**engineering** FOR SILICON VALLEY AND A BETTER WORLD

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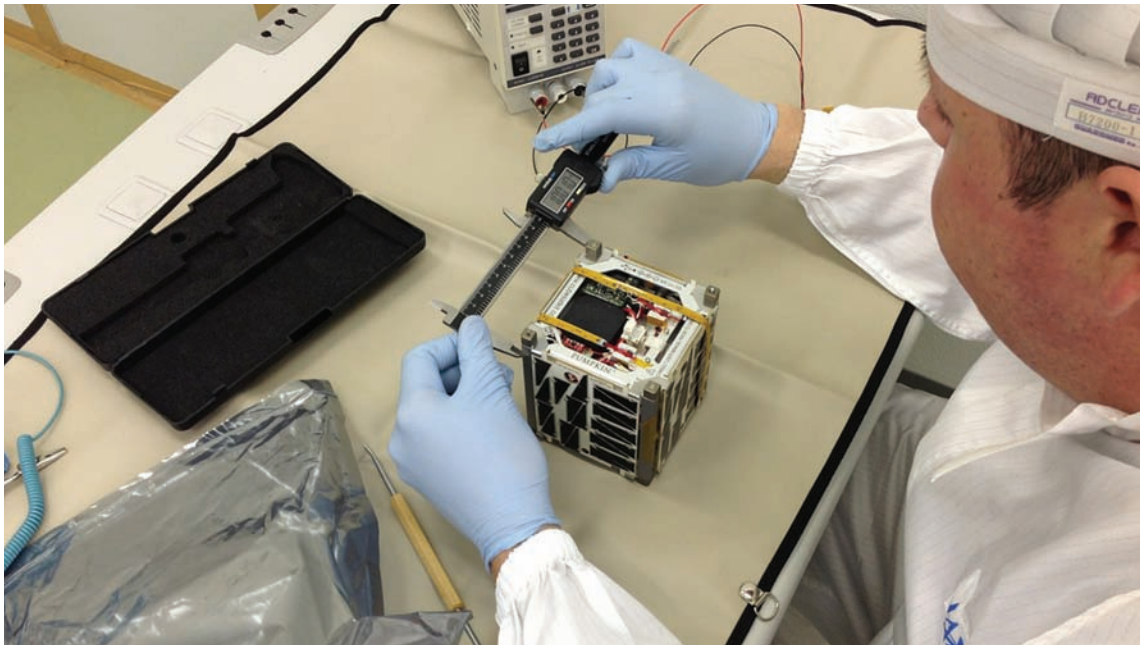

# Ingenuity in orbit

## *SJSU STUDENTS PARTNER WITH NASA TO LAUNCH TINY SATELLITE FROM INTERNATIONAL SPACE STATION*

Some 230 miles above our heads, a tiny cube-shaped satellite just four inches on a side has been steadily orbiting the Earth for weeks, transmitting a ham radio signal that can be monitored by space enthusiasts.

Hand-built by students in the Charles W. Davidson College of Engineering, the Technical Education Satellite (informally known as TechEdSat) represents a major collaboration between NASA and San José State University.

Completed in just eight months, for less than $40,000 in materials, the satellite worked perfectly when it was launched from the International Space Station (ISS) on Oct. 4.

Not bad work in a business where even $300 million communications satellites sometimes fail to operate properly, says Periklis Papadopoulos, a professor and director of the Aerospace Graduate Studies and Research program who oversaw the project.

A 20-year NASA veteran, Papadopoulos says TechEdSat is an example of a "cubesat," a standardized small-satellite platform built around a cubic frame that is 10 centimeters on a side.

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# Changing deans

## *CONTINUITY IN A TIME OF CHANGE: PING HSU STEPS IN AS INTERIM DEAN*

ROBERT BAIN

Ping Hsu was wrapping up another semester teaching in the Electrical Engineering department last May when he got a call from his longtime friend and colleague, Dean Belle Wei.

Wei, who had led the Charles W. Davidson College of Engineering since 2002 told him she was stepping down in order to become the new provost at California State University, Chico. Would he be willing to serve as interim dean?

"I said I'd be happy to," Hsu recalls. "About a month after that I got a call from the provost."

Hsu, who does not plan to apply for the permanent position, will oversee the college while a national search is mounted for a new dean. "My term officially ends when there is a new dean identified," Hsu says. "It could be as early as next spring."

Hsu, who has taught at San José State University for 22 years, has some prior administrative experience in the Davidson College. He served from 2001-2007 as one of three associate deans.

"I was the 'management' dean," he says. "I was pretty much given the responsibility of all the internal college operations except the budget. I had the responsibility of looking at the operation of the college."

