Engineers Without Borders-Cal Poly was recently named the National Premier Student Chapter. But the group didn’t “fight” its way to the top – instead, the organization has found that collaboration is the key to success.

Founded in 2005 by a handful of students dedicated to making a global impact, the Cal Poly group today includes almost 200 members who are working with three communities in India, Thailand, and Nicaragua to implement sustainable engineering projects.

According to Engineers Without Borders USA, the Premier Chapter award recognizes outstanding chapters that excel in organization, fundraising and public relations, engagement in mentor/mentee relationships, and chapter and regional participation.

Cal Poly chapter president, Bill Woods, expressed his pride at what the group has accomplished since its inception eight years ago, including tripling its membership in the last two years. “We have designed and constructed six water filtration systems in Thailand, a health clinic in Nicaragua, and we are in the midst of imple-
For the past four years, the Robert E. Wulf Aerospace Engineering Scholarship has been attracting top-notch freshmen to Cal Poly engineering. Scholarship founder Bob Wulf (B.S. Aeronautical Engineering, 1963) takes a personal interest in choosing the scholarship recipients. Awardees may continue to receive the scholarship for an additional three years if qualified. Wulf hopes that the scholarship will encourage outstanding students to enter the field in which he spent his career.

This spring, Wulf visited campus and met with current scholarship recipients Max Bodnar, Derek Miller, Michael Replan, Constantine “Gus” Samos and Bradley Schab.

About Bob Wulf

A Northrop Grumman engineer for more than 38 years, Wulf worked on the development of every new aircraft that existed at the company during his career. He is especially proud to have served as chief engineer and vice president of Engineering during the development and flight testing of the B-2 Stealth Bomber.

Little more than four years ago, Don Heye selected Sally Hermansen as an initial recipient of the scholarship he established in his parents’ names, the Marvin Arnold & Irene Jaquetta Heye Scholarship.

Last December, he watched Sally graduate with a degree in aerospace engineering. “It was really a pleasure to see Sally through,” said Heye. “She did well at Cal Poly and immediately landed a job with L-3 Communications in Palo Alto.”

Heye, a 1958 Cal Poly aeronautical engineering alumus, established the scholarship administered by the San Diego Foundation in 2007, and he has personally overseen the selection of the eight students chosen as recipients since then.

“I read every application, up to 300 per year, call the references and interview the top candidates, if possible,” he said. “In fact, when Sally was in Long Beach for a high school conference, I drove up from San Diego to meet her.”

Awarded on the basis of need and merit, the Heye Scholarship is renewable up to four years and can cover the cost of attending Cal Poly in excess of family contributions or other awards. In addition to filling out a comprehensive application that includes an essay and questions about community service and club activities, applicants must indicate their intention to attend Cal Poly as engineering majors.

“I think that Cal Poly changed my own life for the better,” said Heye. “When I reconnected with the school, I was happy to see that it has held on to its Learn by Doing values and its reputation for excellence, so I started the scholarship when I could, to give deserving students the opportunity to attend.”

About Don Heye

A longtime supporter of the college and Aerospace Engineering Department, Heye’s impact on industry has been considerable, starting with his first job at Ryan Aeronautical, where he did early testing for “short takeoff,” “vertical take-off,” and unmanned aircraft. Along the way and at various other companies, Heye contributed to the development of gas turbines, components for the Saturn rocket engines and lunar landing module, and other systems for aircraft, missiles and space vehicles. In 1968, he founded Hyspan Precision Products. The company today does more than $60 million annually, employs 450 people and operates globally with metal manufacturing facilities in Chula Vista, Tulsa, Hamburg, Michigan, Atlanta and Mexico.

Don Heye congratulates Heye scholarship recipient Sally Hermansen (AERO ’11) after her graduation.
CENG ONLINE

COLLEGE OF ENGINEERING WEBSITE
http://ceng.calpoly.edu/

ALUMNI IN THE NEWS
http://ceng.calpoly.edu/alumni/in-the-news/

CALENDAR OF EVENTS
http://ceng.calpoly.edu/event-calendar

CENG ON FACEBOOK
www.facebook.com/CalPolySLOEngineering

GIVING TO THE COLLEGE
http://ceng.calpoly.edu/givingback/

CAMPUS CONSTRUCTION: The Cal Poly Center for Science and Mathematics is rising in the heart of the campus. Workmen were completing the metal framing of the $132 million, 197,000 square foot building during winter quarter. The center was made possible by voter-approved state education construction bonds and $20 million in private donations to Cal Poly.
Gene Haas Foundation is “Making Things” Happen

A recent $50,000 gift by the Gene Haas Foundation will help transform manufacturing education at Cal Poly. The foundation is the philanthropic arm of California-based Haas Automation.

The donation includes $30,000 to enhance the Industrial & Manufacturing Engineering Department’s already strong laboratory resources with an infusion of new hardware, software and the latest technology. The gift also provides $20,000 to establish Gene Haas Foundation Scholarships. Awarded to five students over a span of four years, the scholarships will help attract top freshmen to Cal Poly’s manufacturing engineering program.

In recognition of the gift’s impact, the lab has been renamed the Gene Haas Lab for Robotics and Automation.

“We’re very fortunate to have a long-time partnership with Haas,” said Jose Macedo, department chair. “The company is an outstanding example of the productivity gains that automation makes possible. As a leader in the fast-changing world of automation technology, Haas has a special appreciation for Cal Poly’s role in producing future-ready manufacturing engineers, and they place a high value on what our Innovate by Doing focus means for the manufacturing industry.

“As this gift shows, Haas’ is committed to taking our program to new levels by addressing our most critical needs: scholarships for top students and an advanced laboratory that will attract, cultivate and launch them. These two issues go hand-in-hand with preparing a new generation of engineers.

“As the president stated in his recent State of the Union address, an economy built to last is built on American manufacturing,” noted Macedo. “With the help of Haas, Cal Poly will help foster a vital renaissance in American manufacturing.”

Goodrich Foundation Helps Grow Future Engineers

Think robots, spaceships, solar cars and cities of the future. These are just a few career worlds that the Goodrich Foundation encourages a new generation of middle school students to imagine for themselves.

And, to that end, the Goodrich Foundation recently donated $15,000 to the innovative Engineering Possibilities in College (EPIC) summer camp at Cal Poly.

Now entering its sixth year, the one-week EPIC program, previously limited to high school students, will expand its reach in 2012 to include middle school students who may not have previously considered engineering as a college or career choice.

EPIC will use the Goodrich Foundation grant to create a comprehensive career camp experience designed specifically for middle school students.

Marc Duvall, president of Goodrich Aerostructures in Chula Vista, Calif., said that the goals of the EPIC program in helping stimulate interest is pursuing engineering careers aligns perfectly with the company’s vision.

“One of our key community focus areas at Goodrich is to encourage the study of the STEM (science, technology, engineering and math) disciplines by young people,” he said. “EPIC is strongly aligned with the Goodrich Foundation’s commitment to start early to connect students with science and engineering.”

Dean Debra Larson said the success of the EPIC program is due to its multi-faceted approach that makes engineering fun and stimulating for students.

“EPIC offers students the fun of summer camp, the inspiration of a university setting and the opportunity to explore what their future might look like,” said Larson. “It’s a highly participatory, Learn by Doing environment where they can ‘test drive’ their skills.”

EPIC 2012 will be held July 16-20. For more information, go to the Cal Poly EPIC engineering summer camp site: http://epic.calpoly.edu

Engineering students Mike Darling and Matt Remington work on a HAAS milling machine.

Cal Poly President Jeffrey D. Armstrong, center, met with EPIC campers in 2011. EPIC 2012 is scheduled for July 16-20.

