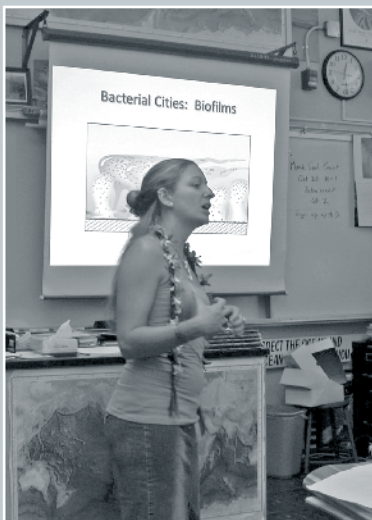


REACHING OUT

By Kristina Mojica, UH Sea Grant-supported graduate student



One goal of the University of Hawai'i Sea Grant College Program is to disseminate relevant and current scientific information regarding coastal and marine resources to the general public in a meaningful way. In order to achieve this aspiration, Dr. Michael Cooney (my advisor) and I, set out to create a comprehensive laboratory curriculum designed to educate local high school students and teachers about marine biofilms. The curriculum entitled *Biofilms*

in Practice: A Hands-on Guide to Understanding Biofilms focuses on providing students with information about biofilms including composition, growth and importance to the marine environment through the use of interactive hands-on learning techniques. The premise behind the development of a hands-on learning exercise can be best described by the preface to the laboratory manual, "The only source of knowledge is experience"- Albert Einstein.

I was honored by the opportunity to implement the laboratory curriculum for a marine science class at a private and very prestigious high school on O`ahu. The marine science class consisted of four sections each containing approximately 20 students, at the junior or senior level. At this high school, marine science is an upper division elective course; as a result, enrolled students had a broad range of interests in marine science. The teacher, however, had an immense love for the ocean, associated sciences, and conservation, which was clearly demonstrated by her enthusiastic attitude and classroom environment.

The execution of the curriculum took place over the course of four weeks and included three introductory lectures of material covered by the laboratory manual, presented by myself, and three laboratory components. The students were asked prior to beginning the curriculum to complete a 30 question exam. The purpose of the exam was to assess the students for any background knowledge that they may have had about biofilms in order to create a baseline, which could be used to measure the amount of knowledge gained over the four week laboratory curriculum.

In order to stimulate and motivate the students on the subject matter of biofilms, I shared with them my own experiences. The following is one example.

While preparing to graduate with my undergraduate degree in marine biology, I accepted an undergraduate fellowship at the University of Hawai'i; the subject matter—marine biofilms. Even after all my research as a marine biology

student, I had never heard of biofilms. At the time they were not part of the course curriculum of microbiology.

I explained to the students, that even now, biofilms are just starting to make their way into microbiology textbooks. So, here they were, being presented with the opportunity to learn something, that most people do not know or understand, even most graduate students. I have to admit that I was somewhat surprised by their level of excitement and curiosity. They often asked very intelligent and well thought out questions. Every student participated in both the lecture discussion and in the laboratory components. The unexpected enthusiasm and motivation of the students made my experience at the high school comfortable, enjoyable and very fulfilling.

At the end of the four-week period, the students were asked to retake the initial exam and complete a survey of both my teaching performance and of the curriculum itself. When asked "what aspect of the course did you like the most?," a large majority of the students said that they really enjoyed the labs, specifically the hands-on component. Although they felt that the material was "challenging" and an "overwhelming amount of information," 80 percent of the students showed an improvement ranging between four and 40 percent in test scores after the four week period.

Overall, I would say that my experience at the local high school was a success on many levels. First, it gave me the opportunity to interact with local high school students and share my enthusiasm for marine science. In the end, the experience



was as much of an inspiration for me as it was for the students. Second, during my time at the high school several students became increasingly interested in biofilms, often performing extracurricular research on the subject which they

would bring to me after class. I cannot begin to describe the utter fulfillment which their interests spurred within me and the delight that came from the ensuing discussions. Finally, on my last day, several of the students, including two who seemed disengaged in the beginning, expressed to me that because of my time there, they now wanted to be scientists, oceanographers, and researchers. These statements touched me and reverberated my reasons for aspiring to become a teacher. These students helped me to prepare for what all teachers aim for, to not only educate but to also inspire. So I must end with the same premise with which I have begun, "The only source of knowledge is experience"- Albert Einstein.