Hsu's journey began in his native Taiwan. As a teenage tech hobbyist, he haunted electronics surplus stores, sorting through transistors and resistors, which were coded according to color pattern that he still has memorized.

Radio-frequency components were a big find, because in the 1970s the government (then under martial law) restricted the public's access to transmitter-building equipment, he says. "For engineering students back then, it was a big thrill to build these transmitters."

After college in Taiwan, Hsu came to the U.S. to earn his master's degree at Southern Methodist University in Dallas. He later worked for four years at a defense-related job in the private sector before moving to the University of California, Berkeley, to study for his Ph.D.

His focus was on control theory, with robotics as a primary application. His work, today mostly conducted on computers, can be applied to such areas as control systems for wind power turbines, he says.

After Berkeley, Hsu says, he almost left the Bay Area for good.

"I came to San José State, I interviewed, I got an offer and I turned it down and took a job at the University of Illinois at Urbana-Champaign," he says. He rethought the decision after he and his family spent a year and a half in the Midwest, learning about snow and sub-zero temperatures.

"I went through the winter and I looked at what I really wanted to do, and I called the department chair here," Hsu recalls. "He was very nice. They pretty much reinstated my offer without an interview, and I was very grateful for that."

Even though he is serving on an interim basis, Hsu is personally overseeing a major new project in the college, the roll-out of a "flipped classroom" learning environment for the introductory electrical engineering course.

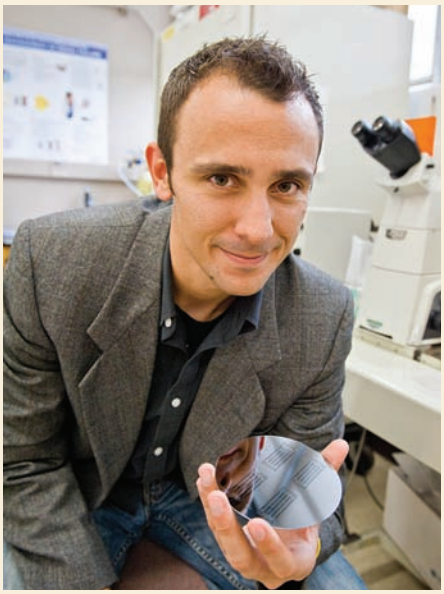
This novel approach, currently being tested on a pilot basis with a section of Electrical Engineering 98 , relies on lectures and other materials delivered by *edX*, a consortium run by MIT, Harvard University, UC Berkeley and the University of Texas System (*see related story on page 8*).

As for Dean Wei's dedication to make the college a more welcoming place for women, minorities and students who are the first in their families to attend college, Hsu vows to stay the course.

"The vision and mission remain the same," he says.

# Multidisciplinary mastermind

*THE NEWEST MEMBER OF THE BIOMEDICAL ENGINEERING PROGRAM*



ROBERT BAIN

As the first tenure-track faculty member hired to staff the new Biomedical Engineering program in the Charles W. Davidson College of Engineering, Benjamin Hawkins knows he is facing some big new challenges.

"It's exciting and intimidating, all at once," says Hawkins, newly arrived from a post-doctoral fellowship at the National Institute of Standards and Technology. "I think they did a good job of establishing the base program."

For Hawkins, who grew up in Fresno and earned his undergraduate degree in electrical engineering from California State University, Fresno, his new post at San José State University is a return to familiar turf. "I'm really happy to be back in California," he says.

Hawkins helped developed battery charging systems as an undergraduate, but expanded his repertoire while earning his Ph.D. in biomedical engineering at Cornell University. There, he developed screening methods to sort microbes called *Mycobacteria smegmatis* based on differences in their bacterial cell membranes using a technique called dielectrophoretic particle manipulation.

The ability to isolate specific cell populations according to their disease-causing potential can help scientists who are trying to develop targeted new therapies, Hawkins says.

During his Ph.D. program he spent six weeks shadowing physicians at a hospital in New York City—"it was all the best parts of being a medical student," he says. One doctor asked him to study high-frequency oscillatory ventilation. "The goal of my project was to develop a computational model for how air might flow into the lungs," Hawkins says.

Biomedical engineers have to bridge a unique gap between distinct disciplines, he observes. "You have to speak the language of engineering to the engineer and the language of medicine to the surgeons and the doctors."

He spent his post-doc at NIST developing microfluidic devices that can culture and record the characteristics of biofilms—bacterial colonies that coat all sorts of everyday surfaces and often cause opportunistic infections.

