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Milagros Guadalupe Rivera

EDUCATION

University of California, Santa Cruz September 2022 - Present

Ph.D in the Department of Ecology and Evolutionary Biology

Focus: Utilizing whole genome sequence data and other molecular tools for understanding marine mammal evolution and advancing conservation and management

Advised by Drs. Rachel Meyer and Roxanne Beltran

University of California, Santa Cruz September 2019 - June 2022

B.S. Marine Biology, Minor in Bioinformatics

Diablo Valley College September 2013 - May 2019

A.S. Natural Science

FELLOWSHIPS AND SCHOLARSHIPS

2024-25 Mildred E. Mathias Graduate Student Research Grant

December 2024

- A $2.900 research grant sponsored by the University of California Natural Reserve System providing financial support for graduate students conducting field research at any one of the UC natural reserves.

IMS Student Research and Education Award June 2024

- A $1,500 research grant sponsored by the Institute of Marine Science (IMS) that provides financial support for graduate students conducting research and education projects in the marine sciences.

Rebecca and Steve Sooy Graduate Fellowship in Marine Mammals

June 2024

- A research grant providing financial support for UC Santa Cruz graduate students conducting marine mammal research.

American Cetacean Society Research Grant September 2023

- A $2,000 research grant sponsored by the Monterey Bay chapter of the American Cetacean Society that provides financial support for graduate students conducting marine mammal research.

NSF Graduate Research Fellowship Program
September 2022 - Ongoing

- Fellowship program sponsored by the National Science Foundation that supports outstanding graduate students in NSF-supported STEM disciplines. The award of $34,000 is given annually over the course of three years, with an additional $12,000 given to the institution for the cost of attendance.

Gordon Smith Undergraduate Scholarship
June 2021

- An annual memorial scholarship funding undergraduate students in the marine sciences. The award of $2,000 is given to one undergraduate student to help pay for any field equipment or help with covering other research expenses.

Research Mentoring Internship Program
September 2020- June 2022

- The Research Mentoring Internship Program (RMI) is offered by the UCSC Genomics Institute. The program offers financial support for undergraduate students in historically underrepresented groups interested in genomic research. RMI also provides mentored research training and placement in a genomic research laboratory intending to complete a research project under the guidance of a faculty member.

CAMINO Internship
June 2020 - August 2020

- The Center to Advance Mentored, Inquiry-Based Opportunities (CAMINO) summer internship program is designed to assist underrepresented groups in ecology and evolutionary biology. This internship was completed remotely during the summer of 2020, with a stipend of $4,000.

UCSC Alumni Association Scholarship
September 2019 - June 2021

- The UCSC Alumni Association Scholarship provides financial assistance to notable members of the UCSC community. This $1,000 quarterly scholarship applies until graduation.

PROFESSIONAL DEVELOPMENT

Smithsonian-Mason School of Conservation Biology: Bioinformatics Analysis for Conservation Genomics Course
March 2023

- Certificate of completion

SCCWRP 2nd National Workshop on Marine eDNA
September 2022

- Three-day training on environmental DNA capture and analysis training; attended by state and federal government officials interested in environmental management policy involving marine eDNA.

ACADEMIC HONORS

Honors Undergraduate Senior Thesis

Dean's Honors

Received Dean's Honors for over two consecutive quarters.

PUBLICATIONS

- M. N. Munguia Ramos, A. L. Simons, L. Pipes. H. Baez, A. Worth, M. Lin, M. G. Rivera, C. Fairbairn, ... & R. S Meyer. (2025) *eDNA Biodiversity of the Los Angeles River for enabling holistic monitoring and for imagining revitalization. (Manuscript in preparation)*
- M.G. Rivera, M. Escalona, R.S. Meyer, R.S. Beltran,J.C. Garza,C. Miller, D.P. Costa, E. Beraut, C. Fairbairn, S. Sacco, W. Seligmann, R. Sahasrabudhe, O. Nyguen, N. Chumchim, E. Toffelmier, and H. B. Schaffer. (2025) *Whole genome assembly of a deep diving pinniped, the northern elephant seal.* (*Manuscript Submitted*)
- A. A. Ellis, J. N. Beck, E. A. Howard, A. L. Rabearisoa, L. M. Alissa, S. Barasi, ... & D. A. Croll (2024). *Coalition-building for labor actions in life sciences departments: lessons from the largest academic strike in history.* BioScience, https://doi.org/10.1093/biosci/biae123
- M.G. Rivera, Abdel-Raheem, S.T., A.R. Payne, S.K. Sturdivant, N.S. Walker, M.C. Márquez, A. Ornelas, M. Turner, K. Byers, and R.S. Beltran. (2023) *Oceanography's diversity deficit: Identifying and addressing challenges for marginalized groups.* Oceanography 36(4), https://doi.org/10.5670/oceanog.2024.136.