Goodrich Foundation recently donated $15,000 to support the EPIC (Engineering Possibilities in College) summer camp at Cal Poly.
Learn by Deux-ing: The Two Cal Polys Team Up for Aerial Robotics Project

Cal Poly students in San Luis Obispo and their peers at California State Polytechnic University in Pomona are joining forces on a project to advance aerial robotics technology and sharpen teamwork skills required in the professional world.

The collaborative project is based on the RMAX, a quarter scale helicopter donated by Northrop Grumman Corp. The research involves sending an unmanned aerial vehicle (UAV) over a specified location, taking surveillance images and then relaying the data to an unmanned ground vehicle (UGV), which processes the images, identifies the location of simulated targets, and is autonomously routed to the target location to deliver a package.

The Pomona team will develop the ground system, while San Luis Obispo students will be responsible for the RMAX helicopter’s flight operations.

Developing the inertial navigation system for a helicopter requires contributions from numerous engineering disciplines,” noted Eric Mehiel, chair of the Aerospace Engineering Department at Cal Poly San Luis Obispo, who is directing the flight project in partnership with computer engineering professor Lynne Slivovsky. “With Northrop Grumman’s support, students from both universities will gain firsthand knowledge of what is required to work on a multidisciplinary team,” Mehiel said. “In fact, this project is a great example of Learn by Doing because so many of the technical problems require the students to acquire knowledge that is not normally part of a traditional class.

We handle flying the vehicle,” said Slivovsky. “Our students are configuring the helicopter to be completely autonomous, meaning it can fly preprogrammed routes by itself without intervention by a pilot on the ground. That includes all the sensors necessary—cameras, scanner, software to control the sensors, as well as mounting all that equipment onto the helicopter.

Senior Mike Hoffman leads the electrical engineering team. “Our job is to make sure there’s enough power, and that the helicopter can communicate with equipment on the ground,” he said. “It involves a lot of software development and also coding.

Like almost all members of the San Luis Obispo team, Hoffman has made the ambitious endeavor his senior project. For Andrew Carrillo, an electrical engineering graduate student and project manager for the San Luis Obispo team, the project is the basis of his master’s thesis. “My thesis is less about the helicopter itself and more about how to bring together different disciplines in different cities.

Northrop Grumman sees many advantages to supporting the joint venture.

We are very enthusiastic about this project, because it will give the students the real life experience of having two teams collaborate over distance while working with technologies that are of significant interest to our business, says Charles Volk, vice president and chief technologist for Northrop Grumman’s Navigation Systems Division. A top priority at Northrop Grumman is improving education through programs that support students and enhance science, technology, engineering and math curricula.

Cal Poly Engineering’s Debra Larson Meets President Obama at White House Event

Cal Poly Engineering Dean Debra Larson attended a White House reception Feb. 8 that celebrated the efforts of deans at leading engineering schools for their commitment to retain and graduate more students in the field of engineering.

Larson was among a select group of about 40 engineering deans whose colleges do well in student retention, as determined by the American Society for Engineering Education (ASEE).

“It was an honor to participate in this special occasion, and it affirms Cal Poly Engineering’s strong commitment to retaining and graduating more globally competitive students in the engineering field,” said Larson.

Also on hand were Secretary of Education Arne Duncan, Secretary of Energy Steven Chu and other senior White House and National Science Foundation officials.

In his greeting to the engineering deans, President Barack Obama pledged to “use the bully pulpit to emphasize how important your work is” and assured that “everyone in this administration is four-square behind you,” the ASEE reported.

While overall college graduation levels have grown by nearly 50 percent over the past two decades, the annual number of engineering graduates has virtually stagnated at around 120,000.

A national campaign – “Engineering – Stay With It” – launches this spring in partnership with academia, the private sector and the entertainment industry. It will focus on accelerating engineering experiences, providing encouragement, increasing the prestige of engineering and helping students graduate with engineering degrees.

“America has always been about innovation,” as well as scientific inquiry, the president said, and has “an incredible diversity of talent out there waiting to be tapped.” He said that “for every Steve Jobs we need 10,000 others.”
Organized by the Engineering Student Council (ESC), National Engineers Week included a full week of activities, competitions and presentations by sponsoring companies. For more on E-Week 2012, see: http://esc.calpoly.edu/eweek2012/.

Designing packaging that prevents eggs from breaking after being tossed from the third floor of the Engineering IV building was the goal of participants in the Egg Drop sponsored by Northrop Grumman.

Sponsored by Johnson & Johnson, Casino Night, above, included blackjack, seven-card stud, and Texas hold 'em. Engineering students also competed in a Wii Sports skills contest sponsored by Solar Turbines.

Nautical engineering was on the agenda when students built and raced boats made of cardboard and duct tape. The races across the Poly Canyon Village pool were sponsored by Western Digital.
Cal Poly MEP Honors Diversity of High Achievers

Members of Cal Poly’s Multicultural Engineering Program (MEP) who received scholarships for the 2011-12 school year were honored at a MEP banquet at which more than $125,000 in scholarships were awarded.

Debra Larson, dean of the College of Engineering, told the students, “Engineering is the foundation of a sustainable, humanitarian world — and you are our future leaders. The way to find innovative solutions and create new designs is to get all kinds of different ideas put forward. And there’s no better way to do that than to have diverse people with diverse backgrounds working together.”

Cristal Vasquez was the recipient of scholarships from Chevron and Raytheon, and one of Cal Poly’s 2011-12 Student Scholars in the California State University Louis Stokes Alliance for Minority Participation program. “MEP has not only been a source for scholarships and internships,” said Vasquez, “it has given me a multitude of opportunities to develop leadership and outreach skills.”

Vasquez, who graduates in June, plans to pursue a doctorate in mechanical engineering. She developed an interest in the field of thermal engineering while at Cal Poly, which was strengthened by internships at the Jet Propulsion Laboratory and NASA Glenn Research Center in Ohio.

Computer engineering students Aaron Martinez and Mishal Shah said MEP was “always there” for them. Both have been hired by Macys.com in San Francisco. “MEP’s networking events, career fairs, etiquette dinners and resume workshops gave a big boost to my professional and personal development,” said Martinez, who volunteered for middle and high school programs that motivate students to pursue careers in engineering and technology.

The scholarship awards were funded by Chevron, Fluor, Raytheon, Xerox, David Cantu, MEP, MESA National Science Foundation, and the Paisanos Cal Poly San Luis Obispo Alumni group.

Additional companies recognized for their support of MEP events, activities and services included Boeing, Cisco, Eaton, Hewlett-Packard, IBM, Lockheed Martin, the National Science Foundation, Northrop Grumman, PG&E, Target and USS POSCO Industries.

For more information about Cal Poly MEP, go to https://mep.calpoly.edu.
EWB

From Page 1

menting latrines in India. Our new Local Projects division is working to pioneer the first septic tank reuse in California in partnership with San Luis Obispo County. With such a motivated and passionate group, it’s no wonder that Cal Poly has excelled!

Debra Larson, dean of Cal Poly Engineering, said, “I am struck by the fact that EWB-Cal Poly promotes sustainable engineering solutions that are truly innovative in their simplicity and distinctly appropriate to particular communities. The group designed a device to de-kernel corn, for instance, that is made of a couple of nails and materials at hand in mountaintop villages in India. It’s ingenious from the community.”

Mechanical engineering student Anthony Ruh, co-founder of the Cal Poly India team, noted, “In all aspects of the project, including the implementation and even the design, villagers will play an enormous role to make sure this project is truly theirs.”

In Sainji, EWB-Cal Poly is collaborating with the Garhwal Organization for the Upliftment of the Needy, a local NGO, along with the village residents. Organization co-founder Lori McFadyen commented on EWB’s impact in Sainji:

“I think that one of the biggest impacts that they’ve had on us as a village is through all their water testing and making the villagers aware of where clean water is and the importance of washing hands,” she said.

