Bennett McAfee

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LinkedIn
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Education

University of Wisconsin–Madison, Madison, WI — Jan 2023 – In Progress
Master of Science | Freshwater and Marine Sciences
Advisor: Dr. Paul Hanson, Committee: Dr. Cayelan Carey, Dr. Gretchen Gerrish
Cumulative GPA: 4.00
Related coursework: Lake Metabolism, Ecosystem Concepts, Abrupt Ecological Change, Estuarian Management

Lawrence University, Appleton, WI — Sept 2017 – June 2021
Bachelor of Arts | Biology with minors in Film Studies and Government
Advisor: Dr. Bart De Stasio, Committee: Dr. Judith Humphries, Dr. Andrew Sage
Major GPA 3.85, Cumulative GPA 3.75
Phi Beta Kappa, *magna cum laude* in course, *magna cum laude* in independent study, Dean's List all terms 2017-2021
Related coursework: Experimental Design and Statistics, Aquatic Ecology, Coral Reef Environments, Animal Behavior, Principles of Chemistry, Microbiology, Genetics, Ecological Modelling, and Statistics for Data Science.

Professional and Work Positions

Graduate Research Assistant — Jan 2023 – Present
Center for Limnology, University of Wisconsin–Madison

Data Curator — Jan 2023 – Present
Environmental Data Initiative

Research Technician — Apr 2022 – Nov 2022
Trout Lake Station, Center for Limnology, University of Wisconsin–Madison

Quality Coordinator — Aug 2021 – Apr 2022
Water Quality Association [contract via Actalent]

Content Tutor — Jan 2021 – June 2021
Center for Academic Success, Lawrence University

Lab Assistant — Sept 2020 – Feb 2021
Department of Biology, Lawrence University

Student Research Fellow — June 2020 – Aug 2020
Department of Biology, Lawrence University
Trout Lake Station, Center for Limnology, University of Wisconsin–Madison

Thesis

McAfee, B. J., (2021). *Programming Simulations of Diel Vertical Migration Behavior of Zooplankton* (157) [Lawrence University]. Lawrence University Honors Projects. https://lux.lawrence.edu/luhp/157

Presentations

Oral

McAfee, B. (2024, February 14). *Advancing Understanding of Lake Water Quality Across Space and Time with Modular Compositional Learning* [Oral presentation]. Limnology and Marine Science Seminar Series, University of Wisconsin–Madison, Madison, WI, USA.

McAfee, B. (2020, October 31). *Programming Simulations of Diel Vertical Migration Behavior of Zooplankton* [Oral presentation]. Midstates Consortium for Math and Science.

Posters

McAfee, B., Ladwig, R., Carey, C., Karpatne, A., Lofton, M., Neog, A., Daw, A., Skoglund, S., & Hanson, P. (2024, February 8). *Understanding Water Quality Dynamics of the Lake Water Column using Modular Compositional Learning* [Poster presentation]. NSF Macrosystems Biology Community Virtual Meeting. https://doi.org/10.5281/zenodo.10659628

McAfee, B., Ladwig, R., Carey, C., Karpatne, A., Lofton, M., Daw, A., Neog, A., Skoglund, S., & Hanson, P. (2023, November 7). *Advancing Understanding of Lake Metabolism using Modular Compositional Learning* [Poster presentation]. Water@UW-Madison 2023 Fall Art & Science Poster Session, Madison, WI, USA. https://doi.org/10.5281/zenodo.8287788

McAfee, B., Ladwig, R., Carey, C., Karpatne, A., Lofton, M., Daw, A., Neog, A., Skoglund, S., & Hanson, P. (2023, August 23). *Advancing Understanding of Lake Metabolism using Modular Compositional Learning* [Poster presentation]. [redacted]

McAfee, B. (2021, May 15). *A Light or Depth Situation: Modelling the Vertical Migration of Daphnia* [Poster presentation]. Biofest, Lawrence University, Appleton, WI, USA.