PRESENTATIONS

- **POSTER PRESENTATION:** Rivera, M.G., Abdel-Raheem, S.T. (2024). *Oceanography's diversity deficit: Identifying and addressing challenges for marginalized groups.* Society of Integrative and Comparative Biology, Seattle, WA.
- **POSTER PRESENTATION:** Rivera, M. G., Favilla, A., & Beltran, R. (2022) *Filling the Puzzle: Evaluating 3D Morphometric Measurements of Northern Elephant Seals (Mirounga angustirostris) using LiDAR Imaging.* UCSC Department of Ecology and Evolutionary Biology Research Symposium, Santa Cruz, CA.
- **VIRTUAL POSTER PRESENTATION:** Rivera, M. G. & Favilla, A. (2021) *Comparing Methods of Surface Area and Mass Estimations of Large Marine Mammals.* Center for Biodiversity and Conservation at The American Museum of Natural History, New York City, NY. *(online)*
- **POSTER PRESENTATION:** Rivera, M. G. & Meyer, R. (2021) *Protecting Our River: An Open Science eDNA Project to Enable Creative Revitalization of the Los Angeles River.* RMI Summer Research Symposium, Santa Cruz, CA.
- **VIRTUAL ORAL PRESENTATION:** Rivera, M. G. & Valenzuela-Toro, A. (2021) *Auditory Morphology and Evolution of Ancient Pinnipeds.* UCSC Department of Ecology and Evolutionary Biology Research Symposium, Santa Cruz, CA. (online)
- **VIRTUAL ORAL PRESENTATION:** Rivera, M. G. & Favilla, A. (2020). *What's on the Outside Counts: Comparing Methods of Estimating the Surface Area of*

Juvenile Mirounga angustirostris Using Morphometry vs. Photogrammetry. CAMINO Undergraduate Research Symposium, Santa Cruz, CA.

PREVIOUS RESEARCH EXPERIENCE

Population Genetics and Conservation Management of the Endangered Gaviota Tarplant (*Deinandra increscens*)

March 2022 - Ongoing

- Project leads: Dr. Rachel Meyer, Dr. Susan McEvoy, Santa Barbara Botanical Garden (SSBG)
- Description: Project ongoing; resequencing of over 900 gaviota tarplant DNA extract samples provided by the SSBG. Genome library prep will provide a population connectivity assessment of the gaviota tarplant around Strauss wind farm. Population genetic analyses will inform managers on how to create effective conservation strategies and maintain the health of the remaining gaviota tarplant populations.
- Skills: Inventory and curation of over 900+ DNA extracts; optimizing protocols for DNA fragmentation; experience with Agilent Bioanalyzer; experience with operating an Agilent BRAVO NGS automated robot for spotlight genome library prep.

Evaluating 3D Morphometric Measurements of Northern Elephant Seals (*Mirounga angustirostris*) using LiDAR Imaging

March 2022 - June 2022

- Mentors: Arina Favilla (*Ph.D Candidate*), Dr. Roxanne Beltran
- Description: Honors thesis, completed June of 2022. Using a 2021 iPad Pro with LiDAR (light detection and ranging) technology to create 3D models of juvenile and adult northern elephant seals. 3D models were exported to a 3D modeling program to measure body length, volume, and surface area, then compared to traditional morphometric methods.
- Skills: Learned to operate a LiDAR camera and scanner to create useful 3D models while in the field; experience using the open software program Blender for measuring models; coding in R for method comparison and statistical analysis; experience interacting with and handling a large pinniped species in the wild.

Protecting Our Rivers: Biodiversity Monitoring of the L.A. River using eDNA

February 2021 - Ongoing

- Mentor: Dr. Rachel Meyer
- Description: Project ongoing; began involvement as a summer undergraduate researcher for the RMI program during Summer 2021. DNA extraction of river water and sediment samples from various locations around the L.A. river watershed. Third round of samples extracted, DNA libraries created for later sequencing. Later analysis will include datasets from the first two rounds of extractions alongside the third. This project involves collaboration with researchers from UCLA and Metabolic Studios.
- Skills: DNA extractions of Freshwater filter and sediment samples were done using Qiagen extraction kits; preparation of DNA libraries using established CALeDNA metabarcoding protocols.

Environmental DNA (eDNA) Based Bioinventory of Palmyra Atoll

February 2021 - Ongoing

- Project: Environmental DNA (eDNA) Based Bioinventory of Palmyra Atoll
- Mentor: Dr. Rachel Meyer
- Description: Project completed as part of the RMI program for the 2020-2021 school year. DNA extraction of seawater filter samples from around the Palmyra Atoll, part of a larger marine protected area near the Hawaiian Islands. DNA libraries were prepared and sequence data used to investigate biodiversity of the waters around Palmyra Atoll using eDNA. This project involved collaboration with researchers from UCLA.
- Skills: Water filter DNA extractions using Qiagen extraction kits; preparation of DNA libraries using eDNA metabarcoding methods.

Auditory Morphology and Evolution of Ancient Pinnipeds

November 2020 - December 2021

- Mentor: Ana Valenzuela Toro (*Ph.D Candidate*)
- Description: Describing the inner and outer morphology of the auditory bulla belonging to an undescribed specimen of an ancient North Atlantic phocid species belonging to the genus *Leptophoca*. This project is being completed in collaboration with researchers from the Smithsonian Museum of Natural History.
- Skills: familiarity with and ability to name and describe the external and internal morphology of the skulls of multiple pinniped species; using image computing software (Osirix, Slicer) to analyze CT data and measure morphological features.

