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School of Engineering

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Horizons
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Dean's Message

Lately, I have been thinking a lot about what it means to be a Jesuit institution; what is a Jesuit education? Most agree a Jesuit education entails teaching students how to think independently and inspiring them to act responsibly for the good of others. It is the second half of this equation that has gotten me thinking.

There is a beautiful history of SCU, *Serving the Intellect, Touching the Heart*, by Professors George Giacomini and Gerald McKevitt, S.J. This title, I believe, captures the essence of Jesuit teaching. At Santa Clara, we do, indeed, serve the intellect as students are stimulated intellectually in classes and non-curricular activities provided by the University. Their growth is palpable and measurable. Touching the heart, on the other hand, is a process that is only begun here. This is a lifelong journey upon which our students are just embarking; one of fulfillment through doing for others and acting for the betterment of society.

I am inspired and encouraged by our community's commitment to academic excellence and to the Jesuit philosophy. In these pages you will read how our students, faculty, and alumni are making a difference through their intellect and through their hearts.

Congratulations to all of our graduating engineering students. I wish you all the best on your journey.

Godfrey Mungal
Dean
School of Engineering

Santa Clara University
School of Engineering

Students Shine in Senior Design Conference

How many times have you been frustrated searching for misplaced keys or eyeglasses? Engineering students Okechukwu "Okey" Mbanugo and Timothy Monzures presented a solution to this challenge at the 38th Annual Senior Design Conference in May. The conference, which drew more than 100 engineering alumni back to campus, featured presentations on senior capstone projects covering everything from a solar installation project to an ocular medical detection device.

Students worked all year researching their projects and perfecting their presentations. Okey and Tim investigated short-range, blue wireless communication for item location, tracking and distance measurement and other applications. For their presentation, they created and demonstrated a prototype, provided a business model, and fielded questions from alumni judges.

Okey, a forward on the Bronco basketball team for the last four years, hopes to continue his athletic career professionally after graduation, but counts on his engineering education to pay off when he joins the work force. "It's definitely been an experience," he said. "I learned a lot about technology through working on this project and it was really interesting." Tim, majoring in both computer and electrical engineering, is participating in the combined B.S./M.S. five-year program, and has interned at Apple Computer for the last year and a half. "Working on this project for the last year has

taught me to shoot high. We set our goals high. We didn't expect to hit them all, but we kept on going and learned a lot in the process."
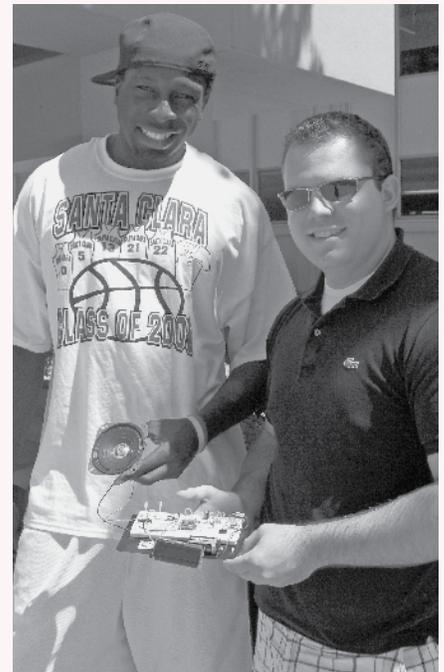

PHOTO: MARISA NAKASONE

Seniors Okey Mbanugo and Tim Monzures with their Blue Tooth Wireless device.

Spring Break, SCU Style

The term, "Spring Break," has become almost synonymous with partying in a sunny locale, but for a group of engineering students, it was quite a different experience this year, as they spent their time traveling to Nicaragua researching sustainable water systems.

In the fall, civil engineering seniors Steffany Castro and Edward Reyes chose to finish their education at SCU in a meaningful way by working on a capstone project relating to water resources. Steffany says, "The issue of water is so basic, yet so many people are without it. For four years, I've been living with the three C's of Jesuit education: competence, conscience, and compassion. I felt I had to use what I've learned to help others as much as I can."

The two began researching a gravity water system for Nicaragua.