But the greatest impact EWB may have goes beyond engineering and health technicalities. Because they immerse themselves in the cultures they’re visiting, Cal Poly students have the chance to become better listeners themselves while inspiring future generations.

EWB Cal Poly students have “influenced the [Sainji] children,” McFadyen said. “They’ve gone from thinking that when they grow up they can be gatekeepers or caretakers or hotel workers to actually becoming engineers.”

– I am very proud of our Cal Poly EWB students.”

The small agricultural device project helped build trust between the Cal Poly team and the villagers of Sainji, a tiny community of subsistence farmers in the foothills of the Himalayas. The group’s next project in Sainji is more ambitious: building sanitation facilities that will protect the environment and safeguard the health of the villagers.

“We interact with the community to make certain that the projects we implement are community driven,” explained Woods. “In every step of the process, we talk directly (sometimes with the aid of a translator) to the community members who are affected. We do not go through with a project unless we have full support

EWB-Cal Poly student Naomi Wentworth meets and works with children in Sainji, India.

EWB-Cal Poly students, including Dan Logue above right, are working on a water treatment project in Sainji, India.

EWB-Cal Poly’s corn de-kerneler agricultural device will assist the villagers in Sainji, India in marketing their primary cash crop.
The Cal Poly Society of Women Engineers (SWE) announced the recipients of the 2011 Outstanding Women in Engineering and Technology Award at this year’s Evening With Industry held in mid-January at the San Luis Obispo Embassy Suites. In addition, SWE named Tracy Thatcher from Civil and Environmental Engineering as Most Supportive Professor, and presented more than $21,000 in scholarships at the gala.

The banquet, attended by more than 250 students, faculty, staff and company representatives, highlighted students for their outstanding accomplishments. In addition to the five Outstanding Women in Engineering and Technology honorees, 18 students received scholarship awards from sponsoring companies (see chart).

The Outstanding Women in Engineering and Technology winners were chosen based on four criteria: faculty recommendations, demonstrated leadership, related work experience and grade point average. The winners were:

- **Lynn Groundwater**, a bioresource and agricultural engineering senior, has been significantly involved in the Agricultural Engineering Society, where she served as president, and the American Society of Agricultural and Biological Engineers. The Cal Poly Tractor Pull and Quarter Scale Design Team have also figured prominently in her extracurricular involvements. To pay for a portion of her education, Groundwater has worked part-time for the Irrigation Training and Research Center, gaining valuable experience with irrigation systems.

- **Megan McIntyre**, an industrial engineering senior, was recently recognized as a Green Belt in Lean Six Sigma through Abbot Labs, where her internship has led to a job. She planned and ran the largest slam poetry event ever held at Cal Poly, and was also project manager for the American Society for Engineering Education conference hosted by Cal Poly in late March. McIntyre is also a member of two academically prestigious groups on campus, the Mortar Board, where she volunteers with the Reading is Leading program, and Tao Beta Pi, where she conducts outreach at local high schools to promote engineering.

- **Morgan Miller**, a civil engineering senior, with a minor in ethnic studies, is the current president of SWE. Through part-time work and internships, she has accrued extensive experience in civil, construction and geotechnical engineering. Since 2007, she has been among a corps of student trainees selected by the U.S. Army Corps of Engineers to work on numerous geotechnical engineering projects in Sacramento. She is a member of Chi Epsilon, the campus civil and environmental engineering honor society. As part of her Study Abroad experience, Miller helped develop appropriate technology to provide clean drinking water for a village in Thailand.

- **Laura Rice**, an architectural engineering senior, is president of the Structural Engineers Association of California/Architectural Engineering Institute student chapter and a member of the Tau Beta Pi honor society. For her senior project, she designed and constructed the base for a portable telescope, which has subsequently led to requests for her to present papers on the project in Portland, San Francisco and Hawaii. She traveled to Haiti with a group of architectural engineering students after the 2010 earthquake, and helped form Structural Engineering Students for Haiti. In addition, Rice is a competitive ballroom dancer and competes with the Cal Poly Dancesport team.

- **Nicole Thomason**, a graduate student in aerospace engineering, has held numerous leadership positions with the Society for Women Engineers and the Engineering Student Council throughout her student career, together with a wide range of other engineering clubs and teams. In 2008, she became part of Team Tech history when, for the first time, SWE had two teams competing for the national title, and both teams tied for first place. Her various internships with industry include experience at Lockheed Martin’s Skunk Works. Thomason has accepted a position with Boeing in St. Louis.
**BMED Student Renders a Winning View**

Arron Rowley's penchant for writing has influenced his engineering career goals and generated accolades. The biomedical engineering (BMED) senior won first place in this year’s Al Landwehr Creative Writing Contest for his story, “A New View,” which will appear in Cal Poly’s literary magazine, Byzantium.

For all his writing chops, Rowley remains passionate about his major. “BMED struck a chord because it has an immediate personal effect on people and allows me to interact a lot more with them,” he said. For his senior project, Rowley and his partner are creating a device that will test the compliance of scaffolds used to grow blood vessel mimics. “This device may help to identify the scaffolds which behave more like native blood vessels, ultimately leading to testing environments that are more similar to real physiologic situations,” he explained.

After graduation, Rowley aspires to combine writing and engineering. Inspired by people like Neil deGrasse Tyson and Carl Sagan, Rowley said he hopes “through stories, teaching, or some form of journalism to bring science into the public square and make it fun and interesting to those who are not typically interested in it.”

Meanwhile, Rowley pursues the creative writing genre of short story. His winning story, “A New View,” concentrates on the way people examine mortality and how a simple conversation can change the way someone considers life. “I like to focus on a specific interaction between two characters that would not normally relate to each other,” he said. “This way I can apply my abstract thoughts and utilize them in a critical way. In ‘A New View,’ I created an emotional trauma that remained hopeful in the end.”

This is not the first time Rowley will have been published in Byzantium. He place second in the contest as a sophomore and third as a junior. “I was genuinely surprised because I’ve never written with the idea that someone is going to read my story,” he recalled. “I appreciated the fact that I was being recognized and not just in a way of showing I can write, but also a way of being able to share my ideas.”

Rowley will continue to nurture both his technical and creative sides. He has attained a six-month co-op at Sadra Medical, a branch of Boston Medical, in the company’s quality department of the cardiovascular device division. As a writer, Rowley has set his sights on a novel. He hopes that both passions will enable him to have an impact on people’s lives.

— Natalie Maris

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**BMED freshman competes on ‘Jeopardy!’**

What could be more competitive than getting into Cal Poly Engineering?

Ask Weston Mangin, a biomedical engineering freshman, who competed against more than 12,000 of the brightest undergraduates in the country to be among 15 players selected for the “Jeopardy!” College Championship, which aired in mid-February. He is the first student to represent Cal Poly in the tournament. The 19-year-old from Arroyo Grande grew up watching the show. “I’ve been annoying them with my ‘trivia tirades’ since the age of 7 or 8,” he said.

The game with his family, and credits them for encouraging him to try out for the tournament. The 19-year-old from Arroyo Grande grew up watching the show. “I’ve been annoying them with my ‘trivia tirades’ since the age of 7 or 8,” he said.

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**ENVE Student Wins New Hybrid Car**

A trip to the world’s largest exhibition about water paid big dividends on land for Anna Yeutter, a Cal Poly environmental engineering junior from Huntington Beach, Calif.

Yeutter won a new 2012 Ford Fusion Hybrid after participating in a scavenger hunt-like contest at the Water Environment Federation’s annual Technical Exhibition and Conference (WEFTEC) in Los Angeles in October.

