

About GES

The University of Hawai'i at Mānoa Department of Oceanography launched the undergraduate Global Environmental Science (GES) Program in 1998 with the generous support of the Pauley Foundation. The vision and brainchild of Oceanography Emeritus Professor Dr. Fred Mackenzie, the GES Program is known for its rigorous math and science foundation, integrated study of environmental- and sustainability-related issues, and faculty-mentored research experience requirement.

This research experience results in every GES graduate having completed a faculty-mentored research project, written a thesis, and presented their research results in a public forum. As a result of the challenging curriculum and research experience requirement, GES graduates are well-prepared to enter the workforce in environmental science-related fields and industries or continue on to graduate studies in many different subjects in the natural sciences, social sciences, law, medicine, and engineering.

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1000 Pope Road, Marine Sciences Building Room 205
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SPRING 2024 GES SYMPOSIUM

Friday, May 3rd, 2024

9:00am - 1:00pm

MSB 114

Refreshments to follow on MSB Lanai



GES Symposium

GES students presenting at this symposium conducted faculty-mentored research, analyzed their results, and compiled their findings into a thesis format. Many theses are converted into peer-reviewed journal publications; a feat usually accomplished by students once in graduate school.

The GES Symposium is a celebration and culmination of undergraduate research efforts and experiences, so join us in supporting, engaging, and applauding our presenters.

In Memoriam



Professor Emeritus Fred T. Mackenzie, the founder of the Global Environmental Science (GES) Program and renowned ocean and Earth systems scientist and friend to many worldwide, passed away at the age of 89 earlier this year.

Fred had an illustrious, internationally-renowned scientific career that spanned over 60 years. He was the author/co-author of over 300 scholarly works along with several seminal geoscience books, and he received numerous medals, awards, and accolades. Forever humble and self-effacing, when prodded, he would admit that he was most proud of founding the GES Program, the first of its kind in the United States.

Fred's curiosity went well beyond science. An ardent athlete, avid runner, hiker, scuba diver, mountaineer, and prolific reader, Mackenzie's exploits took him from the depths of the oceans to the summits of mountains. A true explorer, he traveled through sixty-eight countries with his beloved wife and companion, Judy. His perspective was rich, filled with the knowledge of other cultures and a respect for many belief systems.

The GES Program's curriculum and research requirement is the embodiment of Fred's curiosity and adventurous spirit. Each Symposium presentation, in its own unique way, honors and carries on Fred's enormous legacy, impact, and spirit.

A hui hou Fred, and mahalo nui loa.



Carlo Van Dijken

Carlo first found a passion for the environment in his younger years, loving the outdoors. He grew up in Santa Clara, California, where his teachers and peers reinforced his passion for the environment. Because of this, he decided to pursue a degree in GES in 2020 directly out of high school. While at UH Mānoa he participated in a variety of internships and spent

over a month on the Research Vessel Kilo Moana. In addition, he connected with Professor Nicholas Hawco to complete his undergraduate research and thesis. In the Hawco Lab, he gained great insight on how scientific labs operate and carried out his project on trace metal limitation of an important cyanobacteria, *Prochlorococcus*. In his time in the Hawco Lab, Carlo was able to assist in coastal analysis of Lahaina after the Maui fires. Following graduation, Carlo is planning to use his degree to continue in the environmental field.

Michael Yamada

Born and raised in Pearl City on O'ahu, the ocean was always an important part of Michael's life. In high school, he always knew that he wanted to pursue a career that allows him to study the ocean which led him to choose the GES Program. Throughout his college journey, Michael has demonstrated exceptional academic performance, consistently earning a place on the dean's list since the beginning of his studies in 2020. He has received multiple scholarships, such as the UH Mānoa Marching Band Leadership Scholarship and the Harriet Bouslog Scholarship. After applying to many different oceanography labs around campus to find a thesis project, Michael started working with zooplankton in Dr. Erica Goetze's lab in the Fall of 2022 and received funding from UH Mānoa's Undergraduate Research Opportunities Program which allowed him to continue working on this project for the next two years. After graduation, Michael hopes to continue working in oceanography and possibly return to school to pursue a master's degree.



