Elizabeth McDaniel

Microbiology PhD Student

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Education

University of Wisconsin – Madison *Aug. 2016-present*

Ph.D. candidate in the Microbiology Doctoral Training Program

- Laboratory of Dr. Katherine McMahon, Departments of Bacteriology and Civil and Environmental Engineering

University of Arkansas – Fayetteville *Aug. 2012-May 2016*

Bachelor of Science in Biology with Statistics Minor, Cum Laude Honors

- GPA: 3.71/4.0
- Honors Thesis: Natural Variation of the Ena1p Sodium Pump in *S. cerevisiae*

Research Experience

Graduate Research Assistant *Jan. 2017 - present*

McMahon Lab – Departments of Bacteriology and Civil & Environmental Engineering, University of Wisconsin – Madison, Madison WI

- Dissertation project investigating bacterial communities of engineered wastewater systems using a combination of genome-resolved metagenomics approaches and enrichment culture techniques
- Developing computational workflows and approaches for high-throughput assembly and analysis of freshwater lake metagenomes
- Lab data and systems administrator for storing large-scale metagenomic data and associated metadata

Undergraduate Research Assistant *Aug. 2013-Aug. 2016*

Lewis Lab – Department of Biological Sciences, University of Arkansas, Fayetteville, AR

- Studied the natural variation of stress defense mechanisms in the budding yeast *Saccharomyces cerevisiae,* specifically salt stress
- Developed a protocol for creating transposon deletion libraries in wild strains of *S. cerevisiae*

Summer Undergraduate Research Intern *May-Aug. 2014*

Broach Lab – Department of Biochemistry and Molecular Biology, Penn State Hershey, Hershey, PA

- Investigated interactions and movements of chromosomes during quiescence in the budding yeast *S. cerevisiae* using fluorescence microscopy

Peer-Reviewed Publications

1. McDaniel E.A., Stuecker T.N., Veluvolu M., Gasch A.P., Lewis J.A. **Independent Mechanisms for Acquired Salt Tolerance versus Growth Resumption Induced by Mild Ethanol Pretreatment in *Saccharomyces cerevisiae*.** mSphere. *Editor's Pick.* Nov 2018, 3 (6) e0057418; **DOI:** 10.1128/mSphere.00574-18

Preprints and Submissions

2. Peterson B.D., **McDaniel E.A.,** Schmidt A.G., Lepak R.F., Tran P.Q., Marick R.A., Ogorek J.M., DeWild J.F., Krabbenhoft D.P., McMahon K.D. **Mercury methylation traits dispersed across diverse anaerobic microbial guilds in a eutrophic sulfate-enriched lake.** April 2020. *bioRxiv.* **DOI:** 10.1101/2020.04.01.018762

1. McDaniel E.A., Peterson B., Stevens S.L.R., Tran P.Q., Anantharaman K., McMahon K.D.. **Expanded Phylogenetic Diversity and Metabolic Flexibility of Microbial Mercury Methylation.** Jan. 2020. *bioRxiv.* **DOI:** 10.1101/2020.01.16.909358. *Under Review.*

Datasets, Software, and Teaching Resources (non-peer reviewed)

2. McDaniel E.A. elizabethmcd/R-amplicons: Analyzing 16S Amplicon Data in R Course (Version v1.0). Zenodo. July 2020. http://doi.org/10.5281/zenodo.3942709. Course website at http://elizabethmcd.github.io/R-amplicons/.

1. McDaniel E.A., Anantharaman, K., McMahon K.D. **metabolisHMM: Phylogenomic analysis for exploration of microbial phylogenies and metabolic pathways.** Dec. 2019. *bioRxiv.* **DOI:** 10.1101/2019.12.20.884627.

Oral Presentations

Invited Talks and Plenary Sessions

5. Examining Long-Term Microbial Population Dynamics At Multiple Scales Using Enrichment Bioreactors As Model Ecosystems. **Microbial Ecology and Water Engineering (MEWE) conference**. Hiroshima, Japan. *Nov. 2019.*

4. Expanded Phylogenetic Diversity and Metabolic Flexibility of Microbial Mercury Methylation. Evolution Series Seminar. **University of Wisconsin – Madison JF Crow Institute for the Study of Evolution**. *Sept. 2019.*

3. Integrating Anvi'o Tools into your Workflow: Insights from a Biological Nutrient Removal (BNR) System. **Resolving Microbial Communities at Strain-Level Symposium**. Penryn, UK. *Aug. 2018.*

2. Natural Variation in Yeast Uncovers Novel Regulation of the Ena1p Sodium Pump. **Southeastern Regional Yeast Meeting**. Tuscaloosa, AL. *March 2016.*

1. Natural Variation in Yeast Uncovers Novel Regulation of the Ena1p Sodium Pump. **Southeastern Regional Yeast Meeting**. Little Rock, AR. *March 2015.*