“I traveled to WEFTEC with a group of 10 Cal Poly environmental engineering students and we pooled our knowledge to compete in the Follow the Water contest,” Yeutter said. “We had to answer about 30 questions as we explored all the water technologies there. Then the overall winner was chosen by lottery.”

Yeutter, who said the charcoal grey Ford Fusion she picked out was her first car, attended the sprawling WEFTEC conference in the Los Angeles Convention Center because “events like this expose you to the latest technologies — and it’s fun.”

For more information on the Water Environment Federation (WEF), go to www.wef.org or www.weftec.org.

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**ME Student Honored as Emerging Leader**

Megan Adams received the Sonora Region Emerging Leader – Collegiate award at the recent Society of Women Engineers (SWE) Region B conference. The mechanical engineering engineering student serves as secretary for Cal Poly SWE.

Adams took home one of several Cal Poly honors and awards. Former Cal Poly SWE President Jennifer Harris (B.S., Industrial Engineering, 2003) won the Sonora Emerging Leader – Professional award and Helene Finger (B.S., Civil Engineering, 1988, M.S. Civil and Environmental Engineering, 1998), director of Cal Poly’s Women’s Engineering Program, received the Outstanding Collegiate Mentor award.

The Cal Poly section also won the Sonora Outstanding Outreach Program and Sonora History awards.
Sponsor Cements Relationship with Concrete Canoe Team

Some wear team pride on a shirt. Some on a button. But for Hanson Aggregates, a local sponsor of the Cal Poly Concrete Canoe Team, where better than the drum of a concrete mixer truck?

The novel tribute was officially “unveiled” at Casting Day on campus, where the two-time American Society of Civil Engineers National Concrete Canoe national championship team was joined by numerous team alumni and industry sponsors to prepare canoe castings for the new season of competition.

“The Cal Poly commemorative mixer drum was an exciting way for us to pay tribute to the team’s past success,” said Ryan Jacoby, regional vice president and general manager. “As a member of the local community, we’re proud of how Cal Poly represents the area. And with its back-to-back national victories, Cal Poly Engineering has created instant recognition for outstanding performance throughout our industry. It’s our hope that having the mixer drum visible will help raise local awareness of their accomplishments.

“Seeing so many generations of past team members at the concrete casting was impressive. I don’t think other teams have that kind of legacy partnership. That’s what the truck honors. I’m sure that the 2012 team will make everyone just as proud. We want to put up a ‘three-peat’ decal following another national victory in June!”

Other major sponsors of the team include Shimmick Construction; C.C. Myers, Inc.; Traylor Bros., Inc. and Cannon. And Eric Bjornstrom, project manager of the team, noted another form of concrete support the team receives.

“Another local concrete company, CalPortland, gives generously to the Civil and Environmental Department, which lays the foundation of our success.”

“Hello Space Station, this is Cal Poly, Over”

The Cal Poly Electrical Engineering Department and the Cal Poly Amateur Radio Club, left, hosted a 10-minute radio conversation with astronaut Daniel Burbank aboard the International Space Station. Local elementary school students got a chance to chat with Burbank as he floated more than 200 miles above the Pacific Ocean at the event held in the Advanced Technical Laboratory.

As a cooperative program between the National Aeronautics and Space Administration (NASA), the Amateur Radio Relay League (ARRL), the Radio Amateur Satellite Corporation (AMSAT) and the Amateur Radio on the International Space Station (ARISS), the program is designed to promote science, technology, engineering and mathematics activities for students from kindergarten to college. For more information on the club, see www.w6bhz.org.

Engineering Students Make Winning Pitches

By effectively communicating a new business plan to a group of potential investors in less than two minutes, engineering students Christopher Pagador, Marcus Foley and Davis Carlin connected on their pitches at the Cal Poly Center for Innovation and Entrepreneurship’s Ray Scherr Elevator Pitch competition in late November.

Competing in four categories — Freshman, Idea Cloud, Launch Pad and Audience Choice — 10 Cal Poly students pitched their ideas at the competition, which is designed to emulate the opportunity of presenting a new business to a CEO or venture capitalist in the length of an elevator ride.

Pagador, a mechanical engineering freshman, won the $500 freshman award for pitching the People Press, a website designed to assist new and small-market authors publish their work.

Foley and Carlin, both biomedical engineering students, also made successful pitches in the Performing Arts Center Pavilion. Foley was awarded $1,500 for winning first place in both the Idea Cloud and Audience Choice categories for his plans for a blood-brain pharmaceutical testing procedure. Carlin won the $1,000 award in the Launch Pad category for his idea for a medical device that treats postpartum bleeding.

Pagador, who said he was “amazed and inspired” by the entrepreneurial environment at Cal Poly, credited preparation for his winning proposal. “You can only deliver a solid pitch if the idea is solid,” he said. “Delivery is important, but secondary. Speaking to the judges afterwards, I was told that my idea stood out for its understanding of the industry economics.”

The 18-year-old said he was definitely planning on making the People Press a reality. “I’m joining the Cal Poly Entrepreneurs’ Hatchery starting winter quarter, where I will gain access to mentors, connections and resources.”
IEEE Balloon Project Reaches Great Heights

Cal Poly students with a passion for high altitude balloons successfully reach the stratosphere

The images of Earth from lofty altitudes as high as 92,000 feet are breathtaking.

“It’s quite a sensation to be able to verify for yourself that the Earth is round and that space is black,” said Justin Jordan who led a team of electrical engineering students with an out-of-this-world passion for high altitude balloons.

Although such balloons do not actually reach space, they can make it well into Earth’s stratosphere, or what’s known as near space.

On this near space mission, almost 1,000 images were captured and transmitted in real time. The data was gathered during a three-and-a-half-hour flight last July as part of a project that was a year in the making.

“The successful endeavor was all the more remarkable because it took place outside the usual sphere of classes, senior projects or special projects,” said Dennis Derickson, EE department chair. “The project is extraordinary for the passion, tenacity and curiosity of these team members who – without thought of academic credit – literally achieved great heights.”

Jordan, now 33, came across the high altitude balloon concept while attending Hartnell Community College a few years ago as an adult returning student. Though he had never considered engineering in high school, Jordan’s subsequent two years in the Navy followed by industry jobs, introduced him to engineering and gave him experience in industrial controls.

It was at the community college that he discovered his passion for embedded systems and microcontrollers. At the same time, he worked at the nearby Navy Postgraduate School (NPS) in Monterey, Calif., where he had the opportunity to assist graduate students with their CubeSat projects.

By the time Jordan transferred to Cal Poly in 2010, his mind was already teeming with plans to pursue his interest in high altitude balloons.

At the same time, Jason Osmann, projects director for Cal Poly’s IEEE chapter, was looking for outstanding students with exciting personal projects that needed funding.

“A project that would result in photos of the Earth from near space – now that had the ‘wow factor’ we were looking for," said Osmann. “And Justin’s presentation was outstanding. It was clear that he was a person of integrity and great motivation. In the end we were able to provide about $1,400 for parts for the initial launch and to support the project in the future. The money came from a student projects fund established by Lockheed Martin.”

First to join Jordan was Justin Kenny, who had worked with Jordan at NPS and shared similar interests.

“Justin Kenny and I are born tinkerers,” said Jordan. “He’s quite exceptional, and an all-around knowledgeable individual. He brought the project together.”

Kenny, who had recently received his ham radio license through the Cal Poly Amateur Radio Club, was also drawn by the opportunity to learn more about radio frequency communications and radio systems in a high altitude environment. Billy Beecher and Abesh Mubaraki, new to most aspects of high altitude ballooning, were eager for the hands-on experience. All four students are now seniors, and Beecher is taking the project forward, working with another IEEE student.

