

COLLEEN E. YANCEY

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I am an environmental microbiologist who uses ‘multi-omic’ approaches to understand the biosynthesis of secondary metabolites by cyanobacteria in their native environments, with special interest in Harmful Algal Blooms. I am interested in the role of biogeochemical cycling and microbial interactions in microbial ecology as it pertains to secondary metabolism and chemical interactions between microorganisms. My work uses metagenomic, metatranscriptomic, and metabolomic approaches to link organism, gene cluster, and compound to better understand which organisms are producing which compounds and why in natural communities. My primary research skills include bioinformatic analysis, molecular lab techniques, mass spectrometry, computational analysis in R, Perl, Python, Linux/Unix, and coordinating and executing field work.

EDUCATION

- PhD** Earth and Environmental Sciences, University of Michigan 2018-present
Concentration: Geomicrobiology (GPA 4.0)
Dissertation: “*The biosynthetic repertoire of Microcystis aeruginosa in western Lake Erie Harmful Algal Blooms: Insights into known and novel compound synthesis in a natural population using a ‘multi-omic’ approach*”
Committee: Gregory J. Dick (adviser), Rose Cory, Jenan Kharbush, Reagan Errera, David H. Sherman
- BS** Biological Sciences, University of Vermont May 2018
Cum Laude (3.92 GPA), Honor’s College Graduate

HONORS AND AWARDS

- Susan Lipschutz Award** 2021
Rackham Graduate School, University of Michigan
\$8500 award to an exceptional female graduate student
- NSF Graduate Research Fellowship (NSF GFRP) Honorable Mention** 2020
- 1st Place Poster Presentation at MGU Research Symposium** 2019
University of Michigan
1st place cash prize (\$500) for best poster in Climate and Environment at Michigan Geophysical Union Research Symposium
- Bernd Heinrich Award** 2018
University of Vermont
Awarded to outstanding senior in the Department of Biology for exceptional research
- America East Conference Presidential Scholar** 2018
NCAA Division I America East Conference
Awarded to graduating student athletes with minimum GPA of 3.85
- Presidential Scholarship** 2014-2018
University of Vermont
Highest financial scholarship awarded based on merit

Dean's List <i>University of Vermont</i> Awarded Dean's List designation every semester of undergraduate studies	2014-2018
America East Commissioner's Honor Roll <i>University of Vermont</i> Awarded designation every semester of undergraduate studies	2014-2018

FUNDING AND FELLOWSHIPS

Rackham Doctoral Research Grant <i>Rackham Graduate School, University of Michigan</i> \$3000 award for research	Summer, 2022
Rackham Predoctoral Fellowship Award <i>Rackham Graduate School, University of Michigan</i> one year of fellowship support for outstanding doctoral candidates working on dissertations that are unusually creative, ambitious, and impactful during their final year of doctoral study	2022-2023
Geosciences Stewart R. Wallace Fellowship <i>Department of Earth and Environmental Science, University of Michigan</i> Stipend Support for Graduate Studies	Summer 2022
IAGLR Travel Grant <i>International Association for Great Lakes Research, Ann Arbor, MI, USA</i> \$75 award to support conference attendance for research presentations (JASM 2022)	Spring 2022
Rackham Conference Travel Grant <i>Rackham Graduate School, University of Michigan</i> \$900 award to support conference attendance for research presentations (ICTC 2022)	Spring 2022
NSF Advanced Studies Institute on Water Quality and Harmful Algal Blooms in Lake Victoria, Kenya <i>Bowling Green State University</i> Fully funded 3-week research and collaboration in Kisumu Bay, Kenya (Declined due to ongoing SAR-COV2 pandemic)	2021
Rackham Pre-Doctoral Research Grant <i>Rackham Graduate School, University of Michigan</i> \$1500 award for research	2019
Turner Grant <i>Department of Earth and Environmental Science, University of Michigan</i> 1 st place cash prize (\$500) for best poster in Climate and Environment at \$1600 award for research, awarded 2 consecutive years in a row	2018, 2019
Ernest A. Novak Scholarship Fund <i>Department of Earth and Environmental Sciences, University of Michigan</i> Stipend Support for Graduate Studies	2018
Alumni Earth and Environmental Sciences Fellowship <i>Department of Earth and Environmental Sciences, University of Michigan</i> Stipend Support for Graduate Studies	2018

