

Samantha Miller

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EDUCATION

Yale University Graduate School of Arts and Sciences

August 2021 – Present

Advisor: Dr. Serena Tucci

California State University, Monterey Bay (CSUMB)

August 2017 - May 2021

B.S. Molecular Biology

Overall GPA: 3.69

RESEARCH PROJECTS

- **Graduate Student Research Assistant** *August 2021 - Present*
Yale University
- **Undergraduate Researcher** *March 2019 – May 2021*
California State University, Monterey Bay
Project 1: Functional Genomics of Pesticide Remediating Bacteria
Principal Investigator: Dr. Nathaniel K. Jue
Description: Determine the remediation capacity of pesticide remediating bacterial strains and identify the genes and mechanisms involved in remediation.
Relevant Skills: Protocol development, bacteria culturing, large-scale TECAN growth assays, bacterial DNA extraction, PCR, Illumina MiSeq sequencing and maintenance, R-based data analysis, genome assembly, and genome annotation.

Project 2: Evolution of Sex Changing Fishes
Principal Investigator: Dr. Nathaniel Jue
Description: Determine the genes involved in hermaphroditism of three species of *Serranidae*.
Relevant Skills: Relational database construction, ortholog identification, detection of differentially expressed genes, and positive selection analysis.
- **Undergraduate Researcher and Big Data 2 Knowledge Scholar** *June 2020 - August 2020*
University of California, Santa Cruz
Principal Investigator: Dr. Russ Corbett-Detig
Project: Evolutionary Analysis of the CTCF Gene
Description: Conduct phylogenetic and evolutionary analyses on metazoan orthologs of the highly conserved CTCF gene.
Relevant Skills: Ortholog identification, phylogenetic tree development and analysis, and dN/dS estimation.
- **Undergraduate Researcher** *May 2019 - January 2020*
American Museum of Natural History, New York City
Project 1: Metagenomic Analysis of Myxozoan Parasites in Amazonian Fishes
Principal Investigator: Dr. Mark Siddall
Description: Developed a methodology for targeted amplification of myxozoan DNA from host tissue and characterized the community structure of myxozoans present in fish gills from three Amazonian rivers.

Relevant Skills: DNA extractions using modified kit protocols, PCR, carboxylated bead clean-up, Sanger sequencing, Bioanalyzer electrophoresis, dissection, and command line data analysis.

Project 2: Transcriptomic Characterization of Antimicrobial Peptides Secreted by *Dermatobia hominis* (human botfly)

Principal Investigator: Dr. Mark Siddall

Description: Identified the physiological location of antimicrobial peptide (AMPs) secretion in *D. hominis* larvae and characterized the AMPs through transcriptome sequencing.

Relevant skills: Larval dissection and phenol-chloroform RNA extraction.

Project 3: Archival Crocodile Reclassification

Principal Investigator: Dr. Evon Hekkala

Description: Identified species of Crocodylia for taxonomic reclassification based upon high-throughput DNA sequencing of samples from archival crocodylian specimens.

Relevant Skills: Sample collection from historic crocodylian specimens, historic DNA extraction, PCR, and gel electrophoresis.

- **Course-Based Undergraduate Research Experience** *August 2019 - December 2019*
California State University, Monterey Bay

Project: Metagenomic Analysis of Monterey County Bat Fecal Microbiomes

Principal Investigators: Jennifer Kato and Dr. Arlene Haffa

Description: Determined the species of bacteria present in bat guano from Monterey County through metagenomic sequencing.

Relevant Skills: Biochemical microbiological tests, bacterial DNA isolation, fecal DNA isolation, PCR, carboxylated-bead cleanup, and gel electrophoresis.

HONORS AND AWARDS

- **Barry Goldwater Scholar** *2020*
Amount: \$7,500
The Goldwater Foundation awards this prestigious scholarship to undergraduates in STEM fields who intend to acquire a graduate degree and pursue a career in research. I was 1 of 396 scholars selected from a pool of over 5,000 applicants, and 1 of 2 scholars selected from the California State University system.
- **California State University Agricultural Research Institute** *May 2020*
Data Intensive Fellowship
Amount: \$6,500
I was 1 of 3 undergraduate students awarded this fellowship for research involving big data. I was selected for my proposed research on the functional genomics and transcriptomics of pyrethroid remediating bacteria with Dr. Nathaniel Jue.
- **California State University Council on Ocean Affairs,** *March 2020*
Science, and Technology Award (CSU COAST)
California State University, Monterey Bay
Amount: \$500
I was 1 of 5 undergraduate researchers who received this award from the CSUMB COAST chapter. I was chosen for my proposed work on the functional genomics and transcriptomics of pyrethroid remediating bacteria with Dr. Nathaniel Jue.

