Small school stands tall as science powerhouse

Students have prevailed in competitions thanks to a pioneering and intense focus on STEM education

By Susan Essoyan

Kapiolani Community College is best known for training top-notch chefs such as Alan Wong, but the school on the slopes of Diamond Head is quietly making its mark in another field.

Its students are going head-to-head against teams from four-year universities in scientific competitions and winning — for the caliber of their research, team work and sheer effort.

"They win as much as the cooking students do," said Matthew Tuthill, assistant professor of molecular biology and microbiology at KCC. "Yet nobody seems to realize it."

Most recently, seven KCC students built a hot-pink "CanSat," or canister satellite, and trekked to Burkett, Texas, to face off against teams that came from as far as India. KCC's crew took the top prize in the NASA-sponsored CanSat Competition with a payload that deployed from a rocket soaring roughly 2,000 feet, then transmitted data to Earth as it aero-braked and fell at prescribed speeds before landing with a raw egg cradled inside.

"We were really excited that the egg didn't crack," said Logan Tamayo, a gregarious 21-year-old who worked on the electrical system and flight software. "We were the first team that the egg didn't crack."

The students were judged not just for their performance on launch day in June but for eight months of work on the project, including their preliminary design presented in a 100-page document and via teleconference in January; an intensive review of their work in March; and a post-flight analysis.

"This was the first time that an American team placed in the top five in the last two years, and to have it be a community college ..." said Herve Collin, physics professor and CanSat mentor, his voice trailing off. "We were shocked."

The victory in Texas may have surprised the crew, but it was no fluke. The first time KCC participated in the sponsored CanSat Competition on launch day in June but for eight months of work on the project, including their preliminary design presented in a 100-page document and via teleconference in January; an intensive review of their work in March; and a post-flight analysis.

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CanSat competition, in 2009, the little college placed fifth — well ahead of engineering powerhouses including the iconic Massachusetts Institute of Technology, which came in 10th place that year.

KCC has been pioneering new approaches to science education, emphasizing undergraduate research and collaboration. The college piloted a new associate of science degree in natural science in 2007 that has grown exponentially, from 43 students pursuing that major in 2008 to 297 this year, according to Louise Pagotto, vice chancellor for academic affairs.

"The opportunity to work firsthand on research projects is really important because the only way to get kids to be scientists is to have them doing science," Pagotto said. "We have a very robust undergraduate research program."

The STEM Center on campus gives students a place to gather and work in a common area ringed by faculty offices. (STEM stands for Science, Engineering, Technology and Mathematics.) KCC also offers a STEM Summer Bridge program that aims to ease the transition to college and recruit Native Hawaiian students. Six members of the CanSat team had been in Summer Bridge.

"I think the STEM Center is probably the key," said CanSat crew member Diamond Tachera, who will be pursuing a bachelor's in geology and geophysics at the University of Hawaii at Manoa. "There is a sense of community. There are peer mentors who can help you, no judgment. There is always someone there to help."

The CanSat team reunited Thursday at KCC to receive proclamations issued by state officials in their honor. Rae-Zan Belen, McClyde Gaborno, Taylor Viti, Kelsey Kawaguchi and Joshua Tamayo are the five other members of the team.

Addressing KCC's overall strength in science study, Pagotto said in an interview, "We have been very fortunate to get some grant funding from the National Science Foundation, millions of dollars over the years, which gives us funding to support students. We have scholarships for science, we have funds for stipends to pay students to assist faculty doing research, we have funds to pay for students to serve as peer mentors. We are able to help students be successful."

Among KCC's other science projects: growing tumor cells to investigate cancer and to produce DNA using mice to make antibodies for the research community in Hawaii; and creating remotely-operated vehicles that roam underwater.

"We're probably the only community college in the nation that produces monoclonal antibodies," Tuthill said. "It's embedded in the biotechnology certificate program we have here."

"Community colleges are traditionally seen as vocational or terminal or transfer places," he said. "They are not seen as their own institutions that are able to do a wide range of things. The research we are able to do with our students is really pushing boundaries at both the local and national level."

In the past year, four biomedical students from KCC received awards at the SACNAS national conference, competing against four-year institutions:

- Codi Wong and Lucas Manica-Heldt earned national distinction in cell and molecular biology for building a new method to measure bacterial infection of human cells.
- Micah Garvilles and Thomas Premeaux earned national distinction in biology for their work measuring the levels of a cancer gene in human cancer samples.