Creating a Generational Pedigree of Female Northern Elephant Seals from Año Nuevo State Park

September 2020 - Ongoing

- Mentor: Dr. Roxanne Beltran
- Description: Using R, we create a generational pedigree using archived tag data of female northern elephant seals (mirounga angustirostris) from Año Nuevo State Park. This pedigree can be used to track lineages of northern elephant seals spanning decades, and has information regarding breeding success, pup birth dates, and potential translocation information for each female elephant seal.
- Skills: Experience coding and working with large datasets in R; collecting resight data from Año Nuevo State Park during peak haul-out seasons (molt, breeding) for entering into the tag database

What's on the Outside Counts: Comparing Methods of Estimating the Surface Area of Juvenile Mirounga angustirostris using Morphometry vs. Photogrammetry

June 2020 - August 2020

- Mentor: Arina Favilla
- Description: Project completed as part of the 2020 summer CAMINO internship. Used the 3D image modeling software Photomodeler to create a 3D model of five juvenile northern elephant seals (*Mirounga angustirostris*). The models were used to calculate volume, surface area, and mass estimations of each seal. The results from the Photomodeler models were compared to surface area, volume, and mass estimates of the five seals calculated using morphometric measurements, which geometrically modeled the animals as a series of truncated cones.
- Skills: Field work involved sedation of juvenile northern elephant seals and transport back to the UCSC Long Marine lab; creation of 3D models of each seal using Photomodeler; using R to calculate the surface area, volume, and mass of each seal using morphometric measurements and create figures from the results

TEACHING EXPERIENCE

Undergraduate Student Mentor
Ongoing

UCSC Department of Ecology and Evolutionary Biology

- Mentoring an undergraduate student throughout their third and fourth year as they take a senior thesis project to completion. This thesis project involves using an unmanned aerial vehicle (UAV) to take 3D morphometrics of northern elephant seals and compare them to traditional morphometric estimates of the same animal.

Teaching Assistant
Multiple Quarters

UCSC Department of Ecology and Evolutionary Biology

- Functioned as a teaching assistant for one quarter (Summer 2023, Summer 2024) for a high division ecology course (BIOE 107, BIOE 126). The TA-ship was entirely remote, with classes held online and with self-paced learning.

Outreach Program Assistant
September 2022 - Ongoing

UCSC Department of Ecology and Evolutionary Biology

- Led outreach events across Santa Cruz and Monterey counties as part of Dr. Roxanne Beltran's NSF-funded Rules of Death project. These outreach visits involve k-12 school visits where students are taught about the life history of the northern elephant seal.

WORK EXPERIENCE

Field Technician
July 2022 - September 2022

UCSC Department of Ecology and Evolutionary Biology

- ASPIRE 2022 sample collection
- Led team of experienced undergraduates and field technicians
- Environmental sample collection (soil, water) for later environmental DNA analysis

Laboratory Technician
February 2022 - September 2022

UCSC Department of Ecology and Evolutionary Biology

- Created 900+ genome libraries for population genetic analysis of the endangered gaviota tarplant (*Deinandra increscens*).
- DNA extract sample curation of over 900+ individual plants.

Undergraduate Representative
September 2021 - June 2022

UCSC Department of Ecology and Evolutionary Biology

- Undergraduate student outreach

- Support and mentorship for both frosh and transfer students
- Event-hosting and fundraising for the EEB department

Marine Mammal Physiology Project Volunteer July 2021 - January 2022

- Directed by Dr. Terrie Williams, the Marine Mammal Physiology Project at UCSC's Long Marine Laboratory houses marine mammals that are involved in metabolic and other physiological research. Responsibilities as an animal husbandry volunteer include:
    - Maintaining animal enclosures
    - Daily diet preparation
    - Exposure to animal research training techniques
    - Experience in providing care for a variety of marine mammals (Hawaiian monk seal, Atlantic bottlenose dolphins) and exotic birds.

Volunteer Translator for SIP and PyaR June 2021 - September 2021

- Assisted in translating R notebooks and Python tutorials from english to spanish for Computational Biology PyaR tutorials created by Professor Raja Guha Thakurta in the Department of Astronomy and Astrophysics.

Science Communication Illustrator May 2021 - July 2021

Kenneth S. Norris Center for Natural History

- Worked with PhD student Halie A. Kampman in the Environmental Studies Department in creating a series of eleven illustrations to help visualize the graduate student's work on Senegalese pearl millet crops and agriculture interventions.
- Received a stipend of $1,500 for three months of illustration work.

Undergraduate Researcher October 2019 - June 2022

UCSC Department of Ecology and Evolutionary Biology

- Worked closely with PhD student Arina Favilla in the Costa lab at UCSC and assisted in a variety of field work activities. This includes handling of live pinnipeds, assisting with population monitoring efforts, and translocation of research animals.

ACADEMIC SOCIETIES

Society for Conservation Biology 2021-present

Committee member; local chapter (Santa Cruz, CA)

Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) 2019-present

Society of Marine Mammalogy 2021-present