Agenda

- 9:00 Opening Remarks
- 9:10 **Nicole Mathews** - "Developing a Plankton Image Training Set for Machine Learning in the North Pacific Subtropical Region"
Mentors: Fernanda Hederikx Freitas and Angelicque White, Department of Oceanography
- 9:30 **Jacqueline Clem** - "Floating Upwelling System Impacts Oyster Growth at He'eia Fishpond"
Mentors: Maria Haws, Pacific Aquaculture and Coastal Resources Center, UH Hilo, and Brian Glazer, Department of Oceanography
- 9:50 **Peter Felicijan** - "The Effects of Environmental Forcing on the Water Quality in Ke'ehi Lagoon O'ahu, Hawai'i"
Mentor: Margaret McManus, Department of Oceanography
- 10:10 **Ande Westerhausen** - "Quantifying Active Carbon Flux from Krill Respiration in the Clarion-Clipperton Zone"
Mentor: Jeffrey Drazen, Department of Oceanography
- 10:30 **Mariko Quinn** - "Comparing Fertilization Success of Hāwa'e Maoli Around O'ahu"
Mentor: Malia Rivera, Hawai'i Institute of Marine Biology

- 11:00 **Kyra Dyer** - "The Lahaina Wildfires from a Meteorological Perspective in the Context of Climate Change"
Mentor: Giuseppe Torri, Department of Atmospheric Sciences
- 11:20 **Skye Inn** - "Microbial Metabolism of Diesel Fuel in a Tropical Island Aquifer"
Mentor: Craig Nelson, Department of Oceanography
- 11:40 **Rebecca Koeroessy** - "Isotopic Analysis of a Catchment in Mānoa, Hawai'i"
Mentors: Giuseppe Torri and Alison Nugent, Department of Atmospheric Sciences
- 12:00 **Makenzy Teuila Rui Tamura** - "Chemical Analysis of a Catchment in Mānoa, Hawai'i"
Mentors: Alison Nugent and Giuseppe Torri, Department of Atmospheric Sciences
- 12:20 **Carlo van Dijken** - "Iron and Cobalt Limitation in Atlantic *Prochlorococcus* MIT9301"
Mentor: Nicholas Hawco, Department of Oceanography
- 12:40 **Michael Yamada** - "ZooScanning the CCZ: A Baseline Study of Zooplankton Assemblages in the Clarion-Clipperton Zone"
Mentor: Erica Goetze, Department of Oceanography
- 13:00 End



Rebecca Koeroessy

Rebecca started her academic journey in Biology at Kapi'olani Community College in 2018 after she moved to O'ahu from Stockholm, Sweden. She learned about the GES Program from her esteemed professor, Dr. Wendy Kuntz. The Program's compelling curriculum and its alignment with her aspirations led Rebecca to transfer to the

GES program in January 2022, following a year-long hiatus dedicated to her role as a Sustainability Coordinator. After taking the course *Atmospheric Processes and Phenomena*, Rebecca participated in a research opportunity in the isotopic composition of rainfall, under the guidance of Dr. Giuseppe Torri and Dr. Alison Nugent. Rebecca has been a constant Dean's list student and has a long list of volunteer experiences, especially proud about working at the Hakalau Forest National Wildlife Refuge on the island of Hawai'i to restore and maintain the pristine koa forest. Looking ahead, Rebecca's aspirations in the environmental science field are firmly rooted in water quality where her passion lies. Upon graduation, she plans to continue her practical engagement as a Lab Assistant at the Biogeochemistry Lab on campus, aiming to enrich her experience and lay a solid foundation for her future academic endeavors.