Many hospital-acquired infections, as well as those that occur in a significant number of hip implants, are caused by biofilms, Hawkins points out, and these bacteria can easily become antibiotic-resistant. "This is how you get persistent infections," he says.

One advantage of microfluidic technology is "you can get a fairly high signal from a small sample," Hawkins says. In a laboratory setting, that could allow scientists to study the behavior of individual cells and improve the understanding of the large-scale interaction of millions of cells at once.

This semester Hawkins is teaching "Introduction to Biomedical Engineering," the junior-level class that serves as a gateway to the rest of the curriculum in the major, he says.

"I get to talk about the variety of biomedical engineering," he says. "It's at the confluence of so many disciplines. I like the more scientific and applied aspects of it."

The Davidson College's undergraduate and graduate biomedical engineering programs were a long time in coming. They date back to 2004, when Guna Selvaduray, professor of chemical and materials engineering, started to develop a curriculum. The California State University chancellor's office approved adding the new majors last fall.

Hawkins says biomedical engineering solutions often draw on expertise from a variety of different specialties, which is one reason he was drawn to the area. "It's highly interdisciplinary," he says. "You get people from all kinds of backgrounds who have contributions to make."

Hawkins, who has dedicated laboratory space for ongoing research, has an idea for developing an in-vitro model for biofilm infections, as well as plans to develop new dielectrophoretic assay techniques.

For now, however, he's working on his classroom chops.

"I'm relatively new to teaching, but I'm really enjoying it," he says. "One of the best things I can do in the classroom is lower the barriers to interacting. If I spend 15 minutes lecturing, and an hour answering questions, that's a successful class."

INGENUITY IN ORBIT CONTINUED FROM PAGE 1

The satellite was designed to test so-called "space plug-and-play" software architecture used to configure nanosatellite avionics components. Later versions of the satellite will also help to develop capabilities of the Iridium and Orbcomm satellite systems.

"A lot of us do cubesats," Papadopoulos says. "Very few have flown."

Aaron Cohen, a recent graduate of the aeronautic master's program who now works for NASA, was the spacecraft manager for the project.

"It was first and foremost a technical demonstration," Cohen says. "We bought an off-the-shelf structure and off-the-shelf electrical components and integrated them."

A core group of four students (which would later grow to nine altogether) started planning the mission in late October 2011. Cohen still marvels at a meeting with John Hines, chief technologist at the NASA-Ames Research Center, where they pitched their concept.

"I've got a drawing on a napkin that John Hines wrote and said, 'Make this,'" Cohen says. "He was instrumental, in that he allowed the students to engage."

The students tested the cubesat's components in near-space environments on the ground, subjecting it to shock, vacuum conditions and extremes of heat and cold. "This was all supervised by NASA experts," Cohen says. "The NASA guys are saying we wrote the standards for cubesat deployment on the ISS."

**"A LOT OF US DO CUBESATS. VERY FEW HAVE FLOWN."**

There was also a lengthy safety review process. Cohen remembers being peppered with questions in a five-hour hearing with 40 NASA experts who were "throwing darts." Now, he says, "I think getting through the safety review process as quickly as we did was one of our major accomplishments."

With all its safety clearances in place, the cubesat flew to the space station aboard a Japanese cargo rocket on July 21, 2012.

Cohen, who wrote the majority of the software for the flight, describes the project as "an amazing learning experience." Afterwards, he says, "Everyone on the team got hired. This group of students is the future of the NASA micro-satellite division."

Thanks to this program's success, San José State has been approached by NASA and the Defense Advanced Research Projects Agency (DARPA) about future collaboration, Papadopoulos says.

Meanwhile, military agencies are developing rockets specifically designed to launch cubesats cheaply. "NASA couldn't have done this in this time frame," he points out. In fact, he says, many government aerospace projects never get off the ground. Even among long-time NASA employees, "very few get the opportunity to fly," he says.

Papadopoulos says the project's success was "not by accident," because students in his program frequently interact with NASA-Ames scientists and understand what the technical requirements are.

"Our kids stand out from other students," he says. "They grab the opportunity. They don't waste it."

# A vision takes wing

## *AERONAUTICAL ENGINEERING STUDENTS WIN INTERNATIONAL AIRCRAFT DESIGN COMPETITION*

For a visionary group of students in San José State University's Mechanical and Aerospace Engineering department, it might be said that their dreams took flight last spring on wings made of balsa wood, Kevlar tape, carbon fiber and heat-treated plastic shrink wrap.

Or maybe it was just logic and old-fashioned persistence that helped them to overcome crashes, burned-out motors, structural flaws and a last-minute tornado to win a prestigious international model-airplane design contest.

