

## **Native Hawaiian Science & Engineering Mentorship Program: A Look at Increasing Student Diversity at the University of Hawaii**

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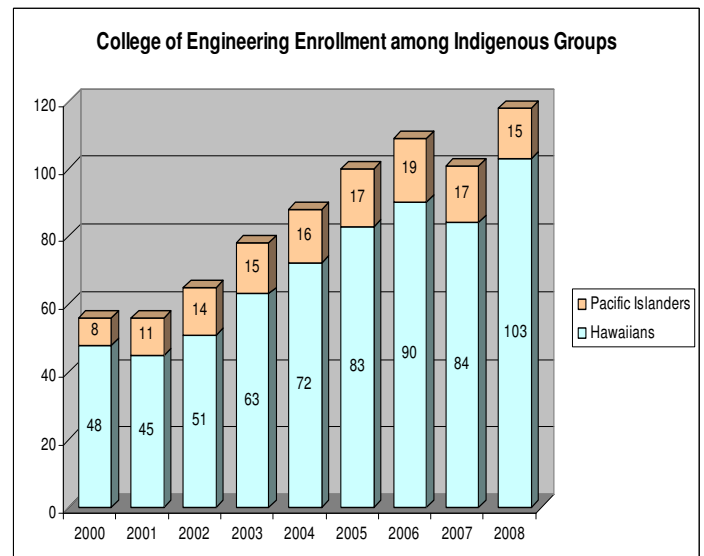
National leaders including the National Academy of Engineering and the National Science Foundation currently advocate for an increased domestic talent pool in engineering to enhance global competitiveness. The concern is that major segments of our society, particularly women and minority students, are significantly underrepresented in engineering classrooms, research laboratories, and the corporate environment. Demographic trends indicate that by 2050 almost half of the U.S. population will be minorities. *How will the engineering profession draw more students from an increasingly diverse population?*

The University of Hawaii (UH) campuses have long strived to increase participation among minority students and, in particular, among the indigenous Hawaiian population. Hawaiians represent 23% of the State of Hawaii population but comprise only 9% of the student body at the flagship UH Manoa campus. The underrepresentation of Hawaiians is more acute in the Science, Technology, Engineering, and Mathematics (STEM) disciplines. *What strategies can be implemented at local engineering schools and colleges to promote diversity goals?*

In 2001, Electrical Engineering Professor Tep Dobry teamed up with Hawaiian Studies Professor Lilikala Kame'eleihiwa to address the underrepresentation of Hawaiian students at the UH Manoa College of Engineering. Together they found a similar model of increasing indigenous educational attainment in science and

engineering from Dr. Herb Schroeder that was making successful gains for Alaskan Native students at the University of Alaska Anchorage (<http://ansep.uua.alaska.edu/>) and for Native Americans at the University of Washington. The National Science Foundation through the Louis Stokes Alliances for Minority Participation (LSAMP) program provided five years of seed funding to implement the model of success strategies in Hawaii. What they found was that by making changes in mentorship and engineering student services, they were able to greatly enhance the success rates among Hawaiian engineering students.

Since the program's inception in 2001, enrollment of Native Hawaiian and Pacific Islanders students at the UH Manoa College of Engineering has steadily increased by both count and percentage of overall undergraduate enrollment.

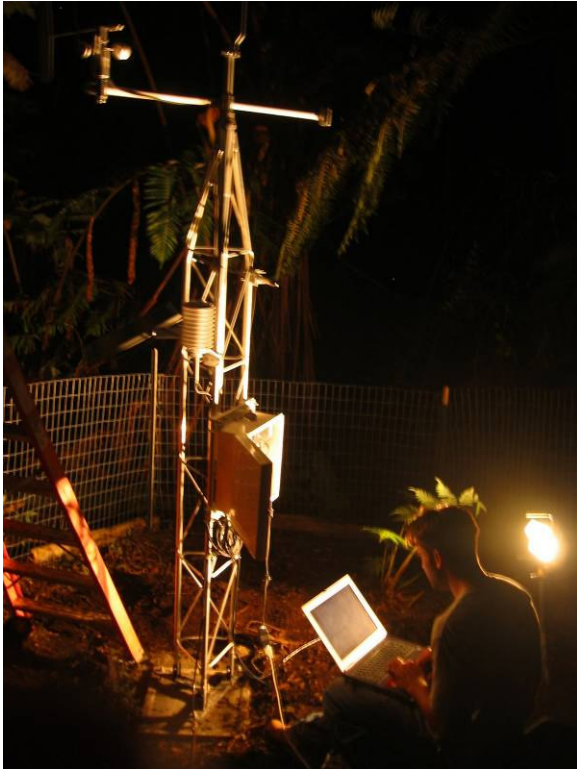


Dobry, Kame'eleihiwa, and Schroeder developed the Native Hawaiian Science & Engineering Mentorship Program (NHSEMP), the first "Minority Engineering Program" in the University of Hawaii College of Engineering's 100-year history. The life retention rate for NHSEMP students (70%) is considered extraordinary, well above the national average retention rate for Indigenous Americans in engineering programs (27%). Engineering has become one of the most popular majors among Native Hawaiian students at the University of Hawaii surpassing historically popular majors such as Hawaiian Studies, Hawaiian Language, and Business. How did this happen?

The changes in mentorship and engineering student services focused on a very simple concept: building **academic community**. Hawaiian engineering students were teamed in a cohort with other Hawaiian engineering students. First and second year cohorts were required to attend **weekly study sessions** for their primary gateway courses in Calculus, Chemistry, and Physics. The seven-week residential **Summer Bridge** allowed NHSEMP students to reinforce their learning community, offered them college credit in both Mathematics and Hawaiian Studies courses, and provided them a summer research experience under the direction of an engineering faculty or industry representative. Hawaiian students were afforded opportunities to pursue paid **internships** or **research experiences** instead of working part-time at non-career related jobs (e.g. food & beverage, or tourism industry). Success of the academic community largely centered around the **cultural relevance** of engineering to the Hawaiian community.



**Service-learning** projects include Native Hawaiian fishpond restoration, taro farming/planting, and heiau (Hawaiian religious site) restoration. NHSEMP students interested in renewable energy, smart development, and sustainable environmental practices quickly recognize how important their participation as engineers is to their community as Hawaiian and Island peoples.



Given the initial success of the program, the National Science Foundation renewed their five-year seed funding of NHSEMP. The new grant extends the successful model to the universities and community colleges throughout Hawaii and the Pacific (17 different institutions). Additional goals of the program would be to reinforce the pipeline of pre-engineering students from the community colleges; engage Pacific Islanders from distant and disparate communities to the University; and move high potential Hawaiian students onto Master's and Doctoral programs. The program's goal is to transition 80% of NHSEMP graduates directly into the STEM workforce, STEM education, or onto graduate school in the STEM fields.

In the next few years, NHSEMP hopes to replicate the student recruitment, participation, and success in other science fields beyond engineering. Although Hawaii's natural laboratory and geographic advantages have contributed to it being one of the leading locations in the world for the study of ocean sciences, astronomy, and geology, there is very low participation from Hawaiian students. This

leaves out valuable perspectives that often, in Hawaii, leads to disconnect between the public and the scientific community. The best problem solving teams are not yet being tapped!



Hawaiian engineers are only one example of the diversity of perspectives and domestic talent pool that the engineering profession will draw from. Will we be prepared to tackle the science and engineering challenges of the future?

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