Benjamin D. Peterson, Ph.D.

Assistant Professor, University of Wisconsin - Milwaukee
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Education

University of Wisconsin - Madison Madison, WI
Ph.D. in Environmental Chemistry and Technology Program August 2021
Department of Civil and Environmental Engineering
Thesis: "Ecophysiology of mercury-methylating organisms in freshwater ecosystems"

State University of New York at Geneseo Geneseo, NY
Bachelor of Science, *summa cum laude* Biochemistry May 2012
Honors Minor (Edgar Fellows Honors Program)

Employment and Research Experience

Assistant Professor August 2024 - current
University of Wisconsin - Milwaukee
School of Freshwater Science

Postdoctoral Scholar June 2022 - August 2024
University of California - Davis PI: Dr. Brett Poulin
Department of Environmental Toxicology

Postdoctoral Research Assistant August 2021 - May 2022
University of Wisconsin - Madison PI: Dr. Katherine McMahon
Department of Bacteriology

Graduate Research Assistant September 2015 - August 2021
University of Wisconsin - Madison PI: Dr. Katherine McMahon
Departments of Bacteriology and Civil & Environmental Engineering

Research Fellow, Animal Biologist Contractor 2012-2015
National Institute on Aging: Neuroplasticity and Behavior Unit PI: Dr. Henriette van Praag

Undergraduate Research Assistant: SUNY-Geneseo 2009-2012

Summer Undergraduate Research Assistant: University of Buffalo Summer 2011

Major Grants and Funding

Discovery and Innovation Grant - University of Wisconsin - Milwaukee 2024-2026
Microbial physiology of mercury methylation
Role: Principal Investigator
Funded amount: $62,064

DOE Joint Genome Institute New Investigator Community Science Project 2023-current
Influence of labile permafrost dissolved organic matter on mercury-methylating organisms
Role: Principle Investigator

Roland L. Girolami Fellowship Award - UW-Madison Dept. of Bacteriology 2020-2021
Funding covered 1 year of graduate stipend ($34,000) and $2000 for research expenses.

National Science Foundation Standard Grant - CBET 2020-2023
Unrecognized microbial sources of methyl mercury in freshwater lakes
Role: Key Personnel, wrote first draft, co-editing with PI McMahon
Funded amount: $329,608

NIWR/USGS National Competitive Grant Program 2019-2022
Microbial drivers of mercury methylation in freshwater eutrophic systems
Role: Key Personnel, wrote first draft, co-editing with PI McMahon
Funded amount: $221,160

National Science Foundation Graduate Research Fellowship Program 2016-2021

Publications

* indicates co-first authorship
** indicates undergraduate student mentee

Peer-reviewed

1. **Peterson, B.D.**, and Poulin, B.A. "Illuminating the black box: Trace element biogeochemistry from a microbial perspective." Environmental Science & Technology 59, no. 42 (2025): 22373–85. https://doi.org/10.1021/acs.est.5c06816.
2. Armstrong, G.J., Janssen, S.E., Lepak, R.F., Rosera, T.J., **Peterson, B.D.**, Cushing, S.T., Tate, M.T., Hurley, J.P. (2025) "Seasonal stratification drives bioaccumulation of pelagic mercury sources in eutrophic lakes." *ACS EST Water*, acsestwater.5c00028. https://doi.org/10.1021/acsestwater.5c00028.
3. **Peterson, B.D.**, Janssen, S.E., Poulin, B.A., Ogorek, J.M., White, A.M., McDaniel, E.A., Marick, R.A, Armstrong, G.J., Scheel, N.D., Tate, M.T., Krabbenhoft, D.P., McMahon, K.D. (2025). "Sulfate reduction drives elevated methylmercury formation in the water column of a eutrophic freshwater lake." *Environmental Science & Technology*, **59**(13), 6799-6811. https://doi.org/10.1021/acs.est.4c12759.
4. Krause, V.M., Baldwin, A.K., **Peterson, B.D.**, Krabbenhoft, D.P., Janssen, S.E., Willacker, J.J., Eagles-Smith, C.A., Poulin, B.A. (2024). "Riparian methylmercury production increases riverine mercury flux and food web concentrations." *Environmental Science & Technology*, **58**(46), 20490–20501. https://doi.org/10.1021/acs.est.4c08585
5. Cook, B.A., **Peterson, B.D.**, Ogorek, J.M., Janssen, S.E., Poulin, B.A. (2024). "Simulated sea level rise in coastal peat soils stimulates mercury methylation." *ACS Earth and Space Chemistry*, **8**(9), 1784–1796. https://doi.org/10.1021/acsearthspacechem.4c00124
6. **Peterson, B.D.**, Poulin, B.A., Krabbenhoft, D.K., Tate, M.T., Baldwin, A.K., Naymik, J., Gastelecutto, N., McMahon, K.D. (2023). "Metabolically diverse microorganisms mediate methylmercury formation under nitrate-reducing conditions in a dynamic hydroelectric reservoir." *The ISME Journal*, **17**, 1705–1718. https://doi.org/10.1038/s41396-023-01482-1

