Emily M. Wollmuth

PhD Candidate | Department of Microbiology | Cornell University
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SUMMARY

Strong verbal and written communicator. Researcher with knowledge of biology—particularly microbial genomics, bioinformatics, and phylogenetics—and professional writing. Educator passionate about implementing active learning and using evidence-based and inclusive teaching practices.

EDUCATION

August 2023 *(Expected)*
Doctor of Philosophy, Microbiology (Advisor: Dr. Esther Angert)
Cornell University, Ithaca, NY
Concentration in Ecological Genetics and Applied Ecology,
Committee: Dr. Michelle Smith and Dr. Andrew Moeller

May 2017
Bachelor of Science, Biology with Chemistry minor (Advisor: Dr. Presley Martin)
Bachelor of Arts, English with a Professional Writing Concentration (Advisor: Dr. Kristina Deffenbacher)
Hamline University, Saint Paul, MN
University Honors, magna cum laude, departmental honors projects in Biology and English, varsity collegiate tennis

Fall 2015
Study Abroad, Department of English and Related Literature
University of York, York, England, United Kingdom

PROFESSIONAL POSITIONS

2019 – present
Graduate Research and Teaching Assistant
Department of Microbiology, Cornell University, Ithaca, NY
Taught introductory biology and various microbiology courses including teaching incarcerated students in the Cornell Prison Education Program; worked on microbial genomics and biology education research projects while mentoring undergraduate researchers; promoted gender equity in STEM as a board member of Graduate Women in Science; served as president of the departmental organization Field of Microbiology Students and planned graduate student recruitment interview weekend and department social events

2017 – 2019
Assistant Editor, BMC Series Journals
Springer Nature, New York, NY
Managed a portfolio of biology and medical journals; performed submissions checks and pre-publication checks to ensure research ethics standards and submission guidelines were met; facilitated peer review; liaised with authors, editors, and reviewers; trained and mentored new Assistant Editors; wrote for the BMC Series blog and Twitter account to promote the journals

BIOLOGY TEACHING & MENTORING EXPERIENCE

2022 – present **Instructor**
Cornell Prison Education Program, Five Points Correctional Facility, Romulus, NY
Instructor of Record; taught incarcerated students enrolled in community college; designed course content including lectures, labs, assignments, and quizzes
Spring 2023: BIO 101, Essentials of Biology
Fall 2022: BIO 101, Essentials of Biology

2019 – present **Graduate Teaching Assistant**
Department of Microbiology, Cornell University, Ithaca, NY
Led multiple discussion sections each semester; designed and taught various active learning lessons; gave guest lectures; graded and wrote exam questions; tutored students and provided mentoring on study strategies
Spring 2023: BIOMI 1100, Microbiology of College Life
Spring 2022: BIOMI 2900, General Microbiology Lectures
Spring 2021: BIOMI 2900, General Microbiology Lectures
Spring 2020: BIOMI 2900, General Microbiology Lectures
Fall 2019: BIOMI 2500, Public Health Microbiology

Summer 2021 **Microbial Friends and Foes REU Teaching Assistant**
Cornell Institute of Host-Microbe Interactions and Disease, Ithaca, NY
Provided mentorship to 22 undergraduate students from primarily historically excluded backgrounds; organized symposium and panel; provided feedback on research proposals, weekly reports, poster presentations, and oral presentations

2015 – 2016 **Undergraduate Teaching Assistant**
Department of Biology, Hamline University, Saint Paul, MN
Assisted in teaching lab sections; provided feedback and guidance on student presentations, lab reports, experimental design, field work, and data collection
Fall 2016: BIOL 1800, Ecology and Evolution, with lab
Spring 2016: BIOL 1820, Plant and Animal Physiology, with lab
Spring 2015: BIOL 1820, Plant and Animal Physiology, with lab

2014 – 2017 **Lab Course Preparation Assistant**
Department of Biology, Hamline University, Saint Paul, MN
Prepared lab reagents and materials for undergraduate courses including Plant and Animal Physiology, Human Anatomy and Physiology, Microbiology, Molecular Cell Biology, and Biochemistry

OTHER MENTORING EXPERIENCE

Fall 2017 **Head Coach Girls Tennis B-Team**
Cretin-Derham Hall High School, Saint Paul, MN
Coached and mentored over 25 athletes ranging from beginner to intermediate level; organized practices and activities; coordinated with players and parents

Summer 2015 – Summer 2017 **Youth Tennis Coach**
Saint Paul Urban Tennis, Saint Paul, MN
Coached diverse groups of children and teens aged 5-17 years spanning various socioeconomic and cultural backgrounds