As they worked on their theoretical design, they decided to make it practical by surveying the area themselves, so an immersion trip was arranged. "It was great because we were able to put faces to the people in the community," says Steffany. "Also, we had a lot of ideas going in, but seeing for ourselves how the system could work led us to change our design quite a bit."

Since she returned to Santa Clara, Steffany has been encouraged and surprised by the number of people she has met who are addressing water challenges. "People are trying to make a change. This was my way of paying back what has been given to me. I've been helped so much that I just wanted to give a little back."

See our Web site for more on engineering immersion study: www.scu.edu/engineering/immersion.

PHOTO: ED MAURER

Steffany Castro researches a gravity water system in Nicaragua.

For SCU Alums, It *Is* Easy Being Green

Combining a passion for promoting alternative energy, a talent for engineering, and a commitment to going "green," five SCU engineering alums are blazing a trail in energy monitoring at Fat Spaniel Technologies.

Chris Beekhuis, President and Chief Technology Officer, founded the company in 2003. Excited about renewable energy before it was a hot topic, Beekhuis was one of the first to install solar panels on his San Jose home in 1998, but was frustrated that he could not get the data he wanted from the available technology. "The first generation of equipment didn't include a monitoring system," said Beekhuis, "so, I bought a power meter and started monitoring the system myself."

One of Fat Spaniel's first employees was Richard Eckman, currently Director of Operations and Sales Engineering Director. He and Beekhuis had worked together previously and both graduated from SCU's engineering management program, receiving their masters' degrees in 1996.

Today, Fat Spaniel is a leader in providing critical monitoring and reporting services that can be managed and controlled over the Internet for the renewable energy industry. Part of their success rests with the addition of three other SCU alums, Steve Millward, B.S.'03, Sales Engineer, Kyle Ogle, B.S. '08, Manufacturing Engineer, and Dmitry Levitsky, B.S. '99, M.S. '07, Engineering Services. "I think of SCU as my farm team," said Eckman, "We have an excellent track record with people from SCU."

Beekhuis notes "there is a good match between SCU programs and what Fat Spaniel does. It's more than just engineering skills; it's working on projects and technologies that matter and have some purpose behind them." This is important to the crew at Fat Spaniel as they are serious about being "green."

"We chose our location because it is accessible to public transit; we sponsor an EcoPass with Valley Transit Authority that allows our employees to ride free," said Beekhuis. Other ways they walk their talk: no paper cups in their offices—they keep a supply of mugs—and they are aggressive recyclers. Eckman notes, "Behavior changes when people see the effect of their choices. Our solutions deliver information the customer can respond to, and our way of doing business reinforces our philosophy."

How does this affect their employees? In Kyle Ogle's words, "I absolutely love it. That's why I'm working here. It's a fast-paced, exciting new field, and I'm working with great people." Can't ask for much more than that!

PHOTO: HEIDI WILLIAMS

From left: Chris Beekhuis, Kyle Ogle, and Richard Eckman

2009 Solar Decathlon Design Selected

Exciting news! A panel of architects selected by Santa Clara University and California College of the Arts has chosen the design to be implemented for our entry in the 2009 U.S. Department of Energy's Solar Decathlon. The winning design is stunningly beautiful as it strikes a balance between performance, aesthetics, and modular construction.

In announcing the selection, faculty project leader and mechanical engineering chair Tim Hight said, "The design is somewhat radical, and has a higher risk factor than the more conventional approaches, but all agreed that it would make a bold statement about both schools and was worth the risks involved. I am quite excited about the house and our implementation of it—we are up to the challenge!"

Congratulations to the 16 CCA students who took part in the design process, working feverishly over the past several months to achieve a great result.

PHOTO: CALIFORNIA COLLEGE OF THE ARTS

The winning design was selected by a panel of judges who have distinguished themselves in the field of sustainable architecture.

Grad Students Learn Lessons for Life

Graduate students in Ray Kehoe's COEN 485 class get more than just a capstone course for software engineering—they learn lessons for life, too.

