

College of **ENGINEERING** UNIVERSITY OF HAWAII AT MĀNOA

2019 YEAR-END REVIEW



MESSAGE FROM THE DEAN

Aloha kākou,

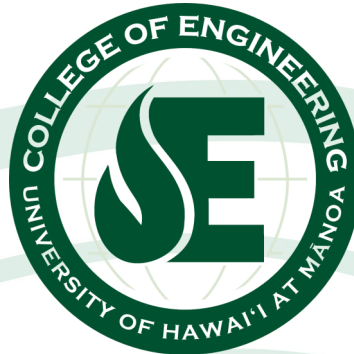
From all of us at Holmes Hall, we welcome you to a new decade! Since stepping into the Dean's role last year, I have been energized and inspired by all of the great work being done by our students, faculty, and alumni, and I am pleased to share some of our 2019 accomplishments with you.

Please accept my sincerest gratitude for you, our friends and alumni of the college, and I look forward to an exciting 2020.

Mahalo,



Brennon Morioka, PhD, PE
Dean, College of Engineering



Growing Degree Programs

Computer Engineering
Construction Engineering
Engineering Science
-Aerospace Engineering
-Biomedical Engineering

16% growth
in graduate student population

50 grants awarded
totaling \$15.7M

86% minority
student population

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PROJECT IMUA TEAM WINS NASA 'ROOKIE OF THE YEAR' AWARD

The Project Imua Mission 6 team, consisting of 14 students from the University of Hawai'i at Mānoa's College of Engineering as well as Honolulu, Kapi'olani and Windward Community Colleges, was recognized for rocketry excellence, winning the Rookie Award as the top new team in the April 2019 NASA Student Launch competition in Huntsville, Alabama. Overall, the UH team finished in the top 10 out of 45 teams in the college/university division.

This year's challenge, hosted by NASA's Marshall Space Flight Center, tasked student teams to propose, design, build and test a reusable rocket with a payload. The rocket had to reach a team-selected altitude between 4,000 and 5,500 feet. Once reaching its highest point, the rocket deployed a recovery system and landed safely. The payload requirement was a drone or rover that autonomously deployed from the rocket after landing, replicating the demands NASA engineers face as they design the Space Launch System rocket to send astronauts and payloads to the Moon.



OHA AWARDS \$1.1 MILLION FOR HIGHER EDUCATION SCHOLARSHIPS

The Office of Hawaiian Affairs (OHA) has awarded the University of Hawaii at Mānoa's Native Hawaiian Science & Engineering Mentorship Program (NHSEMP) a \$1.1 million grant to fund scholarships for Native Hawaiian students studying in science and engineering-related programs. NHSEMP, which is housed within UH Mānoa's College of Engineering, will offer the OHA Higher Education Scholarship to students at all ten campuses within the UH system.

NHSEMP began in 2001 as a joint initiative between the College of Engineering and the Kamakūokalani Center for Hawaiian Studies and has grown to become a model for science and engineering higher education, bridging educational institutions, government agencies, and private industry. NHSEMP's mission is to provide assistance and opportunities for students to excel in the fields of science, technology, engineering, and mathematics, with the goal of creating leaders from the Native Hawaiian and Pacific Island communities in these fields. This grant will specifically support the goal of increasing the number of Native Hawaiian students graduating with an undergraduate degree or higher or earning a vocational education certificate.

In addition to funding, each scholarship recipient will receive a host of other support services including access to an on-campus coordinator, program orientation, mentorship, professional and leadership development, and cultural workshops.

Funds will be dispersed over two years, with the grant period running from February 1, 2020, through June 30, 2021.



UH STUDENTS TEST AWARD-WINNING GROWING SYSTEM AT NASA HABITAT

Engineering students at the University of Hawai'i at Mānoa successfully tested their award-winning autonomous hydroponic growing system, Box Farm, at the NASA-funded Inflatable Lunar-Mars Habitat at the University of North Dakota (UND) last May.

"Because this system is a proof-of-concept prototype, we want to prove the individual tasks it can do," said Preston Tran, the project's team leader. "Once it's been proven, the system can be expanded to take care of hundreds or thousands of plants." That vision of the future is moving closer to reality as Tran and his team members are developing business plans to start an agricultural technology company.

The director of UND's Human Spaceflight Laboratory, Pablo de León, was impressed. "My first look at it is that it is excellent work, very well designed and mechanically very sound, using state-of-the-art technology in some cases," said de León.

The Box Farm team says the system will cut down on manual labor and increase the productivity of crews in space or on Earth. Trevor Sorenson advised the students on their senior design project for the College of Engineering. He is the project manager for UH Mānoa's Hawai'i Space Flight Laboratory.



