

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 ecology, phylogenetics, and bioinformatics – 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 ecology 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 journal blog and Twitter account to promote the journals

BIOLOGY TEACHING & MENTORING EXPERIENCE

2022 – present	Instructor <i>Cornell Prison Education Program, Five Points Correctional Facility, Romulus, NY</i> Independently taught a course to incarcerated students enrolled in community college; designed course content including lectures, homework, quizzes, and labs Fall 2022: BIOL 101, Essentials of Biology
2019 – present	Graduate Teaching Assistant <i>Department of Microbiology, Cornell University, Ithaca, NY</i> Led multiple discussion sections each semester; prepared various active learning lessons; gave guest lectures; graded exams and wrote exam questions; tutored students and provided study strategy tips 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 <i>Cornell Institute of Host-Microbe Interactions and Disease, Ithaca, NY</i> 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 <i>Department of Biology, Hamline University, Saint Paul, MN</i> Assisted in teaching lab sections; provided feedback 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 <i>Department of Biology, Hamline University, Saint Paul, MN</i> 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 <i>Cretin-Derham Hall High School, Saint Paul, MN</i> 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 <i>Saint Paul Urban Tennis, Saint Paul, MN</i> Coached diverse groups of children 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 cell 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

2020-2021 **Phylogeny and Metabolic Potential of a Population of Gut Symbionts of *Naso unicornis*** (Student: Alejandro Schmieder)

Investigated the phylogenetic relationships among various morphotypes of *Epulopiscium* a group of large bacterial gut symbionts of surgeonfish; completed biology honors thesis

- 2021 **Comparing Sporulation Genes in *Epulopiscium* spp. and in Other Endospore Forming Bacteria** (Student: Vanessa Chapa)
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)
Explored the evolutionary history of *Epulopiscium* spp. morphotypes using phylogenetic analysis of housekeeping genes; participant in Microbial Friends and Foes REU

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 Facilitated

- 2021 Genome Assembly and Annotation, Cornell Department of Microbiology Journal Club

Pedagogical Workshops 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

- 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
- Teaching Writing: Theory and Practice (ENG 3720), 4 credits, Hamline University
- Reproducible and Collaborative Data Science in R (NTRES 6940), 2 credits, Cornell University
- Computational Biology (PLBIO 6000), 4 credits, Cornell 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
- Bacterial Genetics (BIOMI 4850), 3 credits, Cornell University
- Population Genetics (BTRY 4810), 4 credits, Cornell University
- Evolutionary Genetics (BIOEE 4950), 3 credits, Cornell University

FELLOWSHIPS & AWARDS

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| 2020-2022 | Cornell Center for Teaching Innovation (CTI) Graduate Fellowship |
| 2021 | Outstanding Teaching Assistant , Cornell College of Agriculture and Life Sciences |
| 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 |
| 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

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. Robertson, **E.M. Wollmuth**, K.C. Lee, E.R. Angert, D.I. Rosendale, L.W. White, K.D. Clements. (2022). *Tannockella sydneyana* gen. nov., sp. nov., a member of the family *Erysipelotrichaceae*, isolated from the hindgut of the herbivorous fish *Kyphosus sydneyanus*. *IJSEM*, <https://doi.org/10.1099/ijsem.0.005374>

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](https://patents.google.com/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, April 2021,
<https://cals.cornell.edu/microbiology/research/active-research-labs/angert-lab/epulopiscium/bacterial-endospores>

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

SKILLS

- **Computation:** genome assembly, genome quality evaluation, genome annotation, phylogenetic reconstruction, analysis of 16S rRNA amplicon sequencing data, data parsing, data visualization, data management, version control using GitHub/git
 - **Languages:** Python, Bash/Unix shell, Markdown, R
- **Laboratory:** aerobic/micro-aerobic bacterial culturing, bacterial transformation, PCR, nucleic acid extraction, plasmid cloning, fluorescence microscopy
- **Software:** Geneious, FigTree, MEGA X
- **Teaching:** backwards course design, adapting materials for online use, flipped classroom, 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