SCU Solar Decathlon Team Kicks Off Construction of House

 Joined by nearly 100 alumni, sponsors, campus community members, and friends, the SCU Solar Decathlon team recently celebrated the kickoff of the construction phase of the project. SCU President Paul Locatelli, S.J., congratulated the team on its commitment to aligning the project with the University’s mission and values, noting that “this project gets right to the heart of the Santa Clara educational experience: educating students for the betterment of society.”

James Bickford, project manager and mechanical engineering junior, updated the crowd on the team’s progress, noting the receipt of a $35,000 grant from SCU’s Technology Steering Committee, highlighting the team’s success in meeting all Department of Energy deadlines, and unveiling the latest architectural drawings and innovations in sustainable building that will be incorporated into SCU’s entry.

The Santa Clara University Solar Decathlon team welcomes support and participation in this project. For further information, contact Timothy Hight, thight@scu.edu, or 408-554-6870, or visit the SCU Solar Decathlon team Web site at www.scusolar.org.
From Satellites to Automobiles, Robotics Lab Does it All

The SCU Robotics Systems Laboratory, under the direction of mechanical engineering Associate Professor Christopher Kitts, is always buzzing with activity. From designing and operating a shoe-box sized spacecraft, to analyzing the computerized diagnostics system of a top-of-the-line BMW, students are involved in real-world engineering on a daily basis.

Last year, recognizing the excellence of Professor Kitts’ program, NASA approved the operation of the GeneSat-1 mission by our student-based team, who not only developed the entire command and control systems, but also contributed to the design and test of the satellite and wrote the programs to track the satellite and run the on-board experiments.

Expanding on the theoretical and algorithmic work Kitts and graduate student Richard “Mike” Rasay have been developing for these spacecraft systems, the Robotic Systems Lab has teamed with BMW to explore the application of advanced diagnostic techniques to BMW’s line of automobiles. In this new project, these techniques will be adapted in order to improve BMW’s ability to detect faults, diagnose their root causes, and resolve them in a cost-effective manner. As part of this project, an interdisciplinary senior design team is working on a 7-series sedan, implementing a data acquisition system, integrating a simulation capability, and developing a fault detection capability for the automobile’s cruise-control system.


Bioengineering Program Launched

Capitalizing on the promise of bioengineering to improve the lives of all people in direct and diverse ways, the School of Engineering has partnered with the College of Arts and Sciences to launch an interdisciplinary undergraduate program in bioengineering. Electrical Engineering Chair Samiha Mourad led a task force composed of faculty from both schools to establish the program, which is designed to prepare students for careers in the medical-device and biotechnology industries, biomedical research, graduate studies in bioengineering, or entry into medical school. The curriculum integrates engineering analysis and design with the necessary background in biology, chemistry, physics, and mathematics.

Bioengineering, the fastest-growing segment of engineering today, is defined as the application of electrical, chemical, mechanical, and other engineering principles to understand, modify, or control biological systems. Arthroscopic surgical tools, genomics, and MRI and CAT (CT) scanning systems are just a few examples of bioengineering advances.

To participate in the program, students choose between two options:

- a concentration in bioengineering within the general engineering major, or
- a minor in biomedical engineering.

“This program is fulfilling a real need for our undergraduate students,” said Professor Timothy Hight, program director and mechanical engineering chair. He cited Santa Clara University’s Silicon Valley location as an ideal spot to study bioengineering as this region is home to some of the most innovative biotechnology and medical device companies in the world. “Extending beyond the classroom, the opportunity for internships and hands-on industrial and technical experience here is remarkable,” he said.

The program has been enthusiastically received from the outset, drawing over 20 majors and minors in its inaugural year. For more information on the program, visit www.scu.edu/engineering/undergraduate/bioengineering.

Nominate Distinguished Engineering Alumni

The School of Engineering and the Engineering Alumni Board are seeking nominations for the 2007 Distinguished Engineering Alumni Awards to honor those whose accomplishments in their profession, community, and University service have set them apart.

To submit a nomination, visit our Web site by June 15: www.scu.edu/engineering/about/dea.cfm.
Center for Nanostructures Announces Project

With the goal of designing, fabricating, and testing a lightweight, low-resistance (electrical and thermal), longer-lasting chip using new carbon-based interconnect and thermal interface materials, Santa Clara University’s Center for Nanostructures (CNS) initiated its thermal and electrical nanoscale transport (TENT) project in February. Cary Yang, principal investigator, CNS director, and professor of electrical engineering, said the five-year project “is a timely response to the current need of integrated circuit manufacturers for enhanced performance and increased reliability in their most advanced products.” The project is sponsored by the U.S. Army with an initial funding of $1.7 million for the first two years.

In addition to utilizing the CNS laboratory here at SCU, nearly 1,300 square feet of space has been leased for a nanostructure characterization facility at NASA Ames Research Center. Specialized equipment, including a high-resolution field-emission scanning electron microscope (SEM), an electrical measurement system consisting of a wafer probe station and DC and ac parameter analyzers, and an atomic force microscope will be used. Additional instruments, such as a thermal imaging system, will be designed and constructed in the first year of the project. According to Yang, “The resources provided by TENT allow investigators to build upon existing research efforts in electrical interconnects and thermal interfaces, and advance the knowledge base in the four areas of the project, namely: thermal, structural, and electrical characterizations, as well as electrothermal transport modeling.”

