Real Problems, Real Clients, Real World Projects

A quick look around the College of Engineering reveals Learn by Doing in action. Whether working on a club project, a class project or a senior project, engineering students relish the opportunity to apply their engineering knowledge to address real problems or devise new innovations. The handful of projects included here provide a glimpse of the project work going on throughout the college:

**Student Projects Assist Injured Navy Veteran**

Two student projects have the potential to improve the health and wellbeing of Navy veteran Taylor Morris, who lost his legs and arms to an improvised explosive device while on patrol in Afghanistan.

Overheating is a problem for amputees because they have less body mass and less skin surface to modulate heat. Four seniors in the interdisciplinary senior project design course have an idea for a cooling system to reduce heat in Morris’ prosthesis sockets. Mechanical engineering senior Benjamin Kraw, biomedical engineering seniors Derek Piastrelli and Kathy Ha, and general engineering senior Cuong Tau Lai have designed a system that uses a thermoelectric effect to transmit heat generated from Morris’s residual limbs to the surrounding environment by means of forced convection over small aluminum heat sinks.
A Moment with Dean Debra Larson

Teaching at Heart of Cal Poly Success

“My passions led me to apply to my current position. I felt that Cal Poly’s emphasis on teaching was second to none, and that I would have the opportunity to really work with and get to know my students.”

A first-year faculty hire said something (above) that made me think about how Cal Poly prizes teaching as the foremost institutