L. Mauzerall. Global Scale Methane Emissions from On-Site Wastewater Management. AGU Fall Meeting, San Francisco, CA, December 2013

11. **M.C. Reid**, D.S. Pal, and P.R. Jaffé. Gas Exchange in the Wetland Rhizosphere: Quantifying Spatial and Temporal Variability at Field Scales with Dissolved Gas Tracer Experiments. AGU Chapman Conference for Soil-mediated Drivers of Coupled Biogeochemical and Hydrological Processes Across Scales. Tucson, AZ, October 2013.

10. **M.C. Reid** and P.R. Jaffé. In situ Measurements of Dissolved Gas Dynamics and Root Uptake in the Wetland Rhizosphere. European Geosciences Union General Assembly, Vienna, Austria, April 2013.
9. **M.C. Reid**, S. Mignotte, S.M. Brink, M. Sengupta, H.T. Godfrey, and D.M. Mauzerall. Household Scale Biogas Digesters: Opportunities for Methane Emissions Reductions from Latrines in Rural Areas of China. Global Methane Initiative Methane Expo, Vancouver, Canada, March 2013.
8. R. Tripathee, **M.C. Reid**, P.R. Jaffé, and K.V.R. Schäfer. Methane Emission from a Restored Wetland at New Jersey Meadowlands, North East USA. AGU Fall Meeting, San Francisco, CA, December 2012.
7. **M.C. Reid** and P.R. Jaffé. Pathways for Volatilization from the Wetland Rhizosphere. EcoSummit, Columbus, OH, September 2012.
6. S. Ferrón, D.T. Ho, V.C. Engel, M. Vazquez-Rodriguez, **M.C. Reid**, L.G. Larsen, W. Anderson, R. Jaffé, and M. Sukop. Dynamics of organic and inorganic carbon in a mangrove-dominated estuarine system (Shark River, Florida). Ocean Sciences Meeting, Salt Lake City, UT, March 2012.
5. **M.C. Reid** and P.R. Jaffé. A Push-Pull Test to Measure Volatilization Fluxes of Organic Pollutants without Flux Chambers. AGU Fall Meeting, San Francisco, CA, December 2011.
4. **M.C. Reid** and P.R. Jaffé. Measurement and Modeling of Volatilization through Wetland Macrophytes. Joint Meeting of the Society of Wetland Scientists, Wetland Biogeochemistry Symposium, and Wetpol. Prague, Czech Republic, July 2011.
3. **M.C. Reid**, D.T. Ho, and P.R. Jaffé. Diurnal Cycles of Trace Gas Transfer through Wetland Macrophytes, AGU Fall Meeting, San Francisco, CA, December 2010.
2. E.A. Variano, V.C. Engel, P.J. Schmieder, **M.C. Reid**, and D. T. Ho. Flow Measurements through natural and degraded regions of the Everglades. AGU Fall Meeting, San Francisco, CA, December 2007.
1. M.J. Krisch, L.R. McCunn, **M.C. Reid**, K. Takematsu, L.J. Butler, F. Blase, and J. Shu. Photodissociation of  $\text{CH}_3\text{OCl}$  and  $\text{HNO}_3$  at 248 nm. American Chemical Society Meeting, Philadelphia, PA, August 2004.

## MENTORING AND ADVISING

### Postdoctoral Scientists

1. Scott Maguffin, 2017 - 2019 (now Assistant Professor, SUNY-Oneonta)
2. Michael Vega, 2023-

### Graduate Students

1. Simiao Wang (M.S., 2019) (now PhD Student at EPFL)
2. Xuhui Zhang (M.S. 2020) (now PhD Student at University of Illinois Urbana-Champaign)
3. Philip Maguire (PhD, 2021) (now research scientist at Superbrewed Food)
4. Anita Sanchez (M.S., 2021) (now PhD student at Freiberg University of Mining and Technology, Germany)
5. Lena Abu-Ali (PhD, 2022) (now Physical Scientist, EPA Office of Water)
6. Hyun Yoon (Ph.D), 2019-
7. Yi Sang (Ph.D), 2019 -
8. Zihao Zhang (Ph.D.), 2021 -
9. Yizhuo Zhang (M.S.), 2022 -
10. River Himmer (M.S., EAS), 2023 -
11. Lizeth Vanessa Silva Contreras (Ph.D), 2023 -

### Undergraduate Students

Unless noted otherwise, all students are from Cornell.

1. Lily Falk, CEE, **ELI Award** (2017-2019) (now at Ramboll Engineering, Princeton, NJ)
2. Natalie Butkevitch, Biology, supervised Honors thesis in Biology (2019-2020) (now MS student at Stony Brook University)
3. Jessica Olsen, CEE, **Rawlings Presidential Research Scholar** (2017 - 2021)
4. Jenna Israel, CEE, **Rawlings Presidential Research Scholar**, supervised honors thesis in Environmental Engineering (2018 -2021) (**now PhD Student at UC-Berkeley**)
5. Jessica Rappaport, University of Michigan, CCMR REU Program (2019) (**now PhD student at Rutgers**)
6. Shreya Vaidya, Chemical and Biological Engineering (2019)
7. Lucy Hurt, CEE (2020)
8. Valentine Starnes, CEE (2020)
9. Valentina Dai, CEE, **ELI Award** (2020 - 2021) (now MS student at UC-Berkeley)
10. Lydia LaGorga, CEE (2020 )
11. Olivia Pietz, Chemistry and Chemical Biology (2021-2022, supervised honors thesis in Chemistry) (**now PhD student at Harvard**)
12. Iva Petrovic, Chemistry and Chemical Biology (2021-2022, supervised honors thesis in Chemistry) (**now PhD student at Rice**)
13. Emily Christiansen, Environmental Science and Sustainability (2021)
14. Aryaman Saksena, Biology (2021) (now research assistant, Stanford University)
15. Sofia Echavarria, ECE, **ELI Award, Semiconductor Research Corporation URP Scholar** (2022 - )
16. Romir Anand, CEE, (2023 - )
16. Gianna Weidman, CEE, **ELI Award** (2023 - )
17. Ava Slade, CEE, (2023 - )
18. Henry Sigel, CEE, (2023 - )