PUBLICATIONS

Colleen E. Yancey, Derek J. Smith, Paul Den Uyl, Osama G. Mohamed, Fengan Yu, Steven A. Ruberg, Justin Chaffin, Kelly Goodwin, Ashootosh Tripathi, David H. Sherman, Gregory J. Dick (2021) Variation of the *mcy* operon and population diversity in a cyanobacterial bloom community reveals dynamics of novel and known *Microcystis* genotypes. *Applied and Environmental Microbiology*. <https://doi.org/10.1128/aem.02464-21>

Gregory J Dick, Melissa B. Duhaime, Jacob T. Evans, Reagan M. Errera, Casey Godwin, Jenan J. Kharbush, Helena S. Nistchky, McKenzie A. Powers, Henry A. Vanderploeg, Kathryn C. Schmidt, Derek J. Smith, **Colleen E. Yancey**, Claire C. Zwiers, Vincent J. Deneff. (2021) The Genetic and ecophysiological diversity of *Microcystis* strains. *Environmental Microbiology*. *Environmental Microbiology*. <https://doi.org/10.1111/1462-2920.15615>

Justin D. Chaffin, John F. Bratton, Edward M. Verhamme, Halli B. Bair, Amber A. Beecher, Caren E. Binding, Johnna A. Birbeck, Thomas B. Bridgeman, Xuexiu Chang, Jill Crossman, Warren J.S. Currie, Timothy W. Davis, Gregory J. Dick, Kenneth G. Drouillard, Thijs Frenken, Hugh MacIsaac, Andrew McClure, R. Michael McKay, Laura A. Reitz, Keara Stanislawczyk, Richard P. Stumpf, Zachary D. Swan, Brenda Synder, Judy A. Westrick, Pengfei Xue, **Colleen E. Yancey**, Arthur Zastepa, Xing Zhou. (2020). The Lake Erie HABs Grab: A binational collaboration to characterize the western basin cyanobacterial harmful algal blooms at an unprecedented high-resolution spatial scale. *Harmful Algae*. <https://doi.org/10.1016/j.hal.2021.102080>

Paul A. Den Uyl, Subba Rao Chaganti, Luke R. Thompson, Reagan M. Errera, Christina M. Preston, William Ussler III, **Colleen E. Yancey**, James M. Birch, Steven A. Ruberg Gregory J. Doucette, Gregory J. Dick, Christopher A. Scholin, and Kelly D. Goodwin (2021). Lake Erie Field Trials to Advance Autonomous Monitoring of Cyanobacterial Harmful Algal Blooms. *Frontiers in Microbiology*. (Submitted)

Colleen E. Yancey, Stephanie M. Juice, Aimee Classen, Lindsay Rustad, Carol E. Adair (2022). The impact of ice storm on mycorrhizal fungi varies by season and mycorrhizal type in a hardwood forest. *Ecosphere*. (Submitted)*

Colleen E. Yancey, Fengan Yu, Ashootosh Tripathi, David H. Sherman, Gregory G. Dick. (2022). Examination of the diverse suite of *Microcystis* Natural Product Genes from a natural population reveals the synthesis of several novel secondary metabolites. *Environmental Microbiology*. (Submitted)

Colleen E. Yancey, Olivia Mathiesen, Gregory J. Dick (2022). W. Lake Erie's hidden cyanobacteria: Insights into the genomic diversity of the ADA clade from natural cyanoHAB populations. *Harmful Algae* (In preparation).