At the heart of the year-long course is the task of applying engineering and project management skills to the creation of a new software product. In the fall, students conceptualize and pitch ideas to classmates who vote on the top four products to be developed in teams. Resumes are exchanged and members are "drafted." "This experi-

PHOTO: HEIDI WILLIAMS

COEN 485 students learn more than software development in class.

ence prepares them for the real thing," said Kehoe, Senior Program Manager for Palm, and SCU adjunct professor for the past 15 years.

"They pitch their products just as they would to a venture capitalist or to a vice president of engineering. They choose their teammates based on their qualifications, just as they would on the job. I'm really not lecturing or teaching; I'm there for guidance. I train them to listen closely and ask themselves three questions: do I understand what I'm being told, do I believe what I am being told is true, and can I improve upon what I'm being told."

As the course progresses, teams regularly present their projects' progress and capabilities to each other, and they present their ideas and prototypes to area venture capitalists through a number of different means. This high level of practice in presenting their ideas, receiving criticism, and refining product definition prepares them to embrace entrepreneurship.

Aside from facilitating students with product development and presentation skills, Kehoe takes time to help with life skills as well. "I want them to achieve their goals, so one of their assignments is to create and present a 10-year plan for reaching them, both personally and professionally. I tell them to treat life like a project and to plan it like one." Kehoe notes, "When I told a senior manager at Intel about this, he said, 'I wish somebody had done that for me, because I just muddled through my career.'"

Kehoe is pleased that at the end of the course, his students know how to create and develop a software product, have improved their ability to present themselves and their work to industry leaders, and walk away with a 10-year plan vetted by 25 other students and their instructor. "Everyone has an idea, but no one ever asked these students what it was. I tell them, 'You have the tools; now go make it happen.'"

Robotics Lab Goes Global

The students in the Robotics Lab are at it again. This time they are off to El Salvador and the Marshall Islands to build ground stations to track a pair of upcoming NASA satellite missions.

"We're going global!" exclaims Mike Rasay, SCU Ph.D. candidate and NASA's Ground Segment Lead. Rasay heads the team of masters' students Jose Acain, Paul Mahacek, Giovanni Minelli, and Ph.D. students Ignacio Mas and John Shepard, who are responsible for the installations. "In the past, we set up systems in Alaska, Hawaii, and California" he said, "but this is our first time going out of the country. Both stations will be used for the operation of the NanoSail-D and PreSat missions."

The NanoSail-D satellite will deploy a 9-meter square foil sail designed to propel the satellite through space due to solar pressure created by the impact of particles from the Sun. Because of the low orbit for this launch, the sail will act like a parachute, causing the satellite's orbit to lose energy due to drag from the Earth's upper atmosphere. This will test the use of a drag sail to speed up the de-orbiting process of spacecraft at the end of their missions. "This is a collaborative effort between NASA/Ames and Marshall Space Flight Center," said Rasay, "Marshall is responsible for the design of the sail, and Ames is providing the bus flight support system that was used for GeneSat and has since been improved upon."

The PreSat spacecraft is a technology test for key subsystems that will fly

SCU and UCA students work together to assemble a satellite ground station.

later this summer on the PharmaSat spacecraft, which the Robotics Lab students will also control. PharmaSat will carry a biological payload to test the efficacy of antifungal drugs on yeast in a microgravity environment.

To prepare for the installations, the team spent the past few months surveying locations, spec'ing parts, researching shipping and customs regulations, and assembling and disassembling the antenna twice to make sure the fabrication was correct. Their antenna was tested by monitoring GeneSat-1 which has been in flight for a year and a half. Following the NanoSail-D and PreSat missions, the team will disassemble the Marshall Islands station and ship it back to SCU. Most of the El Salvador ground station will remain on the roof of the

engineering building at Universidad Centroamericana (UCA), and will be used for new collaborations between SCU and UCA. Aside from tracking satellites, El Salvador's ground station will be used to train UCA students in developing and operating radio communication stations, and it will serve as a communication hub during natural disasters.

"Proving the ability to set up ground stations anywhere in the world for low-cost, six-month mission implementation is a new direction for NASA," said Rasay. "It was a quick decision to build these two ground stations and our team jumped into action. I'm proud of our guys—they really stepped up."

For more information on SCU's Robotics Systems Laboratory: http://rsl.engr.scu.edu/

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