“The project really encompassed all aspects of electrical engineering,” said Kenny. “The system needed power, communications, embedded systems and analog design, all wrapped up into two custom-designed printed circuit boards (PCBs), and the end product is a platform that gives its users easier access to the environmental extremes of near space.

“Justin Jordan and I worked on the board that contained the microcontroller and Automated Position Reporting System (APRS). I took on the challenge of designing an APRS tracker for our balloon, a system widely used by the ham community and well tested. Billy worked on the analog interface board, which would allow users of the system to add other analog or digital sensors. Abesh and Billy worked on the camera and enclosure.

“The biggest part of this project was creating our own PCBs. Having an opportunity to put our skills to practice and seeing a custom-made product come out of it was a great learning experience,” concluded Kenny.

Said Jordan: “I hand it to my team. We met every Friday, we were consistent and we communicated well. That’s why this project was a success. The funding from IEEE, as well as the ground support, time, and resources provided by NPS, were also invaluable.

“We wanted to develop a platform and avionics package that would work for any experiment – one that would include communications to track the balloon with GPS coordinates, log local data and transmit real-time data. It worked, and it’s modular – which means it can be tinkered with and further explored. No one is tied to our idea. For this project, the sky’s not the limit.”
A couple of years ago, Cal Poly industrial and manufacturing engineering lecturer Martin Koch knew he had struck gold in his foundry class when he offered the students an optional metal casting project after the completion of the regular coursework. “When 123 the 125 students in the five sections stayed for the optional project, it was amazing,” Koch said. “I knew right then we were on to something. The students were really enjoying the hands-on aspects of the class.”

Today, the foundry class – IME 141 Manufacturing Process: Net Shape – attracts more than 350 students from every engineering discipline and other colleges to its unique combination of old-school metal casting and computer-aided prototyping.

“In order to Learn by Doing, you have to do, right?” said Koch, a history grad who is basically self-taught in the art of metal casting. “This class gives students experience with the complete sequence of designing and manufacturing a product. We start on the computer with what we call CAD CAM (computer-aided drafting and manufacturing) and then make the molds in wax and sand, and then finally pour the metal. The students get more than a sense of the process; they actually perform the process.”

Thanks to technology, Koch said the casting process has evolved dramatically. “What used to literally take weeks, we can now do in under an hour,” he said. “We take it slowly step by step at first, make a few assigned projects and then let them design their own.

By the end of the quarter, every student makes a functional metal casting.”

By the second week of the class, the process culminated in a Cal Poly keychain. Clad in protective gear from head to shoes, the students poured a silvery aluminum alloy heated to 900 degrees Celsius into sand molds. The physical skill exhibited by the students impressed IME Chair Jose Macedo.

“I think the students gain a lot of confidence from the class,” Macedo said. “You have to remember that some freshmen engineering students rarely even tinker with a screwdriver. It’s not the same as learning on a computer.”

Macedo praised Koch’s ability to make the ancient art of metal casting more relevant to today’s tech-savvy students. “For engineers, the experience in this class is very valuable to the design process,” he said. “When you understand how something is made, it affects your design choices. Martin has fine-tuned the class over the years and incorporated the latest developments. And, importantly, he’s made it fun, too.”

Koch said the fun quickly leads to productivity, with many students casting key parts for their senior projects. “We’ve cast stuff for everybody, from metal car parts to rubber thumbs for a biomedical engineering project,” he said. “The goal all along was to make the foundry a vital resource for other Cal Poly Engineering projects and it’s proving to be just that.”

Creating a mold made from sand and resin is one of the key steps to the process.

Engineering student Nicole Cooper admires her handiwork — a Cal Poly keychain.

Engineering students in IME 141 Net Shape Manufacturing pour molten aluminum into a sand mold.

Martin Koch’s foundry class now attracts more than 350 students a quarter.
Algae cells as they appear on a microscope slide with a hemocytometer (grid) background.

Three Cal Poly Engineering projects delve into algae’s unique ability to clean wastewater, remove toxins and produce biofuels

1 Cal Poly Engineering is partnering with the California Energy Commission to launch an algae-based wastewater treatment plant in San Luis Obispo.

Cal Poly faculty members Tryg Lundquist and Ian Woertz and more than a dozen environmental engineering students are working a project that incorporates new technology that uses algae to treat wastewater and produces biofuel as a byproduct.

The team, which unveiled the Cal Poly Algae Field Station at the San Luis Obispo Water Reclamation Facility in late January, hopes the new technology — called Reclamation of Nutrients, Energy and Water (RNEW) — could be used at wastewater treatment facilities throughout California.

Here’s how Lundquist explained the process: “Oil-rich algae feed on polluting nutrients in the wastewater. The effect is purified water and an increased volume of algae that can be converted to commodities such as liquid biofuel or fertilizer.”

The Cal Poly Field Station, which was funded by a grant from the California Energy Commission with matching funds from MicroBio Engineering Inc., and supported by the City of San Luis Obispo, Phitec LLC, Livefuels Inc. and the U.S. Office of Naval Research, features nine 2,600-gallon ponds filled with wastewater from the adjacent treatment facility for growing the microscopic plants.

“Even though we just started in January, the algae is growing like crazy and we are starting to collect data that shows it’s working,” Woertz said. “The data will change pretty dramatically once we get to the summer months.”

Woertz said the research station is powered by electricity provided by the City of San Luis Obispo, but eventually a full-scale system would be powered by renewable energy, reducing electrical demand for wastewater treatment. A full-scale system would also reduce greenhouse gasses, because it absorbs carbon dioxide from the atmosphere.

For more details, contact Woertz at 805-441-7358 or iwoertz@calpoly.edu.
This project involves algae's ability to utilize toxic gas emitted from power plants.

“...we joke around that we’re going to make food out of smog,” said Environmental Engineering Professor Yarrow Nelson, who along with Food Science Professor Brian Hampson is leading a project that employs a food-grade algae to treat nitrous oxide (NOx) air pollution.

Nelson said the project, which is funded by Paradigm Biosciences International (PBI) and the CSU Agricultural Research Institute (ARI), is focused on the ability of algae to grow using NOx as a nitrogen source.

“NOx is the gas that causes the brown color of smog and it is a respiratory irritant and contributes to acid rain,” Nelson said. “It is produced by combustion, especially from power plants. In January 2015, new NOx rules will go into effect for power plants and current technology for NOx abatement is very expensive — about $1 billion per power plant.

“Since algae can grow in a NOx-rich environment, this is a possible solution to the problem.”

Nelson, who is working with environmental engineering student Steven Shihady and food science student Cristina Brox on the project, said PBI’s business model is to build very large arrays of photobioreactors at power plants to treat the NOx air pollution.

“There is also the ability to produce a food-grade algae called chlorella, which is a healthy supplement with an increasing market,” he said.

A multidisciplinary project focuses on algae oil extraction using electricity.

Hoping to develop a reliable source of biofuels that doesn’t involve food crops, Boeing is sponsoring a multidisciplinary project at Cal Poly led by electrical engineering professors Dean Arakaki and Taufik, and Food Science Professor Brian Hampson that is investigating increased algae oil extraction rates using radio frequency electric fields.

“One of the challenges for biofuel mass production is economical large-scale cell lysis, which requires algal cell wall disruption,” Arakaki said. Lysis refers to the breaking down of a cell.

“Most current procedures for lysing microalgae rely on mechanical disruption such as sonication. However, these techniques are difficult to scale up. Radio frequency electric fields have been successfully used to disrupt bacterial cell walls. To our knowledge, this approach has not been attempted with algae.

“We are now able to lyse algae cells and the current effort is to determine electric field signal thresholds in terms of field intensity, pulselength, and repetition rate for different algae species.”