The 2011-2012 Cessna Aircraft Company/Raytheon Missile Systems Student Design/Build/Fly Competition, sponsored by the American Institute of Aeronautics and Astronautics Foundation, called for an electrically powered radio-controlled model that simulated a small civilian passenger plane.

In a three-day competition at Cessna Field in Wichita, Kansas, last April, the San José State team won first place—and a $2,500 prize—with a design they dubbed PhalanX, beating out 68 teams from such heavy-hitting engineering programs as MIT, Cornell and Columbia.

"Nothing we did here is too progressive," says Thomas Zumsteg, the 13-member team's recently graduated project manager, as he examined a prototype of the plane in the Davidson College of Engineering's aeronautics shop. "We put it together really well."

The contest's design requirements called for an aircraft that could take off from a 100-foot-long runway and alternately carry payloads of

**An SJSU team beat out dozens of other schools in a prestigious international competition with its PhalanX aircraft design.**

eight half-pound aluminum blocks or two liters of water to an altitude of 100 meters.

The PhalanX design, which features a 51.6-inch wingspan, a 15-cell rechargeable nickel-metal hydride battery and ultra-light structural components, weighed a total of 1.75 pounds, says team member Tung Dao, making it less than half as heavy as the plane flown by the second-place team.

"It's all about trade-offs," Zumsteg says. "Our trade-off was to go for a really, really light aircraft that was fast."

Overseen by Prof. Gonzalo Mendoza, the design process started in August 2011 as the team prioritized what attributes they wanted their plane to have, which would in turn dictate the aircraft's shape. "We wanted it to be light first, then fast, then it had to be able to climb," Zumsteg says.

Then it was time to start building prototypes—five in all. They lacked a wind tunnel, but team member Norio Eda says they had something that worked just as well: "We had a car with a sun roof," he says. "We drove around with the plane on a stick."

But perhaps the greatest challenge was waterproofing the aircraft, Eda says, "because water and balsa wood don't mix."

Because each university could only send one team, the PhalanX crew first had to fend off a challenge from another San José State team. During a fly-off, one prototype airplane crashed in front of a professor. "We think it's got something to do with not putting enough glue on it," Eda says.

In April, four team members drove their plane to the Cessna facility in Wichita. The student aviators, including teams from foreign countries, had to contend with winds so heavy that some airplanes flew backwards, Zumsteg says. But the PhalanX more than held its own.

"We put ours up and it was agile and it was fast," he says. "It was something." On the final day, a violent weather system brought a tornado to the vicinity, shutting down the competition, Zumsteg adds.

This was the first time a San José State team had won the AIAA competition, says Nikos Mourtos, professor and director of the aeropace engineering program. The contest, which is integrated with an aircraft design course, gives students a great opportunity to see their designs move from the conceptual stage through to completion.

"This is the most realistic course that we have in the curriculum, and I would say the most valuable, because the students really have to deal with open-ended problems," Mourtos says. "When you design an airplane, you start basically with a few requirements, but you have to make a lot of assumptions. There are multiple paths you can take."

The PhalanX team won because they understood that in engineering design no one gets it right the first time, he says.

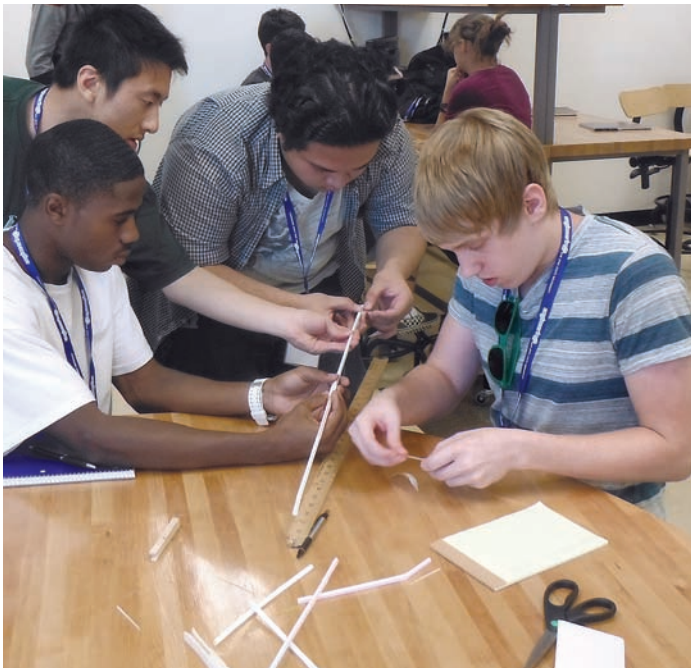
"What this team did is they continued to improve their airplane," Mourtos says. "They would do flight tests. They would observe the airplane and say, 'We can trim a little bit of weight here or make the wing a little bit smaller there.' That enabled them to optimize the airplane."

