

MICAH K. MADRID
800 22nd St NW, Washington, DC 20052
(760) 396-7040
mmadrid@gwmail.gwu.edu

Education

- 2019-Current Doctor of Philosophy Pre-Candidate in Biomedical Engineering (Efimov Lab)
The George Washington University
- 2015-2019 Bachelor of Science in Biological Sciences, (Tsui Lab)
University of La Verne

Research Experience

- 2019-Current Graduate Research Assistant, Efimov Laboratory
Currently exploring a variety of projects on the molecular to functional level in cardiovascular electrophysiology. The Efimov lab specializes in optical measurements using potentiometric fluorescent probes. I observe localized cardiac function, biochemistry, and apply cellular reprogramming. I collaborate in validating cardiac devices (including implantable pacemakers, and electrical & optical sensors), characterizing engineered heart tissues slices (constructed with iPSC CMs), and with developing next generation biotechnology such as graphene based opto-electrical stimulation.
- 2019 Teaching Assistant, *Vector Construction in Therapeutic Synthetic Biological Research - Course-based*
Semester long research design project dedicated towards teaching students cloning and biological gene circuit construction in therapeutic synthetic biology research. Instructed groups on research design and construction in four main therapeutic project designs with vectors assembled via Gibson Assembly. Projects included: In-vivo production of Quercetin Anti-venom biochemical pathway in *E. coli*, Blood-Coagulating Batroxobin Circuit to Treat Minor Wounds in Hemophilia Patients and Patients on Blood Thinners², In-vivo expression of Beta Chain Protein Engineered Insulin in *E. Coli*, Putative Gene Therapy toolbox targeting mutated APP gene sequence using CRISPR-Cas9 for Alzheimers Treatment¹.
- 2018-2019 Project Coordinator, Research Lead and Thesis Project, *International Genetically Engineered Machine (iGEM)*
In vivo production of engineered Polyethylene Terephthalate (PET) degrading enzymes PETase and MHETase fused with secretion tags and optimized for *E. coli*. Explored potential TAT and Sec-DEPENDENT secretion pathways for enhanced protein secretion. Explored Zero energy RAM pump inspired circulation system for controlled application intended for wastewater systems to reduce to microfiber content in water. Designed entire laboratory workflow and trained first, second, and third year students in molecular biology, website programming, and overall research skills. Increased annual funding by 40% through crowdfunding platform and expanded laboratory team by 20%.
- 2018 Teaching Assistant, *Environmental Microbial Cultivation and Characterization, International Streptomyces Project (ISP) - Course-based*
Utilized variety of characterizing microbiological techniques to isolate and cultivate specific microbial strains. Used selective techniques and media to grow strains with 16S rRNA sequencing and phylogenetic analysis for molecular based confirmation. Aimed to explore novel strains of streptomyces for further antimicrobial research.
- 2017-2018 Teaching Assistant, *Immunotoxicological Mammalian Cell Development - Course-Based*
Observed the effects of everyday unregulated toxicants on the development of Chinese Hamster Ovarian (CHO-K1) cells. Looked at varying concentrations of retinoic acid and sodium arsenite in

the development of CHO cells for cellular analysis with growth curves, fluorescent microscopy imaging and flow cytometry.

- 2017-2018 Research Assistant, *International Genetically Engineered Machine (iGEM)*
Developed chassis of genetic constructs vector and parts for future research into coral bleaching mechanism and solutions within synthetic biology. Proposed a putative Symbiodinium promoter and terminator within vector. Developed Iron (Fe), Copper-Zinc (CuZn), and Magnesium (Mg) superoxide dismutases (SOD) into chassis plasmids, determining levels of resistance to reactive oxygen species (ROS) in the model organism *Chlamydomonas reinhardtii*. Collaboratively designed and programmed a monitoring tank for growth curve, turbidity, and temperature real time analysis.
- 2016-2017 Research Assistant, *International Genetically Engineered Machine (iGEM)*
In vivo production of fatty acid methyl esters in Cyanobacteria utilizing the insect methyltransferase, DmJHAMT for biodiesel production. Explored DNA modifications in *S. Elongatus*, Cyanobacteria for alternative sustainable fuel sources.