CPSS Builds a Hybrid Rocket

In May, Cal Poly Space Systems (CPSS) aims to test a hybrid rocket designed and built by a multidisciplinary team of undergraduate students. The flight will take place in the Mojave Desert at the Friends of Amateur Rocketry facility.

“It’s quite impressive that a group of undergraduate students design, build and fly their own 250-pound thrust rocket,” said Dianne DeTurris, faculty adviser.

The rocket is called a hybrid because its engine combines a solid fuel with a liquid oxidizer. The project is sponsored by United Launch Alliance, which has an $8,000 contract with CPSS.

If the flight test is successful, this rocket will be CPSS’s entry into next year’s elite Intercollegiate Rocket Engineering Advanced Competition, an experimental launch event that involves launching a 10-pound payload to 25,000 feet.

Pictured below with Deturris, left, are hybrid rocket team members Joshua Herrman, Joe Vanherweg and Samuel Radinsky.
Into the Wind
Cal Poly’s AMELIA model tested in massive wind tunnel

Researchers from Cal Poly traveled to the National Full Scale Aerodynamics Complex at Moffett Field, Calif., in January to test a future aircraft concept model in support of the NASA Fundamental Aeronautics Program.

The model, called AMELIA (Advanced Model for Extreme Lift and Improved Aeroacoustics), has a 10 foot wing span and is 1/11th scale. AMELIA is designed as an efficient 150 passenger regional airliner capable of short takeoff and landings. It will be significantly quieter because the engines are located on top of the wings.

Aeronautical engineering graduate students Eric Paciano and Jonathan Lichtwardt, along with professor Tina Jameson, tested the AMELIA model in the 40 by 80 foot wind tunnel that is capable of wind speeds of up to 300 knots. An array of 48 microphones recorded sound coming from the AMELIA model airplane during the tests.

The wind tunnel at Moffett Field is the second largest in the world. (Photo: NASA Ames Research Center / Dominic Hart)
Biomedical Engineering Professor Kristen Cardinal Receives Raytheon Excellence in Teaching Award

It’s not surprising Cal Poly Assistant Professor Kristen Cardinal has a contagious enthusiasm for the Biomedical Engineering Department (BMED). After all, Cardinal, who received the 2011-12 Raytheon Excellence in Teaching and Applied Research Award in December, has seen and nurtured the department’s lifespan since inception.

“I was a general engineering student with a strong interest in biomedical engineering, and after taking every class in the subject, went to the University of Arizona for grad school,” says the summa cum laude Cal Poly graduate (2003). “When Cal Poly founded the BMED Department, I was able to come back and be part of the program.”

At Cal Poly, biomedical engineering students have multiplied like cells in a petri dish, going from a couple dozen in 2006 to more than 450 today. “It’s been really exciting seeing more and more students be absorbed by the material,” Cardinal said. “And as the demand for biomedical research grows, so does the demand for biomedical engineers.”

Cardinal, who played outside hitter on the Cal Poly volleyball team with her twin sister Carli, jumped on her interest in research as an undergraduate and that interest plays a large role in her teaching. She said her research areas (tissue engineered“blood vessel mimics,” bioreactor design, stent development and stent healing capabilities) figure prominently in two senior-level classes.

“We have a goal of growing tissue-engineered blood vessels to use as pre-clinical testing systems. So, currently we are working on creating a new scaffold — the tube they grow in — for our blood vessels as well as new methods for analyzing the vessels,” Cardinal said.

“In my senior level biomaterials class, we use some of the extra electrospun scaffolds for students to do mechanical testing on. In BMED 510, I teach the students how to do cell culture, and they recently got to run an experiment at the end of the quarter comparing how our custom scaffolds compare to off-the-shelf commercial products.”

Cardinal said increasing collaboration with cutting-edge companies assures high employment for BMED grads.

“We’ve now had a couple of graduating classes and I’m happy to say they are getting great jobs or other great educational opportunities sometimes funded by industry,” she said.

“It’s exciting when I get a call from a former student who is working at a job they love and they say they’re using techniques they learned in my class.”

“It’s exciting when I get a call from a former student who is working at a job they love and they say they’re using techniques they learned in my class.”

“This kind of feedback is very rewarding.”

Dean’s Office


American Society for Engineering Education (ASEE)

Cal Poly Engineering faculty members are highly involved in engineering education research. The following paper was published at the 2011 ASEE Annual Conference and Exposition in Vancouver, B.C.

Gregg Fiegel published “Graduate Students Mentoring Undergraduate Researchers on a Large-Scale Experimental Research Project - A Case Study” in the Proceedings of the American Society for Engineering Education (ASEE) Annual Conference and Exposition.

Multidisciplinary

Alex Dekhtyar (Computer Science), biology graduate student Emily Neal and biology faculty members Chris Kitts and Michael Black co-authored “Chronology-Sensitive Hierarchical Clustering of Pyrosequenced DNA Samples of E.coli: A Case Study” presented by computer science graduate student Aldrin Montana, at the International Conference on Bioinformatics and Biomedicine (IEEE BIBM 2011) in Atlanta.

Scott Hazelwood (Biomedical Engineering) and Steve Klisch (Mechanical Engineering) along with Cal Poly biomedical and mechanical engineering students and outside collaborators gave a presentation on “Differential Regulation of Articular Cartilage Tensile Properties by IGF-1 and TGF-β1 During In Vitro Growth” at the fourth International Conference on Mechanics of Biomaterials and Tissues held in Waikoloa Beach, Hawaii.

Faculty News
Aerospace Engineering

Diane DeTurris was appointed by President Jeffrey D. Armstrong to the International Initiatives Action Group, which was charged with recommending a process for evaluation of international opportunities, evaluating a self-support model for international students studying at Cal Poly and recommending a pilot project action plan. A framework for evaluating international opportunities was proposed by the group. In addition, the group participated in the development of the V.I.S.I.T. Cal Poly Summer 2012 program, which invites international students to take academic classes at Cal Poly during summer term.

Biomedical & General Engineering

Scott Hazelwood, Lanny Griffin and biomedical engineering undergraduate Folorunso Ashaolu gave a presentation on “Nanoindentation Properties of Alendronate Treated Cortical Bone Remain Invariant After Three Years” at the fourth International Conference on Mechanics of Biomaterials and Tissues in Waikoloa Beach, Hawaii.

In the Transactions of the 58th Annual Meeting of the Orthopaedic Research Society, Hazelwood and biomedical engineering undergraduate Scott Snyder published “Cement Penetration into Femoral Head with Longitudinal Slot Following Hip Resurfacing Arthroplasty” (37:1923, 2012). Hazelwood and biomedical engineering graduate student Joseph Calcagno along with outside co-authors also published “Seasonal and Anatomic Variation in Compact Bone Remodeling in the Adult Sheep” in the meeting Transactions (37:522, 2012).

Civil & Environmental Engineering

Rakesh Goel, chair, published “Variability and Accuracy of Target Displacement from Nonlinear Static Procedures” in ISRN Civil Engineering (Vol. 2011, article ID 582426, 16 pp. doi:10.5402/2011/582426) and “Comparison of Base Shear Estimated from Floor Accelerations and Column Shears” in Earthquake Spectra (Vol. 27, no. 3, pp.939-946). Goel also represented the College of Engineering at the workshop organized by the Council on Undergraduate Research held at CSU Los Angeles.

Bing Qu and graduate student Xuhua Guo published “Effects of Column Stiffness on Seismic Performance of Steel Plate Shear Walls” at the 2011 World Congress on Advances in Structural Engineering and Mechanics in Seoul, Korea. Qu was also awarded a $137,000 National Science Foundation - Network for Earthquake Engineering Simulation Research (NEESR) grant for research on “Seismic Rehabilitation of Sub-Standard Building Structures through Implementation of Stiff Rocking Cores.” Qu is collaborating on the $612,000 project with Michael Pollino of Case Western Reserve University and Gilberto Mosqueda of the State University of New York at Buffalo.