Summer 2013 **Youth Tennis Instructor**
City of Savage, Department of Parks and Recreation, Savage, MN

RESEARCH EXPERIENCE

2019 – present **Graduate Research Assistant**
Doctoral dissertation research with Dr. Esther Angert, Department of Microbiology, Cornell University, Ithaca, NY
Characterized the metabolic potential and phylogenetics of bacterial gut symbionts of marine herbivorous fish; completed biology education research examining the impact of 3D-printed models on student learning

2016 – 2017 **Technical Aide**
Internship with Dr. Katie Wlaschin, Corporate Research Materials Laboratory, Biomaterials Group, 3M Company, Saint Paul, MN
Assisted in product development by performing formulation preparation, microbiological assays, and data analysis; contributed to patented work for a xerostomia (dry mouth) relief product; prepared prototypes of a sulfate-reducing-bacteria detection pouch

Summer 2016 **Undergraduate Student Researcher**
NSF REU Summer Intern with Dr. Esther Angert and Dr. David Sannino, Department of Microbiology, Cornell University, Ithaca, NY
Examined the role of thiaminase I, an enzyme involved in the breakdown of vitamin B1, production in bacterial competition

2014 – 2017 **Undergraduate Student Researcher**
HHMI Undergraduate Education Grant funded departmental honors thesis research with Dr. Presley Martin, Department of Biology, Hamline University, Saint Paul, MN
Identified antibiotic resistant bacteria and antibiotic resistance genes in Minnesota soils and explored patterns of antibiotic resistance by land use type; cultured bacteria from soil; trained new student researchers on lab methods

2012 – 2013 **High School Student Researcher**
Independent study project with Dr. Jennifer Bankers-Fulbright, Department of Biology, Augsburg University, Minneapolis, MN
Explored the role of human lung secretions in inhibiting *P. aeruginosa* growth for potential benefit to cystic fibrosis patients; attended Twin Cities Regional Science and Engineering Fair and Minnesota State Science Fair; won Minnesota Academy of Science High School STEM Communicators Award, U.S. Metric Association Award, and U.S. Department of Health and Human Services Award; named alternate and attended International Science and Engineering Fair (ISEF) 2013

Research Mentees

2021 **Comparing Sporulation Genes in *Epulopiscium spp*. and in Other Endospore Forming Bacteria** (Student: Vanessa Chapa, Carthage College)
Compared sigma factors and highly conserved sporulation genes found in *Epulopiscium* spp. with sporulation genes found in other endospore forming bacteria; participant in Microbial Friends and Foes REU

2021 **The Evolution of *Epulopiscium* Morphotypes** (Student: Lauren Griffith, Mansfield University of Pennsylvania)
Explored the evolutionary history of *Epulopiscium* spp. morphotypes using phylogenetic analysis of housekeeping genes; participant in Microbial Friends and Foes REU

2020-2021 **Phylogeny and Metabolic Potential of a Population of Gut Symbionts of *Naso unicornis*** (Student: Alejandro Schmieder, Cornell University)
Investigated the phylogenetic relationships among various morphotypes of *Epulopiscium* a group of large bacterial gut symbionts of surgeonfish; completed biology honors thesis

COMMUNITY SERVICE & LEADERSHIP EXPERIENCE

2021-present **Pen Pal**, Cornell University Write a Researcher High School Outreach Program
2021-2022 **President**, Cornell Field of Microbiology Students (FoMS)
2020-present **Treasurer**, Cornell Graduate Women in Science (GWiS)
2019-2020 **Community Outreach Chair**, Cornell Graduate Women in Science (GWiS)
2016-2017 **President**, Hamline University Biology Club and Beta Beta Beta Chapter
2014-2016 **Copy Editor and Sports Editor**, *The Oracle* Hamline University Student Newspaper
2015 **Inpatient Pharmacy Volunteer**, University of Minnesota Medical Center
2010-2014 **Pediatric ER, Transport Pool, Same Day Surgery Volunteer**, Fairview Ridges Hospital

WORKSHOPS & COURSEWORK

Biology Workshops Designed and Facilitated
2021 Genome Assembly and Annotation, Cornell Department of Microbiology Journal Club

Pedagogical Workshops Designed and Facilitated
2022 Integrating Innovative Technologies in the Classroom, Cornell Center for Teaching Innovation
2021 Effective Grading and Feedback, Cornell Center for Teaching Innovation
2021 Engaging Students in the Online Classroom, Cornell Center for Teaching Innovation
2020 Using Canvas Effectively, Cornell Center for Teaching Innovation
2020 Inclusion in Online Learning, Cornell Center for Teaching Innovation