Meanwhile, Mourtos says, "We're going to have another competition this year, and we have a larger class, so we will probably have four or five teams. We will have to select the best one."

Zumsteg remembers a lot of grueling 18-hour days working on the project, but he wouldn't trade the experience for anything. "There's nothing like watching it take off for the first time," he says. "It's very satisfying to have something you built go out and fly."

# Scholastic solutions

*SEEING RESULTS FROM ENGINEERING PATHWAYS TO SUCCESS INITIATIVE*



Last August, a couple of weeks before hordes of young people started trooping back to the San José State University campus, a group of 32 newly arrived engineering students had already moved into the dormitories.

They had been selected to take part in a pilot program called Excellence in Your Engineering Education (EXCEED), a 10-day campus immersion experience run by the Charles W. Davidson College of Engineering aimed at helping first-year students meet the demands of college.

The students took classes and sampled campus life, eating in the dining halls and taking part in study groups. They also participated in service learning projects, using their nascent engineering skills to design team-based solutions to meet the needs of local non-profit organizations.

"We're providing a lot of resources and activities that will help incoming freshmen jump right in and become part of the college community," says Stacy Gleixner, professor of Materials Engineering and EXCEED academic program director. "We focused on giving them skills to work together as a team and communicate their ideas."

EXCEED is a cornerstone of Engineering Pathways to Success (EPS), an ambitious effort to increase the number, preparedness and diversity of incoming engineering students, says Associate Dean Emily Allen.

Another part of the EPS initiative is Project Lead the Way (PLTW), which provides 3,000 Bay Area public school students a hands-on engineering curriculum to prepare them for college-level courses.

PLTW develops enriched science, technology, engineering and mathematics (STEM) curricula for middle and high schools. The not-for-profit serves 4,200 schools in all 50 states, with San José State hosting the regional center that oversees 11 northern California counties.

The first cohort of local students to have undergone Project Lead the Way training enrolled in the college a year ago. "We have data that shows they're doing better than the overall students," Allen says.

To provide peer support for PLTW, some Davidson College students are also trained as "engineering ambassadors" to work with K-12 students to help translate engineering principles for younger learners.

Meanwhile, the college offers an intensive two-week boot camp-style training for PLTW teachers. Last June, more than 60 teachers came to campus for classes taught by seven master teachers who have been certified by the national PLTW organization.

Middle school teachers took part in the Gateway to Technology curriculum training, while high school teachers studied Introduction to Engineering Design (IED), Principles of Engineering (POE) or Digital Electronics (DE). "The classes are really, really cool," Allen says.

The teachers, who underwent the training on their own time, were mainly from California. Some had engineering backgrounds, while others teach physics, math or industrial arts. One-day refresher courses are also being offered this fall, she says.

EPS was launched in Spring 2011 as a joint venture with the Lurie College of Education and the College of Science with $1 million in donations from Silicon Valley businesses. Donors included KLA-Tencor, Xilinx, Intel, Cisco Systems, Chevron Corp., Aruba Networks and Agilent Technologies, as well as some private individuals.

The idea was to broaden the pool from which future engineers are recruited, Allen says. Attracting more girls and students of color is a must. "We're looking for a different kind of student," she says. "It's not only about drawing in life-long geeks."

The participants in the EXCEED summer program represented just a fraction of 500 or so entering freshmen, Allen says. They applied online and were selected according to specific criteria.

"We wanted to target a certain math demographic," she says, meaning students who were ready to enroll in pre-calculus or calculus. Many, but not all, were graduates of PLTW high school programs.

The students took math and writing workshops and also engaged in service learning projects. The students designed and built specially purposed carts for one non-profit organization as well as composting containers for a community garden.

The program was not for the fainthearted: many days, the program ran for 14 hours, Allen says. In addition to the classroom sessions, time was set aside for social activities, like bowling, board games and movie nights, as well as an information session for parents led by Jared Tuberty, executive director of Engineering Student Success Programs.

"The ones I've talked to since then said they felt so much better prepared just to be on campus," says Allen. "They were very acclimated when school started."

The students had help from mentors like Cassandra Acosta, a mechanical engineering senior and peer advisor for the Student Success Center. "Engineering is hard work," Acosta says. "Students benefit from having a strong support system in place to help them stay on track. That's why the EXCEED program is so important—the head start is already having a positive impact on these new students."