7. **Peterson, B.D.**, Krabbenhoft, D.K., McMahon, K.D., Ogorek, J.M., Tate, M.T., Orem, W.H., Poulin, B.A., (2023). "Environmental formation of methylmercury is controlled by synergy of inorganic mercury bioavailability and microbial mercury-methylation capacity." *Environmental Microbiology*, **25**(8) 1409-1423. https://doi.org/10.1111/1462-2920.16364.
8. Vivar, C., **Peterson, B.D.**, Pinto, A., Janke, E., and van Praag, H. (2023). "Running throughout middle-age keps old adult-born neurons wired." *eNeuro* **10**(5) ENEURO.0084-23.2023. https://doi.org/10.1523/ENEURO.0084-23.2023.
9. Capo, E., **Peterson, B.D.**, Kim, M., Jones, D.S., Acinas, S.G., Amyot, M., Bertilsson, S., et al., (2023). "A consensus protocol for the recovery of mercury methylation genes from metagenomes." *Molecular Ecology Resources* **23**(1), 190–204. https://doi.org/10.1111/1755-0998.13687.
10. Berg, S.M., **Peterson, B.D.**, McMahon, K.D., and Remucal, C.K., (2022). "Spatial and temporal variability of dissolved organic matter molecular composition in a stratified eutrophic lake." *Journal of Geophysical Research: Biogeosciences* **127**, e2021JG006550. https://doi.org/10.1029/2021JG006550.
11. Lepak, R.F., Tate, M.T., Ogorek, J.M., DeWild, J.F., **Peterson, B.D.**, Hurley, J.P., Krabbenhoft, D.P., (2020). "Aqueous elemental mercury production versus mercury inventories in the Lake Michigan airshed: Deciphering the spatial and diel controls of mercury gradients in air and water." *ACS ES&T Water* **1**, 719-727. https://doi.org/10.1021/acsestwater.0c00187.
12. **Peterson, B.D.**, McDaniel, E.A., **Schmidt, A.G., Lepak, R.F., Janssen, S.E., Tran P.Q., **Marick, R.A., Ogorek, J.M., DeWild, J.F., Krabbenhoft, D.P., McMahon, K.D. (2020). "Mercury methylation genes identified across diverse anaerobic microbial guilds in a eutrophic sulfate-enriched lake." *Environmental Science & Technology* **54**, 15840-15851. https://doi.org/10.1021/acs.est.0c05435.
13. McDaniel, E.A., **Peterson, B.D.**, Stevens, S.L.R., Tran, P.Q., Anantharaman, K., McMahon, K.D., (2020). "Expanded phylogenetic diversity and metabolic flexibility of mercury-methylating organisms". *mSystems* **5**(4), e00299-20. https://doi.org/10.1128/mSystems.00299-20
14. Mohammad, H., Marchisella, F., Ortega-Martinez, S., Hollos, P., Eerola, K., Komulainen, E., Kulesskaya, N., Freemantle, E., Fagerholm, V., Savontous, E., Rauvala, H., **Peterson, B.D.**, van Praag, H., Coffey, E.T., (2018). "JNK1 controls adult hippocampal neurogenesis and imposes cell-autonomous control of anxiety behaviour from the neurogenic niche." *Molecular Psychiatry* 23, 362–374. https://doi.org/10.1038/mp.2016.203
15. Sah, N., ***Peterson, B.D.**, Lubejko, S.T., Vivar, C., van Praag, H., (2017). "Running reorganizes the circuitry of one-week-old adult-born hippocampal neurons." *Scientific Reports* 7, 10903. https://doi.org/10.1038/s41598-017-11268-z
16. Vivar, C., **Peterson, B.D.**, van Praag, H., (2016). "Running rewires the neuronal network of adult-born dentate granule cells." *NeuroImage* 131, 29–41. https://doi.org/10.1016/j.neuroimage.2015.11.031