Visiting Industry Scholar Jeffrey Puschell Expands the Frontiers of Space-Based Learn by Doing

CubeSat – Cal Poly’s program in which students design, build and launch small satellites – sits foursquare among the factors that drew Jeffrey Puschell to Cal Poly to serve as this year’s visiting industry scholar.

A principal engineering fellow at Raytheon, Puschell is an internationally recognized expert in space-based imaging and remote sensing systems. During his Cal Poly assignment, he is teaching a graduate class in Fourier optics and serving as an adviser for two student projects.

“Most of my background is in environmental remote sensing of Earth from space. Weather satellite instruments, climate monitoring – that’s what I do. So I saw a natural connection with CubeSat,” said Puschell.

For electrical engineering senior Eric Stanton, Puschell’s arrival on campus was a turning point, enabling him to adopt his senior project to CubeSat.

“Everything seemed to fall into place with the opportunity to work with Dr. Puschell. I had been working with CubeSat for the past two years, and my course concentration has been in optics and electronics. So when I heard that he was interested in developing a small satellite imager, it was just what I had been waiting for.”

Noted Puschell: “I bring my particular areas of expertise to bear in helping Eric develop an environmental imager for CubeSat that does the work usually performed by much bigger, more expensive imagers. Eric’s project is to build a breadboard prototype imager that demonstrates proof of principle.”

“Environmental imaging CubeSats have the potential to fill in the gaps left behind by bigger satllites, such as when there’s a commercial or government need to look at Earth, and do it quickly – to look at chlorophyll in the ocean, for example, or to detect fires,” explained Puschell.

“CubeSat helped launch the small payload revolution – and environmental monitoring is a natural next step. It would be great to see Cal Poly in the middle of that.”

Stanton noted that the visiting scholar’s expertise in the small satellite technology extends to the details and applications of Fourier optics.

“With Dr. Puschell’s help, I am learning how to approach and optimize an optical design that could make it feasible to fly an imager on a CubeSat, as well as make it a marketable high tech product.”

“It’s a project that can go on for quite some time, decades even,” said Puschell, “and it may lead to a whole series of satellites like this. It would be great to leave that legacy, and come back in a few years to see how far Cal Poly Engineering has taken it.”

Another student benefiting from Puschell’s background is Travis Heffernan, currently on leave from Raytheon to pursue a master’s in Electrical Engineering.

“We didn’t know each other at Raytheon, said Puschell, “but he heard that I was here, and I’m glad he sought me out because his project is quite interesting. It uses wireless transmission power to beam energy to a remote object. It can be a device as small as a cell phone or a system as large as unmanned aerial vehicles (UAVs).”

“My focus is on the use of metamaterials,” said Heffernan. “Those are advanced materials, not found in nature, that are engineered to have specific optical properties. It’s an extraordinary technology that’s revolutionizing how engineers focus and direct electromagnetic waves. It’s even used in applications as exotic as invisibility cloaking.”

Even real world applications of metamaterials have a sci-fi quality, he finds.

“In my project,” said Heffernan, “I’m focusing on how a satellite could collect solar energy and use metamaterial antennas or other channels to beam down microwave energy to UAV. The microwave energy could then be converted to DC power and eliminate the need for the UAV to land.”

“Raytheon loves projects like these, which is one reason the company is ‘lending’ employees like me to serve as visiting scholars,” said Puschell, “but the single biggest thing we love are the students produced here. That’s Cal Poly’s claim to fame and contribution to our world.”
Faculty News

Gregg Fiegel was named the Faculty Adviser of the Year by the American Society of Civil Engineers (ASCE) Region 9 for the third consecutive year. He was also elected vice president of Student Activities for the ASCE Los Angeles section.

Fiegel and co-authors Dan Jansen and Jay DeNatale published “Water Jetting to Mitigate Defects in Drilled Shafts: Laboratory Investigation” in the Transportation Research Board: Journal of Transportation Research Record: Journal of the Transportation Research Board (Issue 2212, pp. 14-22).

Eugene Jud was invited to speak on “Sustainable Mobility - How real is it?” at the prestigious Symposium for Leaders of the Next Generation (STARS) conference in Stein am Rhein, Switzerland. Attending the conference were 100 CEOs and leaders from 30 nations. He also co-authored “Integration of Bicycling and Walking Facilities into the Infrastructure of Urban Communities” published by the Mineta Transportation Institute (see http://transweb.sjsu.edu/project/2906.html).

Tryg Lundquist cut the ribbon on a wastewater treatment demonstration project that uses algae and produces biofuel as a byproduct. The research treatment station is the outcome of a grant Lundquist received from the California Energy Commission and matching funds from MicroBio Engineering Inc. The project is supported by the City of San Luis Obispo, Phitec LLC, Livefuels Inc., and the U.S. Office of Naval Research.

Robb Moss was invited to participate in post-earthquake reconnaissance of the 2011 Tohoku Earthquake in Japan as part of a follow up the National Science Foundation’s Geotechnical Extreme Events Reconnaissance-GEER team (see http://www.geersassociation.org/).

Moss was awarded a supplemental National Science Foundation grant to test shear wave velocity in conjunction with deep and wide excavations in congested urban areas. For this project, Moss is evaluating how the dynamic properties change as the excavation proceeds for the Transbay Transit Center in San Francisco.

Computer Science & Software Engineering


Chris Clark, John Clemens, David Janzen and Michael Haungs published “Improving First-year Success and Retention through Interest-Based CS0 Courses” at the annual meeting of the Association for Computing Machinery (ACM) Special Interest Group on Computer Science Education (SIGCSE 2012) held in Raleigh, N.C. The paper reports the outcomes from the redesign by these faculty members of the first-year course sequence for Computer Science and Computer Engineering freshmen. The course curriculum now incorporates projects, such as designing and building computer games, apps and robots, or creating art. As a result of the change, there has been an increase in student grades and retention.

Pan Receives IMAPS Teaching Award

Over the years, Professor John Pan has given almost 30 presentations at international conferences and also given the same number of invited talks at universities and professional societies. Those accomplishments plus a record of involving students in research have earned Pan the 2011 IMAPS (International Microelectronics and Packaging Society) Outstanding Educator Award.

Pan received the award last October at the IMAPS International Symposium on Microelectronics, where he also earned Best Paper accolades for “A Study of Solder Joint Failure Criteria.” The paper is an outcome of a joint research project with Agilent Technologies – Agilent’s manager, Julie Silk, is a co-author.

Jose Macedo, chair of the Industrial and Manufacturing Department, noted that Pan’s research projects often focus on environmental issues, including work on lead-free solder paste for printed circuit boards and encapsulation of LED lights.

“Dr. Pan’s research efforts, over time, reveal a unique interest in contributing to the protection of the environment and sustainability,” said Macedo. “John is teaching his students how to be good engineers, and at the same time how to apply their engineering knowledge to be environmentally conscious.”

Pan earned his bachelor’s degree at Xidian University and his master’s at Tsinghua University. He holds a Ph.D. from Lehigh University; he joined Cal Poly in 2003.


Zoe Wood and Chris Clark gave public talks on technologies for underwater exploration at the Department of Systems and Control Engineering of the University of Malta. Wood’s presentation was on “Visualisation of Underwater Data.” Clark spoke on “Tracking Sharks with Autonomous Underwater Vehicles.”

Electrical Engineering

Civil and environmental engineering professor Samuel A. Vigil was elected as a fellow of the Air & Waste Management Association and will be recognized at the group’s 105th Annual Conference in San Antonio, Texas in June.

