Benjamin D. Peterson

Graduate Research Assistant, McMahon Lab
1550 Linden Dr · Room 5525 · Madison, WI 53703
bpeterson26@wisc.edu +1 410 980-4660

Education

University of Wisconsin - Madison Madison, WI
PhD candidate in Environmental Chemistry and Technology Program, current
Department of Civil and Environmental Engineering

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

Employment and Research Experience

Graduate Research Assistant 2015-current
McMahon Lab – Departments of Bacteriology and Civil & Environmental Engineering
Ecophysiology of mercury-methylating organisms in freshwater ecosystems

- Dissertation project focuses on combining meta-omics techniques with functional assays and biogeochemical measurements to understand how microbes link biogeochemical cycling to the production of toxic methylmercury in freshwater ecosystems
- Serve as microbial ecology specialist on two large-scale U.S. Geology Survey projects studying mercury cycling in impacted sites (Hells Canyon Reservoir in Idaho and the Florida Everglades)
- Collaborate with USGS Mercury Research Laboratory in Middleton, WI
- Maintain the North Temperate Lakes Microbial Observatory time series

Animal Biologist (Contracter with Kelly's Government Services) 2014-2015
National Institute on Aging: Neuroplasticity and Behavior Unit PI: Dr. Henriette van Praag
Impacts of running on initial integration of adult-born hippocampal neurons

- Designed and led a study to characterize initial integration of new adult-born neurons into hippocampal networks
- Used fluorescent proteins delivered by injection of modified viruses into hippocampus to trace developing neural networks with two-photon microscopy
- Maintained experimental mouse colony

Postbaccalaureate IRTA Research Fellow 2012-2014
National Institute on Aging: Neuroplasticity and Behavior Unit PI: Dr. Henriette van Praag
Tracing impacts of exercise on neuronal integration of adult-born hippocampal neurons

- Performed stereotaxic surgeries, perfusions, and immunohistochemical staining
- Used two-photon microscope to analyze tracings and expression of neurotransmitter receptors and chloride transporters
- Conducted animal behavior experiments
- Developed protocol to trace initial stages of neuronal integration by adult-born hippocampal cells

Undergraduate Research Assistant 2009-2012
State University of New York at Geneseo: Biology Department PI: Dr. George Briggs
Characterization of a Novel Specifier Protein in the Glucosinolate-Myrosinase Pathway in Brassica rapa

- Identified novel protein in the glucosinolate-myrosinase pathway in *B. rapa* and cloned it into E. coli for characterization
- Designed a gas chromatography/mass spectroscopy protocol to identify the effect of the putative specifier protein on the products of the glucosinolate-myrosinase pathway
- Analyzed isothiocyanate production of B. rapa under conditions of stress

Summer Undergraduate Research Assistant Summer 2011
University of Buffalo: Department of Biological Sciences PI: Dr. Denise Ferkey
Impact of G-protein coupled signaling receptors on chemosensation of quinine in C. elegans

- Used behavioral assays to identify TRPV channel necessary for chemosensation of quinine
- Used SNP mapping to identify location of TRPV channel gene

Peer-reviewed publications

* indicates co-first authorship
** indicates undergraduate student I mentored

1. Lepak, RF, Tate MT, Ogorek JM, DeWild JF, **Peterson BD**, Hurley JP, and Krabbenhoft DP. "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, December 30, 2020, acsestwater.0c00187. https://doi.org/10.1021/acsestwater.0c00187.
2. **Peterson, B.D.**, McDaniel EA, **Schmidt AG, Lepak RF, Janssen SE, Tran PQ, **Marick RA, et al. "Mercury Methylation Genes Identified across Diverse Anaerobic Microbial Guilds in a Eutrophic Sulfate-Enriched Lake." Environmental Science & Technology, November 23, 2020, acs.est.0c05435. https://doi.org/10.1021/acs.est.0c05435.
3. 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), https://doi.org/10.1128/mSystems.00299-20
4. 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." Mol Psychiatry 23, 362–374. https://doi.org/10.1038/mp.2016.203
5. 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." Sci Rep 7, 10903. https://doi.org/10.1038/s41598-017-11268-z
6. 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

Pre-prints and submissions

1. **Peterson, B.D.**, McDaniel, E.A., **Schmidt, A.G., Lepak, R.F., Janssen Tran, P.Q., **Marick, R.A., Ogorek, J.M., DeWild, J.F., Krabbenhoft, D.P., McMahon, K.D., 2020. "Mercury methyla-

tion trait dispersed across diverse anaerobic microbial guilds in a eutrophic sulfate-enriched lake". bioRxiv. https://doi.org/10.1101/2020.04.01.018762