Colleen E. Yancey, Gregory J. Dick (2022). A review of the secondary metabolism of the cyanobacteria genus *Microcystis*: current understandings and advancements in unlocking genomic and chemical diversity. *Applied and Environmental Microbiology*. (In preparation)

*Denotes undergraduate publication

RESEARCH EXPERIENCE

Dissertation, University of Michigan, Ann Arbor, MI, USA
Advisor: Gregory J. Dick

In Progress

- NIEHS Ocean's and Human Health Lake Erie Center for Great Lakes and Human Health – discovery and characterization of new toxin in genomes and metagenomes of bloom forming cyanobacteria
- Harmful Algal Bloom monitoring in Western Lake Erie via weekly sampling, 3G-ESP, HAB Grab collaboration, various auxiliary cruises
- Skills acquired: Bioinformatic Analysis, Scientific Writing, Computational Workflows, High-throughput molecular techniques, Project/lab management

Honor's Thesis, University of Vermont, Burlington, VT, USA 2017-2018

Undergraduate Honor's Researcher, Adair Biogeochemistry Lab

- Completion of Honor's thesis about biogeochemical cycling, mycorrhizal interactions in Hubbard Brook Experimental Forest Ice Storm Experiments
- secured \$5000 funding for completion of research, developed methodology
- Skills Acquired: Scientific Method, Scientific Writing, Biogeochemical Lab Skills, Research Collaboration

Vermont EPSCOR, University of Vermont, Burlington, VT, USA 2016-2017

Intern, Adair Biogeochemistry Lab

- Fully funded research opportunity in 2 NSF funded projects: Research on Adaption and Climate Change (RACC), and Basin Resilience to Extreme Events (BREE)
- secured \$5000 funding for completion of research, developed methodology
- Skills Acquired: Biogeochemical Lab Skills, Research Collaboration, Science Communication

TEACHING EXPERIENCE AND MENTORING

Graduate Student Instructor, University of Michigan F2018, F2019

EARTH 313: Geobiology, Earth and Environmental Science

- Upper level EES course exploring microbial & vertebrate interactions with the Earth
- Taught (2) Lab sections, wrote quizzes, graded homework, exams, labs

Graduate Student Instructor, University of Michigan Su2020

EARTH 296: Intro to Earth and Environment, Earth and Environmental Science

- Completely Virtual Adaptation of Field Camp Course as a result of SARS-Cov-2 Pandemic
- Developed course from ground up: wrote/revised syllabus, taught lab and lecture sections, developed course content including labs, quizzes, projects, grading

Undergraduate Students Advised

- Olivia Mathison, "Assessing the Expression of Novel Biosynthetic Gene Clusters Found in *Dolichospermum* from the 2014 W. Lake Erie Harmful Algal Bloom", May 2021
- Helena Nitschky, "Analysis of Carbon Concentrating Mechanisms in *Microcystis*", May 2022
- Claire Zwiers, Culture Cultivation & Various Lab Techniques, May 2022

PRESENTATIONS

Oral Presentation (15 mins), *Natural Microcystis populations reveal the presence and abundance of truncated mcy operons and microcystins: a continuing source of research for water quality research*, 2022 International Conference on Toxic Cyanobacteria, May 2022.

Oral Presentation (15 mins), *Beyond the Microcystins: A metagenomic approach to detecting biosynthetic gene clusters from a natural western Lake Erie Microcystis Population*, 2022 Joint Aquatic Sciences Meeting, May 2022.

Invited Oral Presentation (30 mins), *Secondary Metabolism of the Toxic Cyanobacteria Microcystis aeruginosa: unlocking chemical secrets and pharmaceutical potential via omics approaches*, International Water Quality Board, April 2022.

Oral Presentation (15 mins), *Examination of the diverse suite of Microcystis Natural Product Genes form a Natural Population Reveals the synthesis of several novel secondary metabolites*, Oceans and Human Health Annual Meeting, October 2021.

Oral Presentation (5 mins) & Poster, *Examining the Diverse Suite of Microcystis Natural Products in Western Lake Erie Harmful Algal Blooms*, 10.5 US HABs Symposium, April 2021.