Makenzy Teuila Rui Tamura

Makenzy's passion for the environment led her to the GES Program in Fall 2021. Having transferred from Oregon State University for her sophomore year, she was eager to delve deeper and explore research opportunities. Dr. Alison Nugent's class, *Atmospheric Processes and Phenomena*, sparked her interest in rainwater chemistry, and she eagerly joined the

research project with Dr. Nugent and Dr. Giuseppe Torri. She worked with both professors to organize her thesis plan, which included applying for funding by UH Mānoa's Undergraduate Research Opportunities Program. Makenzy's dedication to environmental pursuits extends beyond academics. During the summer of 2023, she secured an internship at the City and County of Honolulu's Department of Facility Maintenance's Storm Water Quality Division. Following graduation, Makenzy plans to gain experience in consulting or environmental management before potentially pursuing a master's degree. Makenzy was born and raised in Ewa Beach, HI.





Kyra Dyer

Kyra originally started as a Marine Biology major as it had been her dream since she was a kid, but quickly realized it was not for her. She had taken an environmental science class her senior year of high school and loved learning about how to better care for the world, climate change impacts and how

diverse of a field environmental science is, so switching majors to GES her sophomore year at UH Mānoa was an easy decision. Kyra knew she wanted to find a project that involved climate change and after months of searching through various departments, she was finally referred to Dr. Giuseppe Torri in the Department of Atmospheric Sciences. Unfortunately, after months of working on the project, one of the devices essential for the project ended up being faulty and Kyra and Dr. Torri had to switch gears. Luckily Dr. Torri presented Kyra with another idea that Kyra was even more excited to look into—climate change and wildfires in Hawai'i. After graduation, Kyra plans to stay on O'ahu and work for a non-profit involving conservation and sustainability efforts to better the community and teach more people about the importance of caring for the planet.

Skye Inn

Skye started her academic journey as a Biology major on a Pre-Med track. However, after a year in the program, she discovered the GES Program, switching majors in the Fall 2021. She had always been passionate about the environment and research growing up, making GES the perfect fit for her. After transferring, Skye explored various research opportunities, volunteering in labs and participating in a coral Research Experiences for Undergraduates program at the Hawai'i Institute of Marine Biology, before joining Dr. Craig Nelson's laboratory in the Fall of 2022. Through Dr. Nelson, Skye became heavily involved with the UH Red Hill Task Force, processing samples from impacted households from the November 2021 fuel spill. This ultimately led to her GES thesis on analyzing the microbial degradation of jet fuel in groundwater. Since committing to her research project, Skye has additionally joined Dr. Andrea Jani's laboratory studying Hawaiian *Drosophila*. Post-graduation, Skye will take a gap year, working for both Dr. Nelson and Dr. Jani as a lab technician before pursuing a master's degree. Skye was born in Los Angeles, CA, and raised in Honolulu, HI.



Nicole Mathews

Growing up on a small island, Nicole has always had an interest and appreciation for the uniqueness of island biodiversity and its interconnectedness to ocean life. Since her first experiences in local and international science fairs, Nicole knew she was interested in environmental and sustainability science. After

graduating high school, the GES Program at UH Mānoa provided the versatility for Nicole to discover the range of fields and opportunities related to environmental science. Through GES, she volunteered with the Hawaiian Ocean Time-Series projects (HOT) and discovered a passion for oceanography. Through HOT, Nicole learned about the diverse fields of ocean research as well as what came to be the basis of her research project. In addition to being a dean's lister, Nicole is also an Honors student in the University's Honors Program. Nicole is currently pursuing a Post-Baccalaureate Certificate in Teacher Education with a focus in science. Upon graduation, Nicole will continue to complete her teaching certificate, hoping to one day be teaching alongside her mom and brother at her alma mater. Nicole was born and raised on the island of Guam.