R Packages

McAfee, B. (2023). EDIutilsAddons: Additional functions for interacting with the Environmental Data Initiative repository. R Package version 0.1.5. https://github.com/bmcafee/EDIutilsAddons

McAfee, B. (2022). ZoopCounter: Opens a tally counter designed for counting Zooplankton, but can be used for any tallying purposes. Use ZoopCounter() with a list of names to create a window with the counter. Use and edit keyboard shortcuts to make counting faster. R Package version 0.1.0. https://github.com/bmcafee/ZoopCounter

Licenses and Certifications

Open Water Diver Sept 2019 – non-expiring
Professional Association of Diving Instructors (PADI)

Heartsaver® First Aid CPR AED Sept 2022 – Sept 2024
American Heart Association

Boater Safety Education Apr 2022 – non-expiring
National Association of State Boating Law Administrators
Wisconsin Department of Natural Resources

Research, Field, Lab, and Technical Experience

Significant Research Projects

Ecology Knowledge-Guided Machine Learning Jan 2023 – Present
Role: Graduate student researcher
Institution(s): University of Wisconsin–Madison Center for Limnology, Virginia Tech
Description: Utilized modular compositional learning to model water quality in Lake Mendota (Dane County, WI) to investigate spatial and temporal variance in ecosystem processes including lake metabolism. Also harmonized multiple long-term datasets of lake water quality to create a training dataset for transfer learning experiments.
Skills: Python, R, ecosystem modeling, machine learning

NTL-LTER Lake Phenology Project Apr 2022 – Nov 2022
Role: Research technician
Institution(s): University of Wisconsin–Madison Center for Limnology Trout Lake Station
Description: Collected and analyzed zooplankton community and water quality data in two lakes in Vilas County, WI throughout the summer to understand the effects of ice-off timing on various biotic and abiotic characteristics of lake systems.
Skills: Field sampling with Schindler trap, Wisconsin net, Kemmerer, light meter, multiparameter water quality sonde (YSI), and peristaltic pump. Lab analysis with spectrophotometer for chlorophyll-a, microscopy for zooplankton identification. Data entry and analysis with Microsoft Access and R respectively. Motorboat operation and maintenance.

Diel Vertical Migration (DVM) Project June 2020 – June 2021
Role: Undergraduate researcher (former), collaborator
Institution(s): Lawrence University, University of Wisconsin–Madison Center for Limnology
Description: Used stochastic dynamic programming to model the diel vertical migration behavior of *Daphnia* to understand the influence of various biotic and abiotic characteristics of the system on zooplankton behavior. This led to field experiments of the influence of trophic status on diel vertical migration.
Skills: R, behavioral modeling, field sampling with Schindler trap at night, laboratory DVM experiments

Lake^{View} Hyperspectral Imaging of Lakes Oct 2023 – Present
Role: Assisting graduate student
Institution(s): University of Wisconsin–Madison Center for Limnology
Description: Used hyperspectral imaging equipment mounted to an airplane to capture images of Lake Mendota (Dane County, WI) at the same time that technicians in a boat sampled in situ water quality to bridge the gap between current and future monitoring technologies.
Skills: Water quality sampling, laboratory water quality analysis, laboratory management, motorboat operation

Short-term Field and Lab Experiences

ZOOLOGY 511: Ecology of Fishes Lab 29 Mar 2024
Role: Volunteer field technician
Institution(s): University of Wisconsin–Madison Dept. of Integrative Biology
Description: Assisted the teaching assistants of the Ecology of Fishes lab course in testing and troubleshooting backpack electrofishing equipment. This involved wading in a stream, shocking, netting, and handling fish.
Skills: backpack electrofishing, fish identification

Mercury Mendota ("MerMen") 2-3 Oct 2023
Role: Volunteer field technician
Institution(s): University of Wisconsin–Madison Dept. of Bacteriology
Description: Used mesocosm experiments within Lake Mendota to understand the microbial food web and how mercury is moved through it.
Skills: microbial mesocosms, peristaltic pumps

Satellite Remote Sensing of Algal Blooms in Lake Superior 6-18 July 2023
Role: Volunteer data technician
Institution(s): University of Wisconsin–Madison Center for Limnology
Description: Used Google Earth Engine to create a supervised learning training dataset to detect algal blooms in Lake Superior using satellite imagery.
Skills: Google Earth Engine, supervised learning algorithms

Novel Littoral Habitat after Water Level Rise Survey 22 June 2023
Role: Volunteer field technician
Institution(s): University of Wisconsin–Madison Center for Limnology
Description: Sampled water quality, zooplankton, and macrophyte communities at various points around Fish Lake (Dane County, WI) to understand the impact of drastic water level rise on a small lake
Skills: Limnological field sampling with multiparameter sonde (YSI) and Wisconsin net, macrophyte identification

Spatial Heterogeneity of Water Quality in an Urban Lake 28 Mar 2023
Role: Volunteer field technician
Institution(s): University of Wisconsin–Madison Center for Limnology
Description: Sampled water quality at various points around Lake Wingra (Dane County, WI) to understand the influence of varying urban land use around the lake.
Skills: Limnological field sampling with multiparameter sonde, air quality measurements, motorboat operation