CNS will be working with the University of California Santa Cruz, NASA Ames, Hitachi, and Radiance Technologies as partners and collaborators on this project. Professors Shoba Krishnan (electrical engineering) and Drazen Fabris and Jorge González-Cruz (mechanical engineering) are co-investigators on the project. “The TENT project is an example of working closely with government, industry, and academic partners on cutting-edge technology, and is at the same time a product of such collaborative effort,” Yang said. “Everyone associated with the Center for Nanostructures will benefit from these partnerships, and we all look forward to contributing to this exciting project.”

For more information, visit www.scu.edu/cns.

Conscience-Driven Engineering

Spend a few minutes talking with civil engineering Assistant Professor Ed Maurer and you will learn that his commitment to researching the impact of climate change is fueled by a deeply thoughtful consideration of the implications of this issue.

Focusing his research on the impact of projected global warming on water resources in California, Maurer has presented his findings at a variety of state and national conferences. He was recently appointed to the Climate Change Technical Advisory Group of the California Department of Water Resources through which he will participate in incorporating statewide water planning implications of global warming in the next biennial report of the Governor’s Climate Action Team, due in 2008.

In his profession, Maurer feels a strong call to action. “Civil engineers have the task of building and maintaining the infrastructure that supports human society,” he says, “so I feel especially compelled by the results of the research to help highlight the essential role we play in shaping a world that can adapt to inevitable change, and to envision, design, and create a more sustainable future.”

Maurer is currently advising three undergraduates on a senior design project investigating green roof technology, which he expects to be an ongoing effort expanding to El Salvador. He says, “Green roofs have a direct application for mitigating impacts of global warming. In the classroom, I emphasize that the design of our cities and buildings shapes the footprint we have on the world, and ultimately the sustainability of human society.”

Maurer is committed to helping raise Californians’ consciousness to the global repercussions of their actions. “California is the 12th largest emitter of greenhouse gases in the world. We have a burden of responsibility to those countries whose water supply is rapidly diminishing due to increased temperatures worldwide—often poorer areas without the means to adapt to these changes. Acknowledging that needs to be part of the equation; we need to own up to our role in climate change. We need to be on the front lines not just of planning for inevitable changes but also helping to reduce the impacts of climate change.”

Maurer lives the values of Santa Clara University—competence, conscience, and compassion—seeking social justice through his research, teaching, and community involvement.

www.scu.edu/engineering
Lockheed Martin has selected SCU’s School of Engineering to provide graduate level education for their most promising Silicon Valley engineers. Through the employer's Engineering Leadership Development Program (ELDP), team-oriented engineers who demonstrate leadership potential and are identified as excellent communicators and problem-solvers are given the opportunity to pursue a master's degree at their company's expense here at SCU.

Initially implemented with the University of Denver (DU) for employees at the company’s Colorado site, the success of the program warranted expansion to include Silicon Valley engineers. Collaboration between SCU and DU enables transferees from Denver to continue their education uninterrupted; ELDP members who move between Denver and Sunnyvale may take courses at both universities. The major emphases of the program are mechatronics systems engineering and software computer systems engineering. Participants are required to take two technical development courses in space systems, two courses in systems engineering, and a course in project management.

Nam Ling, associate dean for graduate studies and research, announced the partnership. "Our Silicon Valley location, reputation, and the recommendations of our alumni and the School’s advisory board all contributed to Lockheed Martin's selection of SCU,” he said, “And the spring enrollment is an early indication of a rewarding collaboration."

"Partnering with the largest employer in the Bay Area and attracting their best engineers to SCU will only enhance our already excellent program," Ling added. “We look forward to a successful affiliation with Lockheed Martin, working together to educate Silicon Valley engineers.”

For further information about this program, visit: www.scu.edu/engineering/graduatesandresearch/graduates.cfm.

With the improved display quality of high definition television comes the opportunity for a new wave of information dissemination, and Professor Qiang Li of the computer engineering department is at the forefront of this movement.

Li recently returned to the School of Engineering after spending two years at UTStarcom as chief architect for designing the flow of content distribution for television signals over IP networks. “The flexibility of the IP platform allows the television to become the home entertainment and information center. The potential for interaction reaches far beyond the time-shifted television, value-added gaming, or video-on-demand now available,” Li said, “but the emergence of this technology outpaced industry standardization of legal and regulatory issues.”

Working with the United Nations’ International Telecommunications Union and the Chinese Minister of Information Industry among others, Li was a leading force in determining and implementing industry standards. His research in this field was invaluable in managing a myriad of details ranging from tracking availability of content, to digital rights management, to maintaining the emergency broadcast system.

Li was also instrumental in SoftBank Corp.’s launch of the first million-user system of TV over IP in Japan. His ability to lead and successfully deploy a project of this magnitude is truly remarkable and is an example of the synergy created when industry and academia join forces. “It was a wonderful experience for me,” Li said. “I was able to bring a different approach to the industry’s environment—a collaborative, non-territorial way of doing business that smoothed the way for understanding between various sectors. But I was also afforded a unique insider’s view that I can now bring into the classroom.”

SCU students have the opportunity to tap into Li’s research and field experience in courses such as Operating Systems, Computer Networks at both graduate and undergraduate levels, and Information Security Management.

Save the Date

37th Annual Senior Engineering Design Conference
Thursday, May 3, 2007
Thomas J. Bannan Building, Santa Clara University
For more information: www.scu.edu/engineering/srdesign
For information on judging the competition: www.scu.edu/engineering/srdesign/judges.cfm

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