Resources and Data Products

1. **Peterson, B.D.**, Janssen, S.E., Tate, M.T., Poulin, B.A., and McMahon, K.D. "Mercury Concentrations and Methylation Rate Potentials in Lake Mendota, Wisconsin, USA: 2020-2021, U.S. Geological Survey Data Release." 2025. https://doi.org/10.5066/P14TO3BL.
2. Hg-cycling Microorganisms in Aquatic and Terrestrial Ecosystems (Hg-MATE) Database: Caitlin Gionfriddo, Eric Capo, **Benjamin D. Peterson**, Heyu Lin, Daniel Jones, Andrea G Bravo, Stefan Bertilsson, John Moreau, Katherine McMahon, Dwayne Elias, Cynthia Gilmour. Version 1. Posted January 29th, 2021

Pre-prints

1. Tran, P.Q., Bachand, S.C., **Peterson, B.D.**, He, S., McMahon, K.D., Anantharaman, K. "Viral impacts on microbial activity and biogeochemical cycling in a seasonally anoxic freshwater lake." bioRxiv, posted April 19, 2023. https://doi.org/10.1101/2023.04.19.537559
2. White, A.M., Gonzalez Vazquez, A., McDaniel, E.A., **Peterson, B.D.**, Koch, P.L., Remucal, C.K., McMahon, K.D. "Expanded diversity of tfdA harboring bacteria across the natural and built environment." bioRxiv, posted September 30, 2022. https://doi.org/10.1101/2022.09.28.509959
3. **Marick, R.A., **Peterson, B.D.**, McMahon, K.D. "Stratification in microbial communities with depth and redox status in a eutrophic lake across two years" bioRxiv, posted October 16, 2021. https://doi.org/10.1101/2021.10.15.464574

Teaching and Mentoring

Instructor of Record - University of Wisconsin - Milwaukee

- Field Analysis and Experimentation in Freshwater Sciences — Fall 2024, 2025

Course contributor

- Teaching Assistant (UC-Davis): Chemistry and Toxicology of Metals — Two quarters
- Teaching Assistant (UC-Davis): CURE - The Arboretum: A Living Laboratory — One quarter
- Teaching Assistant (UW-Madison): Environmental Microbiology — Two semesters

Master's Students — 2025-present

- **Nicole Price** - Quagga mussel impacts on mercury accumulation in Lake Michigan benthic food webs. *Summer 2025 - present*

Undergraduate Mentoring - Peterson Laboratory — 2025-present

- **Grant Probst** - Microbial physiology of mercury methylating organisms. *Spring 2025 - Winter 2025*

Undergraduate Mentoring - Poulin Laboratory — 2022-2024

- **Emily Richter** - Influence of increasing temperatures on methylmercury formation in sediments across ecotypes.

Undergraduate Mentoring - McMahon Laboratory — 2015-2020

- **Anna Schwendinger** - Assisting with routine mercury sampling. *Fall 2019 - Spring 2020*
- **Robert Marick** - Spatial and temporal dynamics of microbial communities along strong redox gradients in Lake Mendota. Preprint posted on bioRxiv. *Summer 2018 - Spring 2020*
- **Anna Grace Schmidt** - Zooplankton-associated microbiome in Lake Mendota. Lead undergrad for Microbial Observatory sampling. *Summer 2017 - Spring 2020*
  - UW–Madison College of Agricultural and Life Sciences Research Award — 2018
  - ASM-Undergraduate Research Fellowship — 2018
  - UW-Madison Sophomore Research Fellowship Award — 2018
- **Diana Mendez** - Impact of zebra mussel feeding on planktonic microbial community *Summer, fall 2017*

- **Ariel Sorg** - Metagenomic characterization of methylotrophic freshwater Betaproteobacteria in Wisconsin, USA. *Summer 2017*
- **Mykala Sobieck** - Assisted with routine mercury sampling *Summer, fall 2016*
- **North Temperate Lakes Microbial Observatory Team** - Led team of 2-4 undergraduates per year in maintaining 20+ year time series. *2017-2019*