**First-year engineering students in the EXCEED summer program designed and built solutions for non-profit organizations.**

# edX

## *ONLINE ELECTRICAL ENGINEERING COURSE MAKES FOR A "FLIPPED CLASSROOM"*

The 88 students who have been showing up this semester for Khosrow Ghadiri's section of EE98—the introductory electrical engineering course—know they won't hear a long, boring lecture.

They are more likely to break up into small groups to work on problem sets and discuss material they've been studying outside of class, while Ghadiri and his two teaching assistants administer short quizzes and circulate through the room.

"In my classroom, if a lion roared you wouldn't hear it because everyone is passionately arguing with each other," says Ghadiri, a professor in the Electrical Engineering department. "I am like a ringmaster or a referee. There is so much enthusiasm and passion involved."

Ghadiri's students do receive lectures, but they're delivered online by an Massachusetts Institute of Technology engineering professor named Anant Agarwal via *edX*, a new $60 million collaboration between MIT, Harvard University, the University of California, Berkeley, and the University of Texas System aimed at making high-quality instruction available worldwide.

After watching Agarwal's lectures on their own, students come to class to collaborate in small teams, bringing questions to Ghadiri and his assistants as needed.

"They argue with each other over how to solve the problem," he says, adding that this so-called "flipped classroom" actively engages students in the learning process.

Two other EE98 sections are being taught in a traditional way, says Prof. David Parent, electrical engineering undergraduate coordinator. "Essentially, we're running a pilot and gathering all the requisite statistical evidence to show whether it's worth it," he says.

Usually taken by second-year undergraduates, EE98 is a difficult, lecture-based make-or-break course, Parent says. "If you don't pass it, you delay your graduation by at least a semester," he says.

"The MIT curriculum was set up as if you were an electrical engineer at Intel designing chips," Parent says. "When they come into this class they're actually working like they would on the job—in teams."

Studies show the average student has an attention span of seven to 10 minutes. "In the traditional classroom the teacher is standing at the front of the room and lecturing for 75 minutes," Ghadiri says. The *edX* lectures are in segments lasting no more than 10 minutes. Transcriptions run alongside the video window—a boon for non-native English speakers.

The course also allows for online discussion groups, wiki-based collaborative learning and online labs. Its non-proprietary technology allows San José State University faculty to add their own content, Ghadiri says.

San José State's collaboration with the *edX* consortium came about thanks to university provost Ellen Junn, who was preparing to visit Cambridge, Mass., last May for her daughter's graduation from Harvard when the project was announced. She quickly contacted Agarwal, director of MIT's Computer Science and Artificial Intelligence Laboratory, and the founding president of *edX*.

In a happy coincidence, Junn learned that Agarwal once lived just blocks from the San José State campus while his wife was a student there. MIT and San José State professors met to work out the parameters of the experimental EE98 section.

Junn says the move should improve the school's standing with Silicon Valley. "We haven't leveraged our location to participate with people doing really cutting-edge things," she says. "The notion of collaborating with top-notch faculty across the nation—that's a very exciting thing."

CHRISTINA OLIVAS

**Khosrow Ghadiri's EE98 students use class time to discuss what they've learned from lectures delivered online via their *edX* course.**

Interim engineering dean Ping Hsu confesses a fondness for old-style lecturing, but he recalls with a wry smile giving a quiz after a talk to an EE98 class. "I thought I did a really good job with presenting the material and thought for sure they could answer these questions," he says. "I was totally wrong."

Research findings about student attention spans are compelling, Hsu adds. "It's not how well you teach," he says. "It's about whether the student is ready to learn."

The obvious signs of engagement by students in Khosrow's *edX* class have made believers of Hsu and his colleagues.

"Just observing my team, our attitude was skepticism at first," Hsu says. "I've seen it change to commitment, and now, it's passion."

# Personalized programs

*DELIVERING GRADUATE COURSES CUSTOM-TAILORED FOR SILICON VALLEY FIRMS*

One evening a week this fall, more than 300 professionals working for Silicon Valley firms like KLA-Tencor and Lockheed Martin have gathered after work in company-owned classrooms to take courses toward master's degrees offered by the Charles W. Davidson College of Engineering.

Grouped into cohorts of 30 or 35 students, they will need between 18 months and two years to earn their San José State University degrees by taking eight seminar courses and completing two project-based courses.

It's a "win-win" for the college and area technology firms that have a keen interest in keeping their employees' skills up-to-date, says Ahmed Hambaba, associate dean for Graduate & Extended Studies.

Davidson College faculty members team-teach each class with one or two senior staff experts from the companies, giving them exposure to the latest cutting-edge technical developments in their fields, Hambaba says. They will often arrive early or stay after class to interact with students and answer their questions.