- **Undergraduate Research Opportunities Center Scholar** *December 2018 – May 2021*
California State University, Monterey Bay
The UROC Scholars program is a competitive, two-year, mentor-influenced research program that provides professional development opportunities, graduate school preparation, and research courses for students who intend to attend graduate school.
- **School of Natural Sciences Dean’s List** *Spring 2018, Spring 2019-Spring 2020*
California State University, Monterey Bay

PUBLICATIONS

- **Miller, S. L.**, Williams, K. M., Crampton, W., Calegari, B. B. *Metagenomic Analysis of Myxozoan Parasites in Amazonian Fish Gills*. Manuscript in preparation for submission to the Journal of Parasitology.
- **Miller, S. L.**, Williams, K. M. *Transcriptomic Analysis of Antimicrobial Peptides Secreted by Dermatobia Hominis*. Manuscript in preparation for submission to the Journal of Medical Microbiology.
- **Miller, S. L.** *Accommodating Diverse Learning Styles Using Metacognitive Strategies*. Manuscript in preparation for submission to American Biology Teacher.
- **Miller, S. L.**, Machado, M. Y., Jackson, D., Jue, N. K. *Evolution of Hermaphroditism in Perciformes Fish*. Manuscript in preparation for submission to the Journal of Bioinformatics and Comparative Genomics.

ORAL PRESENTATIONS

- **Miller, S. L.** “Functional Genomics of Pyrethroid Remediating Bacteria” *presented at the California State University Agricultural Research Institute Communicating Science and Leadership Conference*. October 2020. Webinar.
- **Miller, S. L.** “Evolution of the CTCF Protein in Metazoa” *presented at the Big Data 2 Knowledge Symposium*. August 2020. Webinar.
- **Miller, S. L.** “Developing Student Leaders” *panel member for the Association of Colleges for Tutoring and Learning Assistance Tutor Forum*. November 2019. Webinar.
- **Miller, S. L.** “Metagenomic Analysis of Myxozoan Parasites in Amazonian Fishes” *presented at the Western Society of Naturalists Annual Meeting*. November 2019. Ensenada, BC, Mexico.
- **Miller, S. L.** “Metagenomic Analysis of Myxozoan Parasites in Amazonian Fishes” *presented at the American Museum of Natural History Summer Research Symposium*. July 2019. New York City, NY.

POSTER PRESENTATIONS

- **Miller, S. L.** “Metagenomic Analysis of Myxozoan Parasites in Amazonian Fishes” *presented at* the California State University Program for Education and Research in Biotechnology Annual Symposium. January 2020. Santa Clara, CA.

TEACHING AND PEDAGOGY

- **Supplemental Instruction Leader** *August 2018 - May 2021*
Cooperative Learning Center, California State University, Monterey Bay
Tutor for Precalculus, Calculus I, Calculus II, Molecular and Cell Biology and Animal Physiology, and Genetics
 - Develop pedagogical strategies to serve diverse populations of my peers, create lesson plans that future tutors can utilize, and construct exercises to help tutors develop metacognitive abilities and enhance adaptability during mandatory tutor training sessions.
 - Tutor drop-in sessions, group sessions, and Peer-Led Undergraduate Study (PLUS) sessions. Devise session plans and strategies that are shared with other tutors and adapted to other courses.
 - Mentor other Genetics tutors to calibrate them with the process of developing PLUS sessions and benchmark their metacognitive capabilities, provide monthly evaluations to mentees, and provide feedback that facilitates the mentee’s development as a tutor.
- **Teaching Assistant** *June 2020 - May 2021*
Department of Biology and Chemistry, California State University, Monterey Bay
Teaching Assistant for Practical Computing for Scientists
 - Develop and adapt pedagogical methodologies for use in an online setting, create and populate a collection of supplementary resources that can be implemented by future teaching assistants.
 - Lead weekly online discussion sessions and provide assistance to students during scheduled class time to minimize preventable coding errors.
Instructional Student Assistant for summer Genetics course
 - Constructed structured lesson plans to support students in an online summer genetics course, created and populated a repository of materials for use by current and future teaching assistants.
 - Taught daily 2-hour discussion sessions during a month-long accelerated genetics course and provided students with supplementary materials to aid in understanding. █