Service

IAGLR Annual Conference: Session Co-Chair June 2025
- Lead chair: "Contaminant Cycling in the Great Lakes: From Biogeochemistry to Bioaccumulation"

External Examiner: Ph.D. Dissertation Defense May 2025 - Zohra Zahir, University of Regina

ASLO Summer Conference: Special Session Co-Chair June 2024
- Lead chair of "Mercury Biogeochemistry in a Changing World"

International Conference on Mercury as a Global Pollutant: Special Session Co-Chair 2022
- Co-chair of "Meta-omic and geochemical approaches to linking microbial activity to biogeochemical mercury cycling"

Mersorcium: Organizing Board and Founding Member 2022-2024
- Co-lead Seminar Committee, hosted monthly virtual seminar and workshops during semester

Ad hoc Journal Reviewer: The ISME Journal, Environmental Science and Technology, Environmental Science and Technology Letters,Environmental Science and Technology Water, ACS EST Water, Environmental Science and Pollution Research, Frontiers in Microbiology, Chemosphere, Environmental Research Letters, FACETS, Science of the Total Environment, Geosciences, JGR Biogeosciences, Applied and Environmental Microbiology.

Water at UW Graduate Student Representative 2018-2019

SETAC Young Environmental Scientist meeting: Organizer 2018
- Organized 1-day science communication workshop

O.N. Allan Soil and Environmental Microbiology Small Grants Review Panelist 2018

Postbac IRTA Representative: National Institute on Aging 2013-2015

Geneseo Presidential Scholar: SUNY-Geneseo 2011-2012

Other Grants, Scholarships, Awards, and Honors

NorCal SETAC Distinguished Early Career Scientist Award 2023

Becker Travel Award: $200-250 2016, 2018, 2020

Student Research Travel Grants - Conference: $1500 2018

Anna Grant Birge Memorial Scholarship: $1942 2018

Anna Grant Birge Memorial Scholarship: $1917 2017

Anna Grant Birge Memorial Scholarship: $2000 2016

Phi Beta Kappa 2012

Ulmer-Jackson Biochemistry Award 2012

Goldwater Scholar: $7500 2011

CRC Award to the Best Overall Student in Introductory Chemistry 2009

Geneseo Dean's List 7 semesters

Presentations

Invited presentations

1. Microbial insights into environmental methylmercury formation. **Environmental Engineering Sciences Seminar Series - Northwestern University McCormick School of Engineering**. Evanston, IL, United States. *January 2025*
2. Leveraging microbial communities to understand biogeochemical drivers of mercury methylation. **NorCal SETAC's 31st Annual Meeting**. Sacramento, CA, United States. *September 2023*

Contributed oral presentations

1. Mercury methylating microbes in the Great Lakes. **International Association for Great Lakes Research Annual Conference**. Milwaukee, WI, United States. *June 2025*
2. Unraveling the complex role of sulfate reduction in environmental methylmercury formation. **Association for the Sciences of Limnology and Oceanography Summer Conference**. Madison, WI, United States. *June 2024*
3. Metabolically diverse microorganisms mediate methylmercury formation under nitrate-reducing conditions in a dynamic hydroelectric reservoir. **Hells Canyon Complex TMDL Advisory Committee Meeting**. Virtual meeting. *May 2024*
4. Linking microbial ecophysiology to environmental mercury methylation. **Applied and Environmental Microbiology Gordon Research Seminar**. South Hadley, MA, United States. *July 2023*
5. BONCAT applications for environmental biogeochemistry. **UC-Davis Environmental Biogeochemistry Symposium**. Davis, CA, United States. *July 2023*
6. Microbial and Biogeochemical Controls on Mercury Methylation in the Everglades. **Greater Everglades Ecosystem Restoration Conference**. Coral Springs, FL, United States. *April 2023*
7. Inorganic mercury bioavailability and microbial methylation capacity constraints on *in situ* mercury methylation. **International Conference on Mercury as a Global Pollutant**. Virtual conference. *July 2022*
8. Potential role of PVC microbes in mercury methylation in freshwater lakes. **Webinar on Planctomycetes, Verrucomicrobia, and Chlamydiae**. Virtual conference. *April 2021*
9. Identification of Mercury Methylating Organisms along a Trophic Gradient. **Greater Everglades Ecosystem Restoration Conference**. Virtual conference. *April 2021*
10. Identification of Mercury Methylating Organisms along a Trophic Gradient in the Florida Everglades. **International Symposium on the Biogeochemistry of Wetlands Conference**. Virtual conference. *March 2021*
11. Identification of Mercury Methylating Organisms along a Trophic Gradient. **Society for Environmental Toxicology and Chemistry**. Virtual conference. *November 2020*
12. Novel hgcA+ organisms dominate mercury-methylating community in water column of sulfate-enriched lake. **International Conference on Mercury as a Global Pollutant**. Krakow, Poland. *September 2019*
13. Mercury-methylating organisms in Lake Mendota. **American Water Resources Association Wisconsin Section Annual Meeting**. Delavan, WI, United States. *March 2019*