Jacqueline Clem

Born and raised in central Illinois, Jackie developed a profound appreciation for nature thanks to her mother's influence. Her fascination with the ocean led her to pursue a degree in Marine Biology at UH Mānoa after her enlistment in the Army Reserves. However, after one semester Jackie realized that the GES program aligned better with her broader interests in environmental issues and global climate dynamics. In Spring 2022, she switched to the GES program. During this semester, Jackie began an internship at Paepae o He'eia, working alongside Dr. Maria Haws and Keli'i Kotubetey. Here, she helped to care for native oysters and monitored water quality. After one year, Jackie aided in the rebuilding of a floating upwelling system for the pond, which she then based her thesis on. Through this experience, she deepened her love for restoration and conservation. Following graduation, Jackie will be moving to Korea while pursuing a master's degree in Environmental Policy and Management.





Peter Felicijan

From the small farming town of Prosser, Washington, Peter has always felt a calling for the outdoors. During summers, Peter worked in the cherry orchards with his family to earn extra money for college. With his high school teachers and family members' encouragement, Peter decided to study

ecological science. Once in the GES Program, Peter was offered an internship in Dr. Margaret McManus's Nearshore Sensor Lab, which sparked his interest in ocean and land science, leading him to other internships: assisting in Dr. Joshua Madin's Geometric Ecology Laboratory at the Hawai'i Institute of Marine Biology, Dr. Lav Khot's Center for Precision and Automated Agricultural Systems at Washington State University, and Dr. Andrea Kealoha's Water Quality Lab at UH Mānoa. Through these internships, Peter gained invaluable research experience and built professional relationships, teaching him the importance and necessity of ocean and land observation. Peter's involvement in Dr. McManus's Lab sparked ideas for his GES thesis and inspired him to aim for a graduate degree in physical oceanography. After graduating, Peter plans to take a gap semester, assisting Dr. McManus as an Oceanographic Technician before pursuing a master's degree in oceanography.

Ande Westerhausen

From a very young age in Conifer, Colorado, Ande wanted to be a scientist, and do anything she could to help the environment. She originally came to UH Mānoa majoring in Marine Biology, however, after the first semester she transferred to the GES Program. In her sophomore year, Ande began working in the Deep-Sea Fish Ecology Lab where she processed a variety of animals from deep sea samples, from which she decided to use her data to form her research thesis. Throughout her time at UH Mānoa Ande has maintained the Mānoa Academic Merit Scholarship. She has also participated in 15+ hours of outreach and participated in multiple research cruises with the Department of Oceanography as well as National Geographic's Pristine Seas. In addition, Ande presented her poster at the Breakthroughs: Uehiro and Oceanography Yearly Symposium and the 48th Annual Tester Memorial Symposium. Upon graduation, Ande will be taking a gap year in Bozeman, Montana, before heading to Australia to further her research and career in Deep Sea Ecology and deep-sea mining risks.



Mariko Quinn

Mariko Quinn was born and raised on the water in He'eia, Ko'olaupoko, where she developed a strong relationship and respect for the ocean from a very young age. In high school, Mariko was motivated to participate in several marine science programs at Moku o Lo'e, which ultimately led her to pursue a

degree in GES and a Political Science minor at UH Mānoa. During her time as a GES student, Mariko was able to continue an internship with the Smithsonian Institute's Hagedorn Lab as well as working with the Keaoa Lo'e Research Experiences in Marine Science Lab at the Hawai'i Institute of Marine Biology. Mariko was selected to participate in both the National Oceanic and Atmospheric Administration (NOAA) Ernest F. Hollings Prep Program, for which she worked at the He'eia National Estuarine Research Reserve (NERR), as well as the Hollings Scholarship Program, through which she worked at the NOAA Southwest Fisheries Science Center and the White Abalone restoration program. As a result of her experiences at He'eia NERR and the Keaoa Lo'e lab, Mariko began her research project examining hāwa'e maoli around O'ahu. As a UH Mānoa Regents Scholar, Mariko has been very lucky to have been supported by several organizations in her undergraduate journey, including the Hayashida Family, Alan Church Scholarship Program, and Schmidt Ocean Institute. Upon graduation, Mariko hopes to apply what she has learned in GES and her experiences in her Political Science minor toward gaining a better understanding of how to best drive, encourage and support community-centered, decolonial research practices.

