



PIPES Interns Tell Their Climate Change Story



A stone heiau, or temple, at Kahalu‘u Mānowai Education Center, Kailua-Kona, Hawai‘i Island. Photo: S. Nash

The restored stone walls of two ancient heiau (Hawaiian temples) rise black and strong out of the gentle waves of the Kona Coast. Large rocks sit farther out in the sea, and coastal plants and bushes spread along the tops of the dunes and farther back, behind the great stone structures. Small groups of university students can be seen peering into the tidal pools, snorkeling among the waves, and gesturing toward plants on the beaches while making notes on data sheets and comparing observations.

The students are PIPES ([Pacific Internship Programs for Exploring Science](#)) interns collecting data for short-term research projects during their three-day orientation at Kamehameha Schools Kahalu‘u Mānowai Education Center in Kailua-Kona, Hawai‘i Island.

Thirty-eight interns make up this year’s roster and not all are from the Hawaiian Islands. A few come to the islands from Washington, New York, and as far away as Puerto Rico and Macedonia, all looking to expand their experiences in the sciences by working with professionals in the field. Lead staff of the PIPES program connect the students with agencies, university professors, and organizations that engage in science through field research, laboratory work, or management actions. Mentors at participating organizations guide the interns throughout the summer, imparting their own know-how and direction to help the interns gain knowledge, confidence, and experience in scientific fields.

In addition to the mentoring aspect of the program, “the interns get to learn how to set-up a research project and write it from start to finish,” says Noelani Puniwai, PhD candidate at University of Hawai‘i (UH) at Mānoa and Orientation Research Lead for the PIPES program at UH-Hilo.

Puniwai's work with PIPES also provides an opportunity to introduce students to climate science and how to integrate cultural, community, and experimental approaches to resource management, which is central to her [Pacific Islands Climate Science Center-supported research on changing seascapes](#). Focusing mainly on surf locations on Hawai'i Island, her research weaves climate science and resident knowledge into one place-based story, creating a rich tapestry of understanding for the physical changes to a site over time.

The human-climate-place interconnection is what Puniwai is drawing out of the interns from this short orientation training. It's not about a groundbreaking scientific experiment, but communicating what you learn. "It's more about telling the stories," she says. "What are the implications [of climate change] to this place and these resources?" The students take the climate science trends particular to Hawai'i, add their resource-specific observations, and produce a narrative that communicates those connections and the implications of climate change to the future of the resources in the community.

In order to incorporate aspects of natural and cultural resources and potential impacts of climate change, one student group compared the effect of a heiau on the species richness inside and outside of its walls. The students sampled interior and exterior tide pools for species of invertebrates and vertebrates, and measured the low and high tide points as well as wave impacts and wind direction. They hoped to include a discussion of possible changes to the physical environment in the form of ocean current regimes, wave height or frequency, and freshwater abundance from groundwater inputs during their final presentation to the local community.

The group's curiosity was also piqued by the intentions of the heiau builders themselves. "Did the kupuna (ancestors) know by closing that area that it would change the system?" One student asked. "This is what we intend to bring up in the presentation with the community."

Whether that question can be answered remains to be seen, but the students were also interested in the follow-on implications of their climate story where species diversity and cultural heritage intersect. Does the heiau structure provide protection for intertidal communities? Or, looking toward the future: could cultural heritage sites play a role in protecting natural systems from impacts of climate change?



Student interns practice identifying and counting plant species in quadrats as part of their orientation to the PIPES program. Photo: J. DeJesus

Some of the students themselves are interested in how climate science could play a role in their own futures as scientists. One student, Cherie Kauahi, a marine science undergraduate of UH-Hilo, will be interning with Ms. Puniwai this summer and aiding in the research of Hawaii's changing seascapes. Her interests lie close to that research, though, more under the surface.

"I love groundwater," says Kauahi. "I find the process of groundwater recharge zones and precipitation and movement from the land to the ocean really interesting." When asked about how climate change might fit into her professional interests in groundwater research, she fires off questions in quick succession. "How does climate change affect those processes of water movement and precipitation? How will invasive species take those resources? And how could climate change affect the shifts [in the ocean] from coral- to algae-dominated zones? Where does the cultural side fit in this process?"

Obviously, these questions can lead Cherie and the other student interns down many different paths in their own scientific careers. For now, they are starting on those paths through mentorship and experience. And, maybe climate science will continue to impact not just their orientation research during these few days on the coast, but also the scope of their careers beyond this summer.