NTL-LTER Macroinvertebrate Survey 6-7 Oct 2022
Role: Volunteer lab technician
Institution(s): University of Wisconsin–Madison Center for Limnology Trout Lake Station
Description: Collected macroinvertebrates and zooplankton from substrate samples collected via Dendy samplers for use in the North Temperate Lakes Long Term Ecological Research program (NTL-LTER) datasets.
Skills: sample preservation, macroinvertebrate identification

NTL-LTER Electrofishing 27-28 July 2022
Role: Volunteer field technician
Institution(s): University of Wisconsin–Madison Center for Limnology Trout Lake Station
Description: Used a shock boat to collected fish for use in the North Temperate Lakes Long Term Ecological Research program (NTL-LTER) datasets. Fish were netted, identified, measured, and weighed.
Skills: Fish handling, fish identification, shock boat use and safety

Fyke Net for Fish Population Estimation 17 May 2022
Role: Volunteer field technician
Institution(s): Wisconsin Department of Natural Resources
Description: Assisted in deploying and retrieving fyke nets to identify, measure, and weigh fish for the purpose of getting population estimates of yellow perch and other fish species in Crystal Lake (Vilas County, WI).
Skills: Fyke net retrieval and deployment, fish handling, fish identification, motorboat operation

BIOLOGY 330: Aquatic Ecology Sep 2019 – Nov 2019
Role: Student
Institution(s): Lawrence University
Description: Undergraduate course in limnology, oceanography, and aquatic ecology that included field and lab experiences.
Skills: Stream flow rate measurement, macroinvertebrate netting and identification, multiparameter water quality sonde (HYDROLAB), Schindler traps, PAR sensor, spectrophotometer for chlorophyll, laboratory animal care and experimental procedure (fish, zebra mussels, zooplankton), data analysis and visualization with R and Excel

Awards

C-R Birge Graduate Travel Award ($490) 22 Feb 2024
Center for Limnology, University of Wisconsin–Madison

Service

Seminar & Kaeser Scholar Committee, co-chair June 2023 – Present
Center for Limnology, University of Wisconsin–Madison

Limnology and Fisheries Society, co-chair Sept 2023 – Present
Center for Limnology, University of Wisconsin–Madison

SCUBA Committee, member Sept 2023 – Present
Center for Limnology, University of Wisconsin–Madison

Trout Lake Station Use & Climate Committee, member Sept 2022 – May 2023
Center for Limnology, University of Wisconsin–Madison

Outreach

Professional

EDI & LTER Network exhibitor booth, ESA 2023 Annual Meeting 7-11 Aug 2023
Clean Lakes Alliance water quality monitoring training event 24 May 2023

Public

UW–Madison Science Expeditions 5 Apr 2024
Hasler Lab Open House 23 June 2023
Trout Lake Station Open House 29 July 2022

Media Coverage, Mentions, and Appearances

Hinterthuer, A. (2023, November 13). Eye in the Sky: Cutting Edge Technology May Change What We Mean When We Say Lake View. *Limnology News*, *Fall 2023*, 6–7.

Mueller, A. (2023, June 5). What a Difference a Day Makes: Lake Mendota Goes From Blue-Green to Crystal Clear. *Water Blogged*.

Hinterthuer, A. (2022, November 21). Limno Launch Breaks Barriers and Builds Connections for Summer Field Season. *Limnology News*, *Fall 2022*, 6–7.

Shubert, S. (2022, August 24). Students join faculty, alums to study microscopic odyssey at northern lake. *Lawrence Magazine*, *Fall/Winter 2022*, 22–23.

Weatherford, C. (2022, July 13). Tiny Invertebrates and The Great Aquatic Migration. *Water Blogged*.

Professional Memberships

Association for the Sciences of Limnology and Oceanography Feb 2024 - Present

Professional References

Dr. Paul Hanson
Distinguished Research Professor
Center for Limnology, University of Wisconsin–Madison
608-320-5322
pchanson@wisc.edu
Note: Served as my academic advisor for my master's thesis

Dr. Gretchen Gerrish
Director of Trout Lake Station
Center for Limnology, University of Wisconsin Madison
608-890-4763
ggerrish@wisc.edu
Note: Served as my employer for two summers at Trout Lake Station, and a committee member for my master's thesis.

Dr. Bart De Stasio
Dennis and Charlot Nelson Singleton Professor of Biological Sciences and Professor of Biology
Lawrence University
920-832-6727
bart.t.destasio@lawrence.edu
Note: Served as my academic advisor, teacher, and employer throughout my undergraduate coursework, and a collaborator throughout my graduate career.