Oral Presentation (5 mins), *Investigating the Spatial and Temporal Variation of Biosynthetic Capacity of Microcystis Populations*, Oceans and Human Health Annual Meeting, October 2020.

Poster, *Determining the Spatial and Temporal Variation in Natural Product Distribution in Western Lake Erie CHABs: Insights into Microcystis Bioactive Compound Potential*, Michigan Geophysical Union Research Symposium, April 2019.

Poster, *Simulated Ice Storms Reduce mycorrhizal colonization of roots in Northern Hardwood Forests*, University of Vermont Student Research Symposium, March 2018.

Oral Presentation (15 mins), *A soil incubation study to quantify the effects of extreme rain events on denitrification in a Northern Vermont wetland*, Vermont EPSCoR Research Symposium, March 2018.

Oral Presentation, Current research overview to Senator Patrick Leahy and Appropriations Committee and importance of climate change research, August 2017.

Poster, *Northern Forest Mesocosm (NForM) Climate Change Experiment: An analysis on N nutrient loss based on frequency of soil freezing and snow cover*, Vermont EPSCoR Research Symposium, March 2017

PROFESSIONAL TRAINING

Center for Research on Learning and Teaching Training Program

Center for Research on Learning and Teaching (CLRT), University of Michigan, completed: Fall 2021

Description: Pedagogical training and development for graduate students interested in teaching careers, included attending seminars, teaching practices (TA, developing and teaching own lecture), and writing Teaching Statement

CLRT Seminars Attended,

Center for Research on Learning and Teaching, University of Michigan

- Teaching and Evaluating Student Writing F19

- The Science of Learning F19
- Facilitating High Stakes Discussion F20
- Let's Make a Screencast (aid in remote teaching) F20
- Principles and Practices of Anti-Racist Pedagogy F20
- Making Groupwork Work in STEM F21
- Understanding how Stereotype Threat, Imposter Syndrome, and Growth Mindset Affect Student Learning F21

PROFESSIONAL AFFILIATIONS

American Society for Microbiology, 2021-Present
International Association for Great Lakes Research, 2021-Present
Michigan Geophysical Union, 2018-Present

PROFESSIONAL SERVICE

Geo Club President

University of Michigan, 2020-2022

Head of student led organization for undergraduate and graduate students in the department of Earth and Environmental Sciences. Responsibilities include Alumni engagement/networking, running weekly meetings, designing/ordering merchandise, planning and executing department events such as Fall Picnic, Grad Student Retreat, Spring Banquet

URGE (Unlearning Racism in Geoscience) Pod Leader

Earth and Environmental Sciences, University of Michigan, 2022-present

Coordination of URGE meetings to discuss education and implementation

Graduate Student Recruitment Coordinator

Earth and Environmental Sciences, University of Michigan, 2020-present

Planning committee for Earth and Environmental Science recruitment events

Career Panel Planning Committee Member

Earth and Environmental Sciences, University of Michigan, 2020-2021

Planning, coordination, moderation of career events in department

Developmental Chair of Mortar Board Society

Akraia Chapter, University of Vermont, 2017-2018

Facilitation of team focus and development to provide leadership, scholarship, community service and promote the advancement of Women

OUTREACH

AWIS Science Mentor

Forsythe Middle School, Ann Arbor, Michigan, 2019-present

Science Demonstrations

2019-present

Demonstrations at various locations including Young Scientist Expo at Forsythe Middle School, University of Michigan Outreach Days, Longridge Elementary School, Greece, NY

Guest Science Speaker

Longridge Elementary School, Greece, New York, 2018-2021

Longridge is a Title 1 School with high needs

LANGUAGES

English: Native Language

Spanish: Intermediate Listener, Novice Speaker, Intermediate Reading, and Writing

COMPUTATION SKILLS

Programming: Perl, Python, R/R Studio, Linux/Unix, Bash

Applications: Microsoft Office, Adobe Creative Cloud Suite

Platforms: Github, Protocols.io,

OTHER

Former NCAA DI Cross Country, Indoor/Outdoor Track and Field Athlete at the University of Vermont (2014-2018)