Biology Workshops Attended
2020 Introduction to Programming for Bioinformatics, Berkeley Center for Computational Biology

Pedagogical Workshops Attended

2023 Teaching Sexual Selection and other Sex and Gender Related Topics, Cornell Project Biodiversify
2023 Inclusive Teaching of LGBTQIA+ Students, Cornell Project Biodiversify
2022 Microbiology by design: Bringing excitement into the microbiology classroom, ASMCUE
2020 Facilitating Effective Classroom Discussions, Cornell Center for Teaching Innovation
2020 Teaching & Learning in the Diverse Classroom Course, Cornell Center for Teaching Innovation
2019 Using Active Learning Strategies in Your Teaching, Cornell Center for Teaching Innovation
2019 Grading Effectively, Cornell Center for Teaching Innovation
2019 Managing Challenging Classroom Situations, Cornell Center for Teaching Innovation
2019 Designing Assignments to Use Primary Literature, Cornell Center for Teaching Innovation
2019 Team-Based Learning, Cornell Center for Teaching Innovation
2019 Facilitating and Evaluating Group Work and Projects, Cornell Center for Teaching Innovation

Relevant Coursework

Evidence-Based Teaching (BIOEE 7600), 3 credits, Cornell University
Computational Approaches for Microbial Systems (BIOMI 6300), 3 credits, Cornell University
Reproducible and Collaborative Data Science in R (NTRES 6940), 2 credits, Cornell University
Computational Biology (PLBIO 6000), 4 credits, Cornell University
Bacterial Genetics (BIOMI 4850), 3 credits, Cornell University
Population Genetics (BTRY 4810), 4 credits, Cornell University
Evolutionary Genetics (BIOEE 4950), 3 credits, Cornell University
Teaching Writing: Theory and Practice (ENG 3720), 4 credits, Hamline University
Scientific Communication Skills (BIOMI 7970), 1 credit, Cornell University
Bacterial Structure and Function (BIOMI 6901), 1 credit, Cornell University
Environmental Microbiology (BIOMI 6902), 1 credit, Cornell University
Bacterial Physiology and Diversity (BIOMI 6903), 1 credit, Cornell University
Bacterial Pathogenesis (BIOMI 6905), 1 credit, Cornell University
Viral Diversity and Ecology (BIOMI 6906), 1 credit, Cornell University

FELLOWSHIPS, GRANTS, & AWARDS

2022 **Conference Travel Grant**, Cornell Graduate School
2020-2022 **Graduate Teaching Fellowship**, Cornell Center for Teaching Innovation
2020-2021 **Outstanding Teaching Assistant**, Cornell College of Agriculture and Life Sciences
2019-2020 **Outstanding Teaching Assistant**, Cornell College of Agriculture and Life Sciences
2017 **Kenyon Award**, for an outstanding senior majoring in biology, Hamline University
2017 **First Place Lund Speaking Competition**, Hamline University Natural Sciences
2017-2018 **Fulbright U.S. Student Program Semi-Finalist**, U.S. Department of State
2014-2017 **MIAC Academic All-Conference**, Varsity Collegiate Tennis Team, Hamline University
2017 **Alison McKee Memorial Award**, for an outstanding coach, Saint Paul Urban Tennis
2016 **Kenyon Scholarship**, awarded for excellence in biology, Hamline University
2015 **Hoffman Award**, for promise in healthcare/teaching professions, Hamline University

2013 **The President's Volunteer Service Award**, AmeriCorps

PUBLICATIONS

C.H. Steingard, **E.M. Wollmuth**, A.N. Murtha, A. Correa III. (2023). Write a Researcher: A Pen Pal Outreach Program for Middle and High School Students. *Accepted in principle to Journal of Microbiology and Biology Education*

E.M. Wollmuth, T.J.L. Sless, M.E. Airey, E.D. France, E.M. Stump, M.A. Sundstrom, R.L. Wilkins, M.K. Smith. (2022). Is Earth Currently Undergoing a Sixth Mass Extinction?. *CourseSource,* https://doi.org/10.24918/cs.2022.19

B. Pardesi, A.M. Roberton, **E.M. Wollmuth**, E.R. Angert, D.I. Rosendale, L.W. White, K.D. Clements. (2022). *Tannockella kyphosi* gen. nov., sp. nov., a member of the family *Erysipelotrichaceae*, isolated from the hindgut of the herbivorous fish *Kyphosus sydneyanus. International Journal of Systematic and Evolutionary Microbiology*, https://doi.org/10.1099/ijsem.0.005374