"It's actually professional development for the faculty," he says. "I would say 30 to 35 percent of faculty are engaged in off-campus programs. They like to do it, because you're challenging them."

The college has been offering advanced degree programs in off-campus settings since 1996. In developing the corporate programs, Hambaba, who has been associate dean since 2004, says he has tried to stay attuned to what kinds of skills Silicon Valley companies want their employees to master.

"When I came in I started being more of an entrepreneur, listening to the companies and expanding the programs," he says. "We have to always collaborate with partners in Silicon Valley, because they are the state of the art."

A total of 18 professional degree programs are being taught at companies like IBM, Cisco, Applied Materials, Lockheed Martin, KLA-Tencor, LAM Research and Hewlett Packard in areas like systems engineering, cloud computing, software engineering and optoelectronic systems.

The companies each sign a memorandum of understanding with the college and usually pay for the students' tuition, Hambaba says. Meanwhile, their technical experts work with college faculty to design the course materials and often become so enamored of teaching that they join the Davidson College as adjunct faculty, he says.

Many of the students already have master's or Ph.D. degrees, Hambaba says, but they are retraining because their companies are changing direction and need workers with different skill-sets.

ROBERT BAIN

"These companies have an ongoing commitment to training," he explains. "It's important for the company to always stay on the front line."

Each company has unique needs and its own demographic profile. At Lockheed Martin, where the college offers aeronautic and mechanical engineering degrees, 60 percent of the workers are in their 50s, while the work force skews younger at a company like Cisco, Hambaba says.

The classroom collaborations often benefit the Davidson College faculty, who may find themselves learning as much as they're teaching. "There are a lot of things where we don't have the expertise," Hambaba says. "We draw the expertise from them."

While the off-site classroom model works well, evolving communications technology is offering fresh opportunities to reach out to students, Hambaba says. "We are moving for quite a few programs to be full-force online," he says.

This is particularly attractive to companies with multinational workforces, Hambaba says. Many of them have their own internal video link systems, creating an ideal method for delivering course content.

The off-campus programs meanwhile offer an ideal opportunity to become better acquainted with Silicon Valley leaders. "We develop some intimacy with them," he says. "When you call, they pick up the phone."

Hambaba also invites executives to visit campus to participate in the Silicon Valley Leaders Symposium. Nearly every week this fall, a local business leader has led an hour-long presentation in the Engineering Building auditorium.

He also has his eye on new areas, like mobile technology or cyber security, that are of great interest to the companies with which he partners. It's a matter, he says, of following the demand.

"For me, it's really integrating with Silicon Valley," Hambaba says. "Whenever I see an opportunity with a company, I jump on it."

# Spring Awards Banquet

*CELEBRATING THE BEST AND BRIGHTEST*

## 2012 AWARDS BANQUET

Prominent business leaders **Chia-Juch Chang** and **Amarjit Gill** were honored with Alumni Awards of Distinction at the Charles W. Davidson College of Engineering 2012 Awards Banquet, held May 9 at the Fairmont Hotel in downtown San José.

Mohammed H. Qayoumi, president of San José State University, presented the pair with the college's highest honor. The Award of Distinction, established in 1980, recognizes alumni whose superior professional accomplishments are matched by significant service to community and professional organizations.

Keynote speaker Paul Saffo, a futurist with Discern Analytics who also teaches at Stanford University, reminded his audience that in times of economic uncertainty, engineers are needed more than ever.

Former dean Belle Wei made the case for greater inclusiveness in higher education. "Inclusiveness means all people, from a variety of diverse backgrounds, especially those from traditionally underserved communities," she said. "It also includes a variety of domains of expertise because the challenges facing us today are too complex for us to limit ourselves to a single domain of knowledge."

The banquet, which drew 550 guests, had 33 company-sponsored tables, underlining the close relationship between the college and Silicon Valley. In addition to recognizing accomplished alumni, it was an occasion for celebrating the contributions of five faculty members for their contributions as teachers and scholars.

**Xiao Su** (Computer Engineering), won the Applied Materials Faculty Award for Excellence in Teaching. **Winncy Du** (Mechanical Engineering) received the Charles W. Davidson College of Engineering Faculty Award for Excellence in Scholarship. **Richard Chung** (Materials Engineering), was given the McCoy Family Faculty Award for Excellence in Service. **Essam Marouf** (Electrical Engineering) took home the Newnan Brothers Award for Faculty Excellence, and **Dan Harkey** (Computer Engineering) was named Outstanding Lecturer. Dean's office staffer **Molly Crowe** received the Onslow Rudolph Jr. Staff Award for Excellence in Service.