### **Committee Member**

- |   |             |
|---|-------------|
| 1. Yating Li (M.S. Committee member, Cornell CEE)                             | 2018 - 2019 |
| 2. Vicky Wu Li (M.S. Committee member, Cornell CEE)                           | 2018 - 2019 |
| 3. Lingzi Xia (M.S. Committee member, Cornell CEE)                            | 2018 - 2019 |
| 4. Huiyong Li (M.S. Committee member, Cornell CBE)                            | 2017-2018   |
| 5. Zhihang Zhang (M.S. Committee member, Cornell CEE)                         | 2019-2020   |
| 6. Chelsea Morris (Ph.D. Committee member, Cornell BEE)                       | 2015 -2018  |
| 7. Andrew St. James (Ph.D. Committee member, Cornell Microbiology)            | 2017-2021   |
| 8. Peisheng He (Ph.D. Committee member, Cornell CEE)                          | 2019-       |
| 9. Behrooz Azimzadeh (Ph.D. Committee member, Cornell Soil and Crop Sciences) | 2019-       |
| 10. Madeline Karod (Ph.D. Committee member, Cornell BEE)                      | 2021-       |
| 11. Peibo Guo (M.S. Committee member, Cornell CEE)                            | 2021-       |
| 12. Meredith Theus (Ph.D. Committee member, EEB)                              | 2022-       |
| 13. Nayantara Joseph (Ph.D. Committee member, EEB)                            | 2021 -      |

## **PROFESSIONAL MEMBERSHIP AND SERVICE**

### **Organization of Workshops and Conference Sessions**

5. Scientific Committee Member, Pan American Light Sources for Agriculture (PALSA) biannual meeting hosted by the Cornell High Energy Synchrotron Source, July 2023
4. Member, Steering Committee, Biogeochemistry and Ecosystem Science (BESS) Seminar Series, Cornell University, 2022 -
3. Co-Organizer, NSF-funded workshop X-LEAP: Life cycle of the elements: rocks, soils, organisms, environment, hosted at the Cornell High Energy Synchrotron Source, July 2021
2. Session Organizer: H43I: Wetland and Riparian Zone Effects on Water Quality, Quantity, and Ecology in Downstream Waters, AGU Fall Meeting 2016 (Hydrology Section)

1. Session Organizer: B076: The Biogeochemistry of Human Sanitation: Local to Global Carbon, Nitrogen, and Phosphorus Cycling associated with the Containment, Treatment, and Reuse of Human Sanitary Waste, AGU Fall Meeting 2018 (Biogeosciences Section)

#### **Invited Participation in Workshops and Panels**

3. AEESP Workshop on Preparing for the NSF CAREER Proposal, Boston, MA, June 2023
2. Environmental Defense Fund virtual dialogue series on Methane and Health: Accelerating Action to Achieve Climate and Health Goals, virtual, March - May 2023
1. AEESP Strategic Planning meeting, virtual, February 2021

#### **Society Memberships:**

**Member**, American Geophysical Union, Association of Environmental Engineering and Science Professors (AEESP), Geochemical Society, American Chemical Society

#### **Broadening Participation in STEM**

1. Panelist, National Society of Black Engineers (NSBE), Cornell Chapter, Black History Month Roundtable Discussion, Ithaca, NY, February 2022, February 2023

#### **Reviewer**

**Journals.** *Environmental Science & Technology*, *Environmental Science & Technology Letters*, *ACS ES&T Water*, *ACS Earth and Space Chemistry*, *Water Research*, *Nature Climate Change*, *Nature Food*, *Nature Sustainability*, *ISME Journal*, *Geochimica et Cosmochimica Acta*, *Biotechnology and Bioengineering*, *Advances in Water Resources*, *Journal of Geophysical Research: Biogeosciences*, *Journal of Geophysical Research: Atmosphere*, *Global Change Biology*, *Geobiology*, *Frontiers in Environmental Chemistry*, *Soil Science Society of America Journal*, *Journal of Environmental Quality*, *Agrosystems, Geoscience, and Environment*, *Science of the Total Environment*, *Environmental Pollution*, *Agricultural and Environmental Letters*, *Journal of Hazardous Materials*, *Chemosphere*, *Plant and Soil*, *Ecological Modeling*

#### **Proposals.**

Panelist, NSF Environmental Engineering Program, October 2017; April 2022; May 2023  
*ad hoc reviewer*, National Science Foundation Earth Science Postdoctoral Program, NSF Hydrologic Sciences Program, NSF Geobiology and Low-Temperature Geochemistry Program; Stanford Synchrotron Light Source