Founded in 1907, the Air and Waste Management Association is an international organization of more than 7,500 environmental engineers and scientists from more than 60 countries. Fellows are selected on the basis of their professional accomplishments and service to the association.

Vigil was recognized for his leadership in applied research in the recovery of energy from wastes with gasification processes, the computer optimization of waste management systems, the development of sustainable waste management techniques, and the modeling and remote sensing of greenhouse gas emissions.

He was also recognized for his co-authorship of the most widely used textbook in the solid waste management field, “Integrated Solid Waste Management: Engineering Principles and Management Issues.” Published by McGraw-Hill, the book has been translated into Spanish, Japanese, and Korean and is used by universities throughout the world as well as by practicing environmental engineers.

Vigil’s service to the association has included serving as a session chair at 16 of the association’s annual conferences and serving as a reviewer for the Journal of the American Society of Civil Engineers and the Journal of the Air and Waste Management Association.

For more information on the Air and Waste Management Association, see www.awma.org.

### Mechanical Engineering

Saeed Niku presented a poster on “Finger-Spelling Hand for the Blind and Deaf” at the 16th Annual National Collegiate Innovators and Inventors Alliance (NCIIA) conference in San Francisco. He was also invited to participate in a Department of Defense review panel for its Science, Mathematics And Research for Transformation (SMART) Scholarship for Service Program (January 2012) and National Defense Science and Engineering Graduate Fellowship (NDSEG) program in Washington D.C.

### Materials Engineering

Kathy Chen received a Nanoscale Informal Science Education Network (NISEnet) mini-grant to develop nano labs for the department and outreach purposes. She and a group of materials engineering students also held a “Materials World” program at the San Luis Obispo Children’s Museum and visited three Boys & Girls Clubs during National Engineers Week to promote science and engineering to children.

### Industrial & Manufacturing Engineering

Jianbiao (John) Pan received a Best Paper award for “A Study of Solder Joint Failure Criteria,” (co-authored J. Silk) at the 44th International Symposium on Microelectronics (2011 IMAPS) in Long Beach.

Pan published the following:


Liz Schlemmer was awarded a $250,000, three-year National Science Foundation grant to research innovative methods of teaching and learning. As part of the grant, Schlemmer is working with faculty from across campus on a learning initiative called SUSTAIN-SLO in which students take general education courses that involve community service projects.

Dan Waldorf is leading a group of industrial and manufacturing engineering undergraduates in a pilot study to create virtual lab guides for the Advanced Manufacturing Lab. The guides utilize text, photos and videos in an internet-streaming environment to instruct users in a variety of common lab tasks. The software for the guides, file storage and server usage have been provided free of charge by Dozuki.

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A dramatic juxtaposition of American automobile ingenuity was on display in Engineering Plaza when one of the first super cars from another century met Cal Poly’s Supermileage team in mid-February.

Cal Poly was on the itinerary of a Cal Poly Engineering alum’s sentimental journey from Phoenix to Eureka. The trek commemorated the 100th anniversary of the Ford car dealerships founded in those two cities by the great-grandfather of Trevor Harper (B.S., Mechanical Engineering, ’00), shown at right. Although not the same Model T touring car that made the original road trip, the vintage Model T on this expedition also starred in both the 50th and 75th anniversary re-enactments.

Harper, his wife Wendy Wharton (B.S., Business, 1996) and three children met the Supermileage team and took a tour of campus before getting back on the road to complete the last half of the expedition. Harper currently manages Harper Motors in Eureka.

The visit came as the Cal Poly Supermileage crew prepared to compete in the 2012 Shell Eco-Marathon Americas in Houston in late March.

For more information on drive, see: http://harperford.dealerconnection.com/harperstory/
Dealing With Diablo

Cal Poly grads form backbone of the nation’s first training program for nuclear planners

At nuclear power plants, no bolt is turned without a written work order. In an industry in which safety is paramount, work order instructions for every action provide documentation and help ensure safe and proper plant operation.

It’s the job of nuclear planners to develop work packages and, additionally, provide technical support for field personnel for design modifications, construction, preventative and corrective maintenance, and tasks to comply with plant licensing and other regulatory requirements.

The first training program for nuclear planners in the country is in Cal Poly’s back yard, at the Diablo Canyon Power Plant – and 11 of the 15 individuals in the program are Cal Poly Engineering graduates.

According to Ed Boucher, program director and maintenance manager at the PG&E plant, the Cal Poly recruits are an “employer’s dream come true” and represent the future of the nuclear power industry.

“I was very selective about these candidates because nuclear power is not for everyone,” said Boucher, a 1990 Cal Poly mechanical engineering alum. “It is an industry where there is zero margin or tolerance for error; the hours can be long and demanding, the stakes can be high and the work stressful. All of the chosen Cal Poly grads understand the seriousness to the public due to consequence of error and they also exhibit the willingness to Learn by Doing.”

The prospective nuclear planners include civil, electrical and mechanical engineers. To become certified, they must complete approximately 200 electronic training modules in addition to job tasks and six months of oversight review.

Despite the challenges of the training program, the Cal Poly alums agreed that the rewards are high.

Several cited the salary they earn even as trainees: “I paid off my student loans in a year,” noted Sam Gardner. Once certified, nuclear planners earn between $150,000 and $200,000 per year.

But job satisfaction was also important. “Our Cal Poly Engineering education gave us the ability to take something on, adapt to situations in the field, meet deadlines and excel,” said Jesse Duenas. “That’s what this job is all about.”

Boucher had nothing but praise for the work done by the Cal Poly cohort. “They exhibit a strong work ethic and engineering curiosity,” he said. “I was looking for people who were capable of leading this industry into the future and I strongly believe that many of these individuals will play important roles at Diablo Canyon or other nuclear facilities in the coming years.”

“Our Cal Poly Engineering education gave us the ability to take something on, adapt to situations in the field, meet deadlines and excel.”

Jesse Duenas (B.S., Electrical Engineering, 2009)
A Ph.D. in Hand, Cal Poly Alum Hopes to Improve the Environment

Thomas Abia, a 2008 environmental engineering graduate and wastewater specialist, recently received his Ph.D. at Texas A&M. Now he wants to put his education to work making clean water accessible to everyone.

“My ideal job would be in research and development of wastewater treatment technology,” said Abia. “I would like to develop a treatment process, optimize it and bring it out of the lab and onto the field.”

Abia’s interest in the environment was nurtured at Cal Poly. During a class trip to the San Luis Obispo Water Reclamation Facility (SLOWRF), Abia noticed the facility was under-staffed and he began to volunteer. “The job allowed me to think with my hands as well as my mind,” said Abia, “and it was at that moment that wastewater treatment clicked for me.”

A plant operator for four years, Abia evaluated the different wastewater treatments and studied how they could be improved. “SLOWRF supplemented my coursework with hands-on engineering, allowing me to converge my skills as a learner and a doer,” he noted.

While at Cal Poly, Abia served as president of the Society of Black Engineers and Scientists, a position he used to initiate community outreach efforts to middle and high school students to help raise awareness of the scarcity of clean water. And, as an active member of Cal Poly’s Society of Environmental Engineers (SENE), Abia participated in a wastewater competition with other universities.

“We had to design, build and optimize portable treatment units for synthetic wastewater using readily available household products. My biggest takeaway was having to anticipate situations in which resource availability is limited,” Abia recalled.

His doctoral studies only increased his dedication to the field of wastewater treatment. “Texas A&M took everything I knew from Cal Poly and put it on steroids,” Abia said. “My hope is to bring attention to Americans that clean water is not as abundant as they believe, especially in other parts of the world.”
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