Internal seminars

1. Microbial drivers of environmental mercury methylation in Lake Mendota, Wisconsin. **School of Freshwater Sciences Colloquium**, University of Wisconsin - Milwaukee. *November 2024*

2. Leveraging microbial ecology to understand the environmental cycling of mercury. **Department of Environmental Toxicology Seminar**, University of California - Davis. *June 1st, 2023*
3. Investigating the microbial influence on mercury methylation in the Florida Everglades. **Center for Limnology Weekly Seminar**, University of Wisconsin - Madison, virtual presentation. *April 2021*
4. Investigating the microbial influence on mercury methylation in the Florida Everglades. **Environmental Chemistry and Technology Weekly Seminar**, University of Wisconsin - Madison, virtual presentation. *February 2021*
5. Identification and activity of mercury-methylating microbes in Lake Mendota. **NTL-LTER Early Career Scientist Meeting**, University of Wisconsin - Madison, virtual presentation. *April 2020*
6. Identification and activity of mercury-methylating microbes in Lake Mendota. **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *March 2020*
7. Mercury-methylating organisms in Lake Mendota. **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *April 2019*
8. Mercury-methylating organisms in Lake Mendota. **Center for Limnology Weekly Seminar**. University of Wisconsin - Madison. *May 2019*
9. Distribution of mercury-methylating microbes along spatial and temporal redox gradients in a freshwater lake. **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *April 2018*
10. Meta-omics, microbes, and freshwater biogeochemistry! Oh My! **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *April 2017*

Poster presentations

1. From a black box to a window: Leveraging microbes to understand environmental mercury cycling. **Applied and Environmental Microbiology Gordon Research Conference**. South Hadley, MA. *July 2023*
2. Distribution of mercury-methylating microbes along spatial and temporal redox gradients in a freshwater lake. **International Society for Microbial Ecology Conference**. Leipzig, Germany. *August 2018*
3. Distribution of mercury-methylating microbes along spatial and temporal redox gradients in a freshwater lake. **SETAC Young Environmental Scientist Meeting**. University of Wisconsin - Madison. *March 2018*
4. Distribution of mercury-methylating microbes along spatial and temporal redox gradients in a freshwater lake. **International Conference on Mercury as a Global Pollutant**. Providence, RI. *July 2017*
5. Spatial distribution of ultramicrobacteria along Lake Erie. **IAGLR's Conference on Great Lakes Research**. Detroit, MI. *May 2017*
6. Vertical distribution of microbial communities during late stratification in a eutrophic, dimictic lake. **International Society for Microbial Ecology Conference**. Montreal, Canada *September 2016*

Professional Development

Geochemist Workbench Virtual Workshop: "GWB Community Edition" February 2023
DELTA Teaching in the College Classroom Spring 2019

Anvi'o Workshop, University of Chicago	April 2017
Data Carpentry Workshop	Fall 2016
DELTA Research Mentorship Training	Summer 2016
EDAMAME bioinformatics workshop	Summer 2016

Society Memberships and Other Affiliations

Berkeley Lab Affiliate at Lawrence Berkeley National Laboratory	2023-current
Association for the Sciences of Limnology and Oceanography	2020-2021, 2023-current
International Society of Microbial Ecology	2018, 2023-current
International Association for Great Lakes Research	2025-current