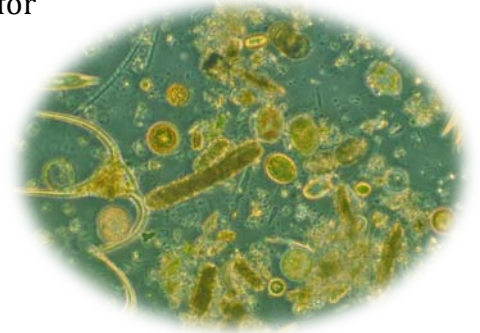


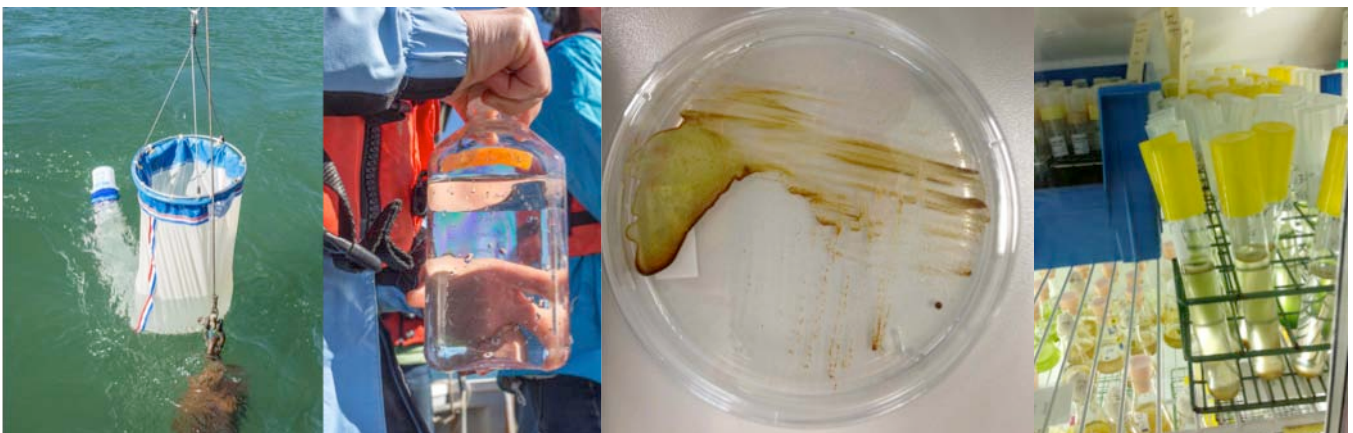
An Exploration, Training and Enlightenment of Phytoplankton Culturing Techniques Holly Church, 'Iolani School June 2013

As a biologist and educator, I am always looking for new ways to engage students in science and, in the process, provide opportunities for the students to explore the environment using student-driven research. Keeping these goals in mind, I will be starting a new phytoplankton culturing course at the wet lab located in the new Sullivan Center for Innovation and Leadership at 'Iolani School. The course will provide students with the opportunity to collect, isolate, and culture phytoplankton species living in the Ala Wai Canal on Oahu. In preparation for creating the curriculum for this new course, I participated in the National Center for Marine Algae and Microbiota (NCMA) Algae Culturing Techniques Course during the first week of June 2013. The intensive week-long course provided detailed instruction on the basic and advanced techniques necessary to culture phytoplankton.



During the first half of the course, I learned a variety of isolation techniques that I can use in the classroom to teach my students how to isolate single cells using microscopy, agar plates, and flow cytometry. I learned how to collect plankton using 5 and 20 μm plankton nets and a Niskin water-sampling bottle. I also spent countless hours isolating and identifying cells from the water samples collected throughout the week.

During the second half of the course, I learned the techniques necessary to turn single cell isolates into cultures that can be maintained in the laboratory. I also had the opportunity to learn how to use polymerase chain reaction (PCR) experiments to amplify the 16S rRNA gene extracted from single cells. The rRNA gene can then be sequenced to identify the species in the sample. Lastly, I had the opportunity to tour the NCMA facility and the new Bigelow Laboratory for Ocean Sciences located in East Boothbay, Maine. During the visit, I ran samples on a flow cytometer, I learned about how cryopreservation is used to preserve algal strains, and I had the pleasure to meet Dr. Robert Guillard, a pioneer in marine algae culturing techniques.



Throughout the course, I had the opportunity to practice the culturing techniques using a variety of scientific equipment. As a result, the course also helped me to determine which supplies and equipment would be needed for the students in my course at 'Iolani School. Immediately following the course, I used this information to help set up the new wet lab at the Sullivan Center.

Due to the C-MORE Grant for Education in Microbial Science that helped me to participate in the NCMA course, I can confidently create a curriculum that requires my students to collect samples, isolate cells, and to grow their own phytoplankton cultures in the laboratory. The next phase of preparation will be setting up the new wet lab, establishing the lab protocols for using the equipment, and designing the day-to-day curriculum that will help the students conduct their own research as they begin to learn about phytoplankton ecology and culturing. As a part of the course, I plan to have the students design and conduct their own experiments to identify the environmental conditions that the cells prefer to grow in. Lastly, the students will have the opportunity to conduct their own community outreach by teaching students at a public elementary school about the phytoplankton that can be found in the waters near their school. I am excited to use these techniques to teach my students how to explore the environment in a new way and to hopefully inspire my students to take a more active role in their own education.