Four outstanding students were also recognized for their achievements. Electrical engineering major **Stephanie Fung** won the Lockheed Martin Student Award for Academic Performance for an Undergraduate, while **Manuel Ahumada**, a mechanical engineering major, received the Donald Beall-Rockwell Award for Engineering Accomplishment.

**Miguel Rebollar**, a civil engineering major, won the Scott T. Axline Memorial Student Award for Excellence in Service, and **David Kao**, a master's degree candidate in materials engineering, won Charles W. Davidson College of Engineering Award for Academic Performance for a Graduate Student.

Chang is chairman and CEO of the China Airlines Group, Taiwan's largest airline. He started his career in academia, teaching at Marquette University from 1979 to 1981 and at National Chiao Tung University from 1981 to 1987.

He became director general of Taiwan's Institute of Transportation in 1987. Beginning in 1995, he served for a decade as the vice minister of the Ministry of Transportation and Communications, where he oversaw land, maritime and air transportation, as well as telecommunications, meteorology and tourism affairs.

In 1998, the Sun Yin Shung Memorial Foundation honored Chang as Taiwan's Outstanding Civil Servant and in 2005 he was awarded his nation's Gold Medal of Professional Excellence in Transportation.

Beginning in 2005, he served for three years as president of Chung Hua University, growing its enrollment to more than 10,000 students. From 2008 to 2010, he was chairman and CEO of China Steel Corp., one of the 20 largest steel producers in the world.

Chang holds a doctorate from Purdue University, a master's degree in civil engineering from San José State (1976), and a bachelor's degree

**Left to right, top to bottom: Xiao Su** ( Applied Materials Award for Excellence in Teaching); **Winncy Du** (Faculty Award for Excellence in Scholarship); **Richard Chung** (Faculty Award for Excellence in Service); **Essam Marouf** (Faculty Excellence); **Dan Harkey** (Outstanding Lecturer); **Molly Crowe** (Staff Excellence in Service Award); **Stephanie Fung** (Lockheed Martin Student Award for Academic Performance for an Undergraduate); **Manuel Ahumada** (Donald Beall-Rockwell Award for Engineering Accomplishment); **Miguel Rebollar** (Scott T. Axline Memorial Student Award for Excellence in Service); **David Kao** (Graduate Student Award for Academic Performance).

in civil engineering from National Cheng Kung University. Purdue has recognized him as a Distinguished Engineering Alumnus.

Gill is co-founder and CEO of the software systems startup Maginatics, Inc., his fourth company.

In 2009, he co-founded Agnilux, a builder of cloud server architectures purchased by Google in 2010. From 2003 to 2008, he was co-founder and executive vice president of sales and business development at P.A. Semi, a fabless PowerPC chip designer purchased by Apple in 2008.

And in 1998, he was co-founder and vice president of sales and business development for semiconductor company SiByte Inc., which developed the first integrated multicore systems on chip and was acquired by Broadcom in 2001.

He has 17 years experience in the embedded-microprocessor industry, including work with National Semiconductor, Texas Instruments and Digital Semiconductor, where he served as director of sales for global accounts.

He earned a bachelor's degree in electrical engineering from San José State University in 1983.

## CONCRETE AWARDS

The San José State University student chapter of the American Concrete Institute was one of 15 nationwide that received ACI's Outstanding University award at the organization's 2012 annual convention in Dallas.

The award recognizes active ACI student chapters that have participated in ACI-related activities, including competitions, local chapter meetings and national conventions.

This was the first time SJSU's student chapter has received the award. The chapter's 20 members maintain an active presence on campus and student membership events, participate in a variety of ACI-sponsored events and share their engineering experience with local high school students.

"I'm very proud of our students, their commitment to ACI and their diligence in applying for this prestigious award," said faculty advisor Akthem Al-Manaseer, a professor of Structural Engineering.

"This national recognition brings merit to our department, the College of Engineering and San José State University. These students are role models for what commitment and hard work can achieve."

SAN JOSÉ STATE UNIVERSITY

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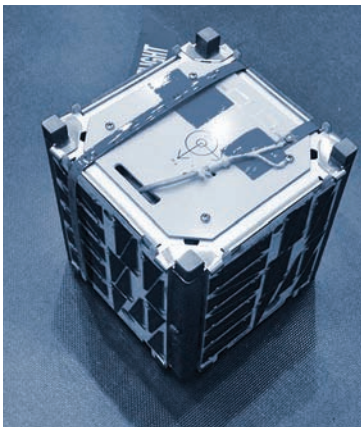

**Davidson College students design and launch tiny cubesat into orbit**
*(see story page 1)*

**Fall 2012**
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