Teaching Experience

- 2019 Teaching Assistant, *Molecular Biology (BIO 316)*
Cloning project design to assemble and characterize Synthetic biological circuits via Biobrick and Gibson Assembly, and various biochemical methods of characterization in *E. coli*. Preparation of laboratory bio/chemical reagents and specimen.
- 2018-2019 Peer Tutor, *Academic Success Center STEM*
One-on-one and group-based tutoring.
Biology Subjects: Plant Biology, Cell Biology, Genetics, Molecular Biology and Microbiology
Chemistry Subjects: General Chemistry, Organic Chemistry, Biochemistry and Physical Chemistry
Mathematics Subjects: Calculus 1, 2, and 3
- 2018-2019 Teaching Assistant, *Biochemistry (BIO 314)*
Instrumentation based course for biochemical analysis. Includes Spectrophotometer applications, Gas Chromatography Mass Spectroscopy (GCMS), Bomb Calorimetry, Acid-Base Titration, Nuclear Magnetic Resonance (NMR) Spectroscopy and SDS-PAGE in application of Carbohydrates, Proteins, Lipids and metabolism analysis.
- 2018 Teaching Assistant, *Microbiology (BIO 302)*
Weekly laboratory lecture including lesson and experimental aim and design, organized with PowerPoints. Demonstrated necessary microbial techniques. Monitor for inquiries and technical accuracy. Effectively accomplished semester long course-based research projects, achieving successful isolation of novel strains in labs with 15+ students.
- 2017-2018 Teaching Assistant, *Cellular Biology (BIO 310)*
Demonstrated and explained framework for research including tissue culture, fluorescence microscopy, and cell cycle analysis via BD FACScan, applying cell biology theory, creating connections to environmental toxicology research. Effectively lead semester long course-based research project.

Conferences

- 2018 International Genetically Engineered Machine (iGEM)
A synthetic biology conference and competition, held by the iGEM foundation, a non-profit organization dedicated to education and competition, the advancement of synthetic biology, and the development of interdisciplinary skills, open community, and collaboration. Poster and Oral Presentation.
- 2017 International Genetically Engineered Machine – Poster Presentation

2017 Kleberg Emerging Leaders Conference
Leadership conference based on understanding purpose and connecting networks for future success.

2016 International Genetically Engineered Machine -- Poster Presentation

Community Engagement

2016-2017 Teaching Learning Connection (TLC) at Lexington Elemental STEM Tutor | 3-5 hrs a week.
Assisted in after school program developing the youth in STEM subjects. Created weekly lesson plan to learn science and math through art and design.

Campus Involvements & Leadership

2016-2018 Research Lead, Coordinator, Assistant, *International Genetically Engineered Machine*
2017-2018 President, *Synthetic Biology Collegium*
2017-2018 Peer Mentor, *Guided Pathways to STEM Success, for First Generation Students*
2017-2018 Vice President of Communications, *Associated Students of the University of La Verne (ASULV)*
2017-2018 Senator for College of Arts and Sciences, *ASULV*
2017-2018 Vice President, *Inter-Fraternal Council*
2017 Executive Board, *Phi Delta Theta Fraternity*
2017 Student Leader, *Orientation Week Leader*
2017 Executive Board Communications & Marketing, *Spotlight Weekend Prospective Student Program*
2016-2017 Secretary and Treasurer, *Polynesian Cultural Club*

Computer Languages

R
MATLAB
Cascading Styling Sheets
Hypertext Markup Language

Computer Software

Adobe Creative Suite
R Studio
Microsoft Office
Visual Studio
X-Code
MATLAB
Serial Cloner (Molecular Cloning Software)
Final Cut Pro X (Video Production)
Logic Pro X (Audio Production)

References

Jennifer Tsui | Senior Thesis, Research and Academic Advisor | Known for 3 years
jtsui@laverne.edu
Paris Panayiotopoulos | Director of Ariad Pharmaceuticals | Known for 15 years
p_panayiotopoulos@yahoo.co.uk
Nancy Reyes | Director of First Generation and Peer Mentoring Programs | Known for 2 years
nreyes@laverne.edu