Our Relation to Hawaii

Hawaii’s economy developed first through the farming of sugar cane and then pineapples. Both crops required extensive infrastructure, such as irrigation, transportation, processing and shipping. Engineering in Hawaii originated through this need. Indeed at one time there were seven railroad companies operating on four of Hawaii’s islands. As these industries have in turn failed to provide a viable economy, tourism and the military presence have taken over as the main drivers of the economy, with construction as one of the principal enabling mechanisms. For several decades there have been attempts to create an alternate economy in addition to the somewhat cyclical tourism and military drivers. Some of these have included medical related activities, notably but not exclusively health care, energy, and especially now renewable energy, software/IT/gaming, film, and food. Accordingly the College of Engineering, at the University of Hawaii at Manoa, has a clear mission to continue to support the growing infrastructure and engineering workforce needs of Hawaii in all its facets, and now including new components such as IT and cyber security. But, the College also needs to educate engineers who can fill the workforce needs of the fledgling economic drivers as they emerge, both in the short term and the long term.
The College Today
The College has ~950 undergrads + ~300 pre-engineers + ~180 graduate students. The College graduates ~140 BS/MS/PhD degrees per year, with 54 tenure track faculty members.

The College offers degree programs in civil and environmental (Chair C.S. Papacostas), electrical and computer (Chair Wayne Shiroma) and mechanical engineering (Chair Mehrdad Ghasemi Nejad) (BS, MS, PhD, except computer engineering with only BS).

Works with all University of Hawai‘i System campuses including community colleges to help recruit STEM students from the neighbor islands, as well as O‘ahu and especially Native Hawaiian STEM students – Over 12 percent of enrollment in engineering is Native Hawaiian or part Native Hawaiian.

The College started the computer engineering undergraduate program four year ago and already has 80 enrolled students; works with the Information and Computer Sciences program in The College of Natural Sciences.

The College holds a career fair every fall and spring semesters with ICS, and recently expanding to math, physics and chemistry, in CNS. The College supplies many of the Hawai‘i’s engineering companies and state agencies with graduates, with 50-60 percent of graduating engineers finding jobs in Hawai‘i. The remaining graduates find jobs on the U.S. mainland, but many of these return later once having gained experience. The College maintains good relations with several large U.S. mainland companies, especially to provide mainland job opportunities for its graduates. Some of these include: Boeing, Northrop Grumman, Lockheed Martin and SAIC.

The College has a large alumni base in Hawai‘i, celebrated by an annual banquet at around 700/800 attendees, that provides a vibrant relationship with the professional engineering community in Hawai‘i.

College faculty provide consulting and sponsored research services to many of Hawai‘i’s state agencies and in particular the Hawai‘i State Department of Transportation.

The College is developing strong student entrepreneurial engagement, especially in its participation with the UH Mānoa Shidler College of Business competitions focusing on entrepreneurship and innovation.

The College has historic strengths in generating entrepreneurs as graduates and faculty. Several faculty members and students have participated in start-up activity in the last few years.

Research Strengths and Interests
Overall research expenditures in 2013 ~ $8.5M/year; ~ $157K/year/faculty; 120 proposals/year.

- Wide range of interests and strengths in design and operation of civil infrastructure systems
- Wide range of bioengineering interests and some strengths (with ties to JABSOM and CTAHR)
- Wide range of renewable energy interests (with ties to HNEI)
- Historical and continuing strength in networks, communications and cyber physical systems – including space communications. Activity includes HCAC: Director, Magdy Iskander
- Interests and some strengths in coastal infrastructure
- Interests and some strengths in autonomous/space/marine vehicles – especially linked with activities in SOEST (CIMES and HSFL)
- Specific strengths in corrosion, nanotechnology and related materials issues.
- Interests and some strengths in water, waste and environmental engineering (with ties to CTAHR)
- Growing interests in (re)-manufacturing and advanced manufacturing
- Growing interests in cyber security, and data analytics (with ties to ICS)
- Growing interests in challenges associated with astronomy and associated instrumentation (with ties to IfA)

(Strength implies three or more faculty participants; Interest implies two faculty participants)

ACRONYM TABLE
CoE = College of Engineering
CNS = College of Natural Sciences
SOEST = School of Ocean and Earth, Science and Technology
JABSOM = John A. Burns School of Medicine
CTAH = College of Tropical Agriculture and Human Resources
IfA = Institute for Astronomy
ICS = Department of Information and Computer Science (CNS)
HNEI = Hawai‘i Natural Energy Institute (SOEST)
HSFL = Hawai‘i Space Flight Lab. (SOEST/CoE)
CIMES = DHS Center for Island, Maritime, and Extreme Environment Security (SOEST/CoE)
HCAC = Hawai‘i Center for Advanced Communications (CoE)