MANUSCRIPTS SUBMITTED & IN PREPARATION

E.M. Wollmuth, E.R. Angert. Microbial circadian clocks: host-microbe interplay in diel cycles. *Revised and resubmitted to BMC Microbiology*

E.M. Wollmuth, A. Correa III, M. Alvarado Obando, M.K. Smith, D.H. Buckley, K.L. Hefferon, E.R. Angert. Helping students see bacteria in 3D: cellular models increase student learning about cell size and diffusion. *Under review*

PATENTS

A.C. Engler, K.F. Wlaschin, H.C. Cohen, Y. Yang, T.T. Ton, J. Yang, J.D. Oxman, **E.M. Wollmuth**, inventors; 3M Innovative Properties Company, assignee. Oral Articles and Methods of Use, World patent WO/2020/136606, 2020 July 7.

CONFERENCE PRESENTATIONS

E.M. Wollmuth, M. Alvarado Obando, A. Correa III, K.L. Hefferon, D.H. Buckley, E.R. Angert. (2022). The use of 3D printed cell models to improve student understanding of bacterial cell size and physiology in an introductory microbiology course, *Presented at the Society for the Advancement of Biology Education Research Annual Meeting*, Minneapolis, MN, USA.

E.M. Wollmuth, M. Alvarado Obando, A. Correa III, K.L. Hefferon, D.H. Buckley, E.R. Angert. (2022). The use of 3D printed cell models to improve understanding of bacterial cell size and physiology, *Presented at the ASM Conference for Undergraduate Educators*, Virtual.

E.M. Wollmuth, P.F. Martin. (2017) A Survey of Beta-lactam Antibiotic Resistance in Minnesota Soils, *Presented at the National Conference for Undergraduate Research*, Memphis, TN, USA.

E.M. Wollmuth, K. Deffenbacher. (2017) Misapplications of Darwin's *Origin of Species*: Nazi Germany and the Eugenics Movement, *Presented at the National Conference for Undergraduate Research*, Memphis, TN, USA

E.M. Wollmuth, P.F. Martin. (2016) A Survey of Beta-lactam Antibiotic Resistance in Minnesota Soils, *Presented at the National Conference for Undergraduate Research*, Asheville, NC, USA.

E.M. Wollmuth, L.A. Thrun, P.F. Martin. (2015) Ampicillin Resistance in Gram-negative and Gram-positive Bacteria, *Presented at the National Conference for Undergraduate Research*, Cheney, WA, USA.

THESES

E. M. Wollmuth, "A Survey of β-lactam Antibiotic Resistance Genes and Culturable Ampicillin Resistant Bacteria in Minnesota Soils" (2017). *Departmental Honors Projects*. 53. https://digitalcommons.hamline.edu/dhp/53

E. M. Wollmuth, "Darwinian Evolutionary Theory and Constructions of Race in Nazi Germany: A Literary and Cultural Analysis of Darwin's Works and Nazi Rhetoric" (2017). *Departmental Honors Projects*. 67. https://digitalcommons.hamline.edu/dhp/67

BLOGS & WEBSITE PAGES

Highlights of the BMC Series: January 2019. BMC Series Blog, 14 February 2019, https://blogs.biomedcentral.com/bmcseriesblog/2019/02/14/highlights-bmc-series-january-2019/

Bacterial Endospores. *Epulopiscium* Website, Updated April 2021, https://cals.cornell.edu/microbiology/research/active-research-labs/angert-lab/epulopiscium/bacterial-endospores

Bacterial Genomes. *Epulopiscium* Website, Updated April 2021, https://cals.cornell.edu/microbiology/research/active-research-labs/angert-lab/epulopiscium/bacterial-genomes

SKILLS

- **Computation:** genome assembly, quality evaluation, and annotation; phylogenetics; analysis of 16S rRNA sequencing data; data visualization and management; version control with GitHub/git
    - **Languages:** Python, R, Bash/Unix shell, Markdown
- **Laboratory:** aerobic/micro-aerobic bacterial culturing, bacterial transformation, PCR, nucleic acid extraction, molecular cloning, fluorescence microscopy
- **Software:** Geneious, FigTree, MEGA X, Artemis
- **Teaching:** backwards course design, adapting materials for online use, flipped classroom, active learning, designing pre-post assessments, inclusive teaching, student metacognition

SOCIETY MEMBERSHIPS

American Society for Microbiology (ASM)
Society for the Advancement of Biology Education Research (SABER)
Phi Beta Kappa—2017 Inductee
Omicron Delta Kappa—2015 Inductee
Beta Beta Beta—2015 Inductee

PROFESSIONAL SERVICE

Collaboratively reviewed for journals Molecular Ecology, ISME Communications, Animal Microbiome