In April, KCC student Robin Kaai won for best overall undergraduate presentation at the University of Hawaii Medical School Biomedical Sciences and Health Disparities Symposium for his research on using genetically modified viruses to produce antibodies.

"We use a viral laboratory to produce and target the antibody that we want," said Kaai, who received his associate of science degree at KCC and works as a peer mentor. "It cuts cost, it cuts time and it's an alternative to the use of animals."

A Waianae High School graduate, Kaai spent time as a medic in the military before coming to KCC and considering nursing. He shifted gears after taking a microbiology course from Tuthill, an eager and inspiring teacher, and is now aiming for graduate school in molecular biology or medical school.

Collin, the CanSat mentor, ignited his students' interest in CanSat, but the kids had to create their "satellite" and control station themselves and figure out how to make it all work.

"This entire project was student-driven," said Gaborno, a CanSat team member who is headed to UH-Manoa this fall to pursue a civil engineering degree. "He (Collin) was there to make sure we were meeting deadlines and provide encouragement."

"In the real world, your boss is not going to be there telling you exactly what you need to do," Gaborno added. "It's prepared us for the real world."

The KCC students not only earned the top trophy in Texas, they showed a sense of aloha. A team from India suffered a devastating blow when it went through customs in Japan and most of its CanSat equipment was confiscated as suspicious.

"We had spare stuff, enough to make multiples, and we tried to offer it up to them," Logan Tamayo said. "We thought they could make something with what we had and what they still had. That way they would have something to show for themselves."

The judges mixed that plan but praised the Kapiolani students for their sportsmanship.
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Mythman wrote:
This is LARGE, MAJOR - heading in the right direction, contributing to the framework for Hawaii's future. I would caution students stay away from HECO and U of H medical school, however, for the time being, as these folks are still bound up in the old Democratic Party style one hand washing the other circumvention of normal processes routine established by 50 years of one party rule with a "king" at the top. Anyone see any similarities to the one party system in China - where the party bosses write the script and everyone else, like the courts and the schools, are just mouthing their lines? Did Inouye pull strings or push buttons to get the NSF grants?

on August 24, 2013 | 05:07AM

palani wrote:
Speaking of China's one party system:

Chinese prof banned from classrooms over speech

on August 24, 2013 | 05:57AM

false wrote:
Our Community Colleges are the stars of the University system. They should be the leading organization and UHM should be a chancellor below.

on August 24, 2013 | 06:21AM

RetiredWorking wrote:
IRT Myth, somehow you have taken such a proud accomplishment of our local State community college and turned it ugly. Go figure. You're a sad case. Congrats, KCC! You've proven yourselves to be the best in the world. Wow! A small time community college in the middle of the Pacific, badly trouncing Goliaths like MIT! Awesome!

on August 24, 2013 | 07:38AM
palani wrote:
Very, very impressive, KCC students and faculty. Keep up the good work!

on August 24, 2013 | 05:47AM

bnc_connection wrote:
Agreed!

on August 24, 2013 | 06:42AM

Tutulois wrote:
GOOD news! I am really encouraged by this, and especially the connections with local high schools. Good science education needs to begin early.

on August 24, 2013 | 06:19AM

Allie wrote:
agree

on August 24, 2013 | 08:20AM

False wrote:
Next reading assignment for up and coming talent. Thanks.

on August 24, 2013 | 06:35AM

Hilocal wrote:
Great article on deserving but heretofore unrecognized KCC students and staff for national scientific achievements. Mahalo, Susan Essoyan and Star-Advertiser! Let's have more stories on academic achievement. We have all too many on athletic achievement.

on August 24, 2013 | 06:44AM

Maili2 wrote:
Teamwork is wonderful and it is inspiring to me that these students are working so hard—May they use their intelligence and efforts to help humankind not hinder.

on August 24, 2013 | 06:55AM

Allie wrote:
yup

on August 24, 2013 | 08:19AM

JKertis wrote:
Congrats KCC. Maybe SA reporters should take classes there to learn to write. ("STEM stands for Science, Engineering, Technology and Mathematics")

on August 24, 2013 | 07:13AM

Allie wrote:
Congrats to all...great story. Let us see more of this kind of coverage and less on the public entertainment football program

on August 24, 2013 | 08:19AM

IN OTHER NEWS
San Diego Mayor Agrees to Resign
Mayor Bob Filner agreed Friday to resign on Aug. 30, bowing to enormous pressure after lurid sexual harassment allegations brought by at least 17 women eroded his support after just nine months on the job. (Aug. 23)