COLLEGE OF ENGINEERING WORKING WITH STATE DEPT. OF TRANSPORTATION TO FIGHT COASTAL EROSION

Recent hurricanes, tsunamis and other natural disasters have demonstrated how vulnerable the state is to a catastrophic event. To address these threats heightened by climate change, University of Hawai'i at Mānoa College of Engineering faculty and graduate students have been working with government and industry partners, including the State Department of Transportation, to determine how these factors will affect Hawai'i over the next several decades.

"There's a lot of expertise in the College of Engineering to address infrastructure engineering," said Civil and Environmental Engineering professor Horst Brandes. "We have people working on roads. We have people working on ocean hazards. We have experts working on tsunamis and many other issues that are of concern for the state of Hawai'i."

In a video released last summer, UH researchers, graduate students and experts from government agencies share how they are exploring a wide range of topics including energy distribution, food production and sustainability, water safety and coastal infrastructure resiliency.

To watch the video, go to: <http://go.hawaii.edu/UAA>.

STUDENT FEATURE: MAXX TAGA

No one understands the importance of hands-on experience in learning better than Maxx Taga, a senior Civil Engineering major. For Maxx, the sky is literally the limit: this Hawai'i native and 'Iolani School graduate has already put his skills to use with the likes of NASA and Disneyland, and is currently providing project engineering support for the Ala Moana high-rise residential project "The Central" as an intern with the Hawaiian Dredging Construction Company.

Maxx's coveted internship at the Disneyland Resort in California in 2018 paired him with the Architecture and Facilities Engineering Department, charging him with environmental documentation of water features on facilities including It's a Small World and Splash Mountain. He also conducted structural inspections on popular attractions such as the Matterhorn, Jessie's Critter Carousel, and the Grand California Hotel pool. Additionally, he prepared structural calculation packages for various anchorage design projects including the Incredicoaster Brine Tanks and the Tomorrowland Astro Orbiter Actuator.



Switching gears, in his recent internship at NASA's Glenn Research Center (GRC), Maxx designed a long term campus-wide parking and greenspace master plan, developing strategies to incorporate sustainable and modern features. He also assisted the center's master planner in developing multi-year strategies to implement improvements to parking, green space locations, landscaping, civil engineering, and support for alternative modes of transportation. To top it off, at the NASA GRC Intern Design Challenge, Maxx won both first place and the Innovation Award. His project consisted of developing a smart parking system for the GRC Lewis campus, formulating a plan, budget, and presentation over the course of a weekend and presenting it to a panel of subject matter experts.

What's next? Upon graduating this spring, Maxx plans to rejoin the Disney family as a member of the Walt Disney Imagineering team. And fun fact: prior to pursuing a degree in engineering, Maxx was a VFX artist, working on movies such as The Revenant and Fantastic Four.



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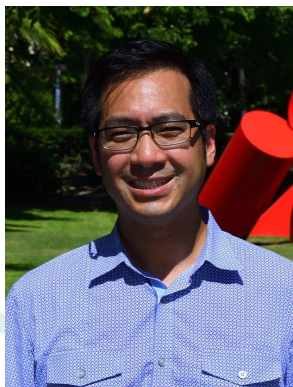
MĀNOA

College of Engineering

2540 Dole Street, Holmes Hall 240

Honolulu, HI 96822

COLLEGE WELCOMES FIVE NEW FACULTY



ROGER CHEN

Civil & Environmental
Engineering
Ph.D. University of Maryland

Research Interests

- ▶ Transportation Engineering and Systems Analysis
- ▶ Smart Cities and Connected Communities
- ▶ Travel Behavior and Demand Modeling



IL YONG CHUN

Electrical Engineering
Ph.D. Purdue University

Research Interests

- ▶ Regression neural networks
- ▶ Machine learning with big data
- ▶ Nonconvex optimization

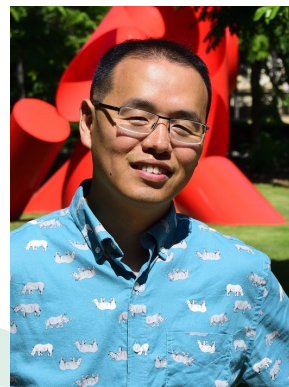


EUNJI JUN

Mechanical Engineering
Ph.D. University of Michigan

Research Interests

- ▶ Rarefied Gas Dynamics
- ▶ Hypersonic Flow
- ▶ Space Propulsion



HYONGSU PARK

Civil & Environmental
Engineering
Ph.D. Oregon State University

Research Interests

- ▶ Coastal inundation process
- ▶ Resilience of a coastal community
- ▶ Coastal debris advection



TYLER RAY

Mechanical Engineering
Ph.D. University of California, Santa Barbara

Research Interests

- ▶ Bio-integrated sensors, microfluidics
- ▶ Additive manufacturing
- ▶ Multiscale/nanoscale materials