LEADERSHIP

- **Cofounder of the Mentorship Alliance** *July 2020 - present*
California State University, Monterey Bay
Cofounded and established a Mentorship Alliance between CSUMB, UCSC, Oregon State University, Pennsylvania State University, UC Irvine, and the University of Hawai’i at Mānoa
 - Increase the accessibility of impactful mentoring by establishing a scaffolded structure for developing and sharing mentoring practices between partner universities, optimizing university resources to enhance capacity for adaptable high stakes mentoring, and developing mentorship training programs and assessment tools.
- **Cofounder of the Linux Users Group (CSUMBLUG)** *April 2020 - May 2021*
California State University, Monterey Bay

Founded and established the Linux Users Group in the Monterey community

- Cofounder: Provide an environment for community discourse and contribution of ideas to the Linux Project to proliferate the ideals of the Open Source movement as they apply to computing and academia as a whole.
- President of Outreach: Organize computational outreach events targeted both towards the Monterey community and towards youth programs dedicated to improving STEM education, establish a framework and session plans for future coding-based educational events that the club may hold after my departure.

- **Workshop Developer and Facilitator**

“Cadette Coding: Coding Basics”

September 2020

- Developed and facilitated computer science and coding workshops for a Girl Scout troop from rural Salinas, CA that enabled the troop members to obtain their *Cadette Coding for Good* badges. Compiled lesson plans and materials in CSUMBLUG materials database and shared the materials with the troop master for future use.

“Writing IT Up: Key Strategies for Writing Fellowship and Graduate School Applications”

August 2020

- Collaborated with members of the Mentorship Alliance to cofacilitate interactive workshops to provide participants with successful strategies for constructing competitive fellowship and graduate school applications. Developed modules on crafting a benchmark level CV and contacting prospective graduate school faculty mentors. Workshops were held with students in UCSC’s BD2K and STEM Diversity Programs and with UROC Scholars from CSUMB.

“Barry Goldwater Scholarship Information Session”

July 2020

- Collaborated with the UROC program to develop and cofacilitate an information session on the Barry Goldwater Scholarship for potential applicants from CSUMB. Shared my personal experience successfully applying for the Barry Goldwater Scholarship and provided participants with opportunities to assess their resources and sources of support. Relevant materials were compiled and stored in UROC’s internal database.

“Introduction to Git: Command Line Collaboration”

July 2020

- Developed and facilitated an interactive workshop for undergraduate and graduate researchers that provided participants with an introduction to command line interfacing with GitHub. Compiled the lesson plan and supplementary resources in the CSUMBLUG’s publicly accessible GitHub account for use by future facilitators and learners.

“GitHub: An Introduction to Cloud Computing”

July 2020

- Developed and facilitated an interactive workshop for undergraduate and graduate researchers that introduced participants to collaborative computing on GitHub. The lesson plan and supplementary resources are accessible on the CSUMBLUG’s GitHub account for use by future facilitators and learners.

“Python: An Introduction for Big Data”

June 2020

- Co-facilitated a workshop that introduced undergraduate researchers to the fundamentals of Python programming and big data analytics. Compiled the lesson plan and

supplementary resources in the CSUMBLUG's publicly accessible GitHub account for use by future facilitators and learners.

PROFESSIONAL EXPERIENCE

- **Lab Assistant** *March 2020 – December 2020*
Tulare County Public Health Lab
 - Process patient samples for COVID-19 testing, organize and prepare RNA extractions using QiaCube, EZ1, MagNA Pure machines, and prepare large scale RT-PCR runs using ABI 7500 Fast Dx instrument.

TECHNICAL SKILLS AND TRAINING

- Advanced Python programming and shell scripting experience
- Proficient R statistical analysis and figure production skills
- Archival DNA extraction
- DNA and RNA Isolation (Kits and Phenol-Chloroform)
- Bioanalyzer electrophoresis
- Sanger sequencing
- PCR, RT-PCR
- TECAN use and maintenance
- Illumina MiSeq use and maintenance
- Family Educational Rights and Privacy Act certified
- College Reading and Learning Association Certification Level 1
- CITI Responsible Conduct in Research Training in Biological/Biomedical and Physical Sciences