Internal Seminars

3. "Best" Practices in Metagenomic Binning and Annotation. **Computational Biology, Ecology, and Evolution (ComBEE) 'Omics Study Group session**. University of Wisconsin – Madison. ComBEE 'Omics Study Group Session. *Dec. 2019.*

2. Eco-systems biology of a Microbial Community Performing Enhanced Biological Phosphorus Removal. **Microbiology Doctoral Training Program Seminar**. University of Wisconsin – Madison. *Nov. 2018.*

1. Bacterial Communities of Lab-Scale Wastewater Enrichments. **UW-Madison Bioscience Opportunities Preview Weekend Lightning Talk**. *Sept. 2018.*

Virtual Seminars and Plenary Sessions

2. Characterizing Ecological Roles and Interactions of '*Candidatus* Accumulibacter phosphatis' in Wastewater Systems. **MicroSeminar.** *August 2020.*

1. Applying Genome-Resolved Metagenomics to Elucidate the Microbial "Black Box" in Model Wisconsin Lakes. **Incorporating Data Science and Open Science Techniques in Limnology and Oceanography Virtual Summit**. *July 2020.* Recording available at https://bit.ly/2BAOSGC

Poster Presentations

11. ComBEE: Computational Biology, Ecology, and Evolution: Enhancing computational literacy in the life sciences through peer-led study groups. **UW-Madison Data Science Hub Data Science Research Bazaar and Wisconsin Institute for Discovery "Illuminating Discovery" events**. *Jan. & Feb. 2020*. (Poster constructed and presented on behalf of ComBEE Team)

10. Microbiomes of Freshwater Lakes and Engineered Wastewater Systems. **Water @ UW Symposium**. Madison, WI. *Oct. 2018.* (Poster constructed and presented on behalf of McMahon Lab)

9. Expanded Phylogenetic and Metabolic Diversity of Microbial Mercury Methylation. **Department of Bacteriology Raper Symposium**. Madison, WI. *Sept. 2018.*

8. Comparative Genomics of Microbial Mercury Methylation. **International Society of Microbial Ecology Meeting**. Leipzig, Germany. *Aug. 2018.*

7. Long-Term Population Dynamics of '*Candidatus* Accumulibacter phosphatis' in Enhanced Biological Phosphorus Removal Sequencing-Batch Reactors. **Population, Evolutionary, Quantitative Genetics Conference**. Madison, WI. *May 2018.*

6. Comparative Genomics of Microbial Methylmercury Production. **Madison Microbiome Meeting**. Madison, WI. *April 2018.*

5. Comparative Genomics of Microbial Methylmercury Production. **Joint Genome Institute User Meeting: Genomics of Energy and Environment**. San Francisco, CA. *Mar. 2018*

4. Natural Variation in Yeast Uncovers Novel Regulation of the Ena1p Sodium Pump. **Arkansas IDeA Network of Biomedical Research Excellence Meeting**. Fayetteville, AR. *Nov. 2015*

3. Natural Variation in Yeast Uncovers Novel Regulation of the Ena1p Sodium Pump. **27th International Conference on Yeast Genetics and Molecular Biology**. Levico, Terme, Trentino, Italy. *Sept. 2015*

2. Natural Variation in Yeast Uncovers Novel Regulation of the Ena1p Sodium Pump. **South Central Branch of the American Society for Microbiology Joint Meeting**. Fayetteville, AR. *Sept. 2014*

1. Chromosome Interactions in Quiescent Yeast. **Penn State Hershey Summer Undergraduate Research Internship Programs Symposium**. Hershey, PA. *Aug. 2014.*

Honors and Awards

Civil and Environmental Engineering Becker Travel Supplement Award - $500	*Nov. 2019*
O.N. Allen Soil and Environmental Microbiology Small Grants Award - $3,290	*Aug. 2019*
Department of Bacteriology Betley-Allen Fellowship Award	*May 2019*
University of Wisconsin-Madison Student Travel Grant - $600	*April 2019*
Microbiology Doctoral Training Program Travel Award - $1000	*May 2018*
Department of Bacteriology Travel Award - $1000	*May 2018*
Southeastern Regional Yeast Meeting Travel Award - $250	*Mar. 2016*
University of Arkansas Honors College Research Grant - $1200	*Jan. 2016*
University of Arkansas Honors College Travel Grant - $1200	*Aug. 2015*
Southeastern Regional Yeast Meeting Travel Award - $250	*Mar. 2015*
University of Arkansas Honors College Research Grant - $2500	*Jan. 2015*
University of Arkansas Academic Scholarship - $2500	*2014-2015*
ASM South Central Branch Meeting 2nd Place Poster Award	*Sept. 2014*
University of Arkansas Academic Scholarship - $1000	*2013-2014*
University of Arkansas Symphony Orchestra Scholarship - $1000	*2012-2016*
University of Arkansas New Arkansan Non-Resident Tuition Award - $39,040	*2012-2016*

Teaching, Mentoring, and Service

Bioinformatics Workshops (Helper/Teaching Assistant/Instructor/Course Development)
Certified Carpentries Instructor as of June 2019

Virtual Software Carpentry Workshop; *Helper*	*Aug. 2020*
Amplicon Analysis in R Workshop; *Instructor and Developer*	*April 2020*
Virtual Software Carpentry Mini-Workshop; *Helper*	*April 2020*
Research Bazaar Software Carpentry Workshop; *Helper*	*Jan. 2020*
Carpentries Genomics Introduction to R; *Instructor*	*Aug. 2019*
Data Carpentry Workshop Introduction to R; *Instructor*	*June 2019*

Software Carpentry Workshop; *Helper* *June 2019*
Microbiome & Data Science Hubs Git/Github Pages Workshop; *Instructor and Developer* *Mar. 2019*
Resolving Microbial Communities at Strain-Level Resolution Symposium; *Teaching Assistant* *Aug. 2018*
ComBEE Git/Github Pages Workshop; *Instructor and Developer* *Sept. 2017*
ComBEE Anvi'o Workshop; *Teaching Assistant* *May 2017*
ComBEE Git Workshop; *Teaching Assistant* *Mar. 2017*
ComBEE R Study Group Introduction to R; *Instructor and Developer* *Sp. 2017*

Computational Biology, Ecology, and Evolution (ComBEE) Study Group Co-Chair *Jan. 2017-present*
ComBEE is a peer-led group for computational biology researchers on the UW-Madison campus. We hold study groups on the R and python programming languages, current topics in genomics, and host seminars from graduate students, postdocs, and professors on topics broadly ranging in ecology and evolution. Website at combee-uw-madison.github.io.

McMahon Lab Mentoring *2017-present*
Graduate Student Mentor for Undergraduate Students, Research Experience Undergraduate Interns (REUs), and Masters Students carrying out independent projects and/or routine maintenance and sampling

- *Kaela Amundson:* Characterization and Enrichment of Microorganisms Capable of Extracellular Electron Transfer. *Undergraduate Mentee Fa. 2017-Sp. 2018.*
- *Matthew Wolff:* Metagenomics of Freshwater Lake and Engineered Wastewater Microbial Communities. *Undergraduate Mentee Sp.-Fa. 2018*
- *Kali Denis:* Time-Series Analysis of Under-Ice Freshwater Bacterial Communities. *Undergraduate Mentee Sp. 2018.*
- *EBPR Team:* Mentored to date **6 undergraduate** students performing routine maintenance and sampling of lab-scale bioreactors simulating Enhanced Biological Phosphorus Removal (EBPR). Additionally mentored **2 masters** students through their thesis projects on EBPR.

Ad-hoc* Journal Reviewer: *Nature Microbiology, ISMEJ, mSystems *Fa. 2017-present*
Topics in Biotechnology Guest Lecturer on Wastewater Microbial Ecology *Sp. 2020*
Microbiology 551: Senior Capstone Guest Lecturer on 16S Workflows and Bioinformatics *Sp. 2020*
MEWE Multi-Omics Methods for Water Engineering Workshop Developer and Assistant *Nov. 2019*
Microbiology Doctoral Training Program Admissions Committee *Fa. 2019*
Data Science Hub Research Bazaar Planning Committee *Fa. 2019*
Microbiology 304: Biology of Microorganisms Laboratory Teaching Assistant *Sp. 2018*
BIOL 2323: General Genetics Drill Instructor *Sp. 2015*
University of Arkansas Office of Admissions Ambassador *Aug. 2013-Dec. 2015*

Professional Development

Google Career Readiness Data Analyst Challenge *Summer 2020*
- *Google Cloud Essentials Quest Badge*
- *From Data to Insights with Google Cloud Platform Specialization*

DELTA Research Mentor Training *Summer 2019*
Carpentries Instructor Training and Certification *April 2019*
IMG Microbial Genomics and Metagenomics Workshop, FISABIO *June 2017*
Anvi'o Workshop, University of Chicago *April 2017*
Data Carpentry Workshop, University of Wisconsin-Madison *Jan. 2017*

Laboratory and Computational Skills

Laboratory Skills: PCR Amplification and Cloning | Quantitative PCR | Flow Cytometry | Enrichment Culture Techniques and Bioreactor Operation | HPLC Analyte Analysis
Computational Skills: Bash/Unix | R/RStudio | Python | SQL | Git/Github | Google Cloud Platform | High-Throughput Computing (HT-Condor) | 16S Sequencing Preprocessing and Analysis | Metagenomic Assembly, Mapping, Binning, and Quality Assessment | Genome-Resolved Metatranscriptomics | Comparative Genomics (Anvi'o)