Oral presentations

Invited talks

1. Identification of Mercury Methylating Organisms along a Trophic Gradient. **Greater Everglades Ecosystem Restoration Conference**. Coral Springs, Florida. *April 2019*

Contributed talks

1. 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 2020*
2. Mercury-methylating organisms in Lake Mendota. **American Water Resources Association Wisconsin Section Annual Meeting**. Delavan, WI. *March 2019*

Internal Seminars

1. Identification and activity of mercury-methylating microbes in Lake Mendota. **NTL-LTER Early Career Scientist Meeting**, University of Wisconsin - Madison. *April 2020*
2. Identification and activity of mercury-methylating microbes in Lake Mendota. **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *March 2020*
3. Mercury-methylating organisms in Lake Mendota. **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *April 2019*
4. Mercury-methylating organisms in Lake Mendota. **Center for Limnology Weekly Seminar**. University of Wisconsin - Madison. *May 2019*
5. 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*
6. Meta-omics, microbes, and freshwater biogeochemistry! Oh My! **Environmental Chemistry and Technology Seminar**, University of Wisconsin - Madison. *April 2017*

Poster Presentations

1. 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*
2. 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*
3. 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*
4. Spatial distribution of ultramicrobacteria along Lake Erie. **IAGLR's Conference on Great Lakes Research**. Detroit, MI. *May 2017*
5. Vertical distribution of microbial communities during late stratification in a eutrophic, dimictic lake. **International Society for Microbial Ecology Conference**. Montreal, Canada *September 2016*

Teaching and Mentoring

Omic's Study Group lead: Fall 2019

- Metagenomic Assembly study group lead
- Phylogenetic Analysis and Tree-Thinking study group lead

Volunteer Teaching Assistant: Environmental Microbiology: Spring 2019

- Assisted with curriculum development
- Designed new course module on freshwater microbiology with emphasis on hypolimnetic anoxia. Delivered lectures for this portion
- Graded homework
- Provided assistance during in-class group work

Undergraduate Mentor in McMahon Lab 2015-present

- **Anna Schwendinger** - Assisting with routine mercury sampling. *Fa. 2019-current*
- **Robert Marick** - Spatial and temporal dynamics of microbial communities along strong redox gradients in Lake Mendota. *Su. 2018-current*
- **Anna Grace Schmidt** - Zooplankton-associated microbiome in Lake Mendota. Lead undergrad for Microbial Observatory sampling. *Su. 2017-current*
  - 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 *Su-Fa 2017*
- **Ariel Sorg** - Metagenomic characterization of methylotrophic freshwater Betaproteobacteria in Wisconsin, USA. *Su. 2017*
- **Mykala Sobieck** - Assisted with routine mercury sampling program *Su.-Fa. 2016*
- **North Temperate Lakes Microbial Observatory Team** - Led team of 2-4 undergraduates per year in maintaining 20+ year time series. *Su. 2017-current*

Organic Chemistry Tutor and Grader: Chemistry Department, SUNY-Geneseo 2010-2012

- Held office hours and set up private tutoring lessons
- Helped set up curriculum and provided feedback on class progress

Service

Journal Reviewer: Environmental Science and Technology, Environmental Science and Pollution Research.
Water at UW Graduate Student Representative 2018-2019
SETAC Young Environmental Scientist meeting: Organizer 2018
- Organized 1-day science communication workshop
Postbac IRTA Representative: National Institute on Aging 2013-2015
Geneseo Presidential Scholar: SUNY-Geneseo 2011-2012

Grants, Honors, and Awards

Student Research Travel Grants - Conference: $1500 2018
Anna Grant Birge Memorial Scholarship: $1942 2018

Anna Grant Birge Memorial Scholarship: $1917	2017
NSF Graduate Research Fellowship Program	2016-2021
Anna Grant Birge Memorial Scholarship: $2000	2016
Becker Travel Award: $200-250	2016, 2018, 2020
Phi Beta Kappa	2012
Ulmer-Jackson Biochemistry Award	2012
Goldwater Scholar	2011
CRC Award to the Best Overall Student in Introductory Chemistry	2009
Geneseo Dean's List	7 semesters

Professional Development

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

Association for the Sciences of Limnology and Oceanography	2020-current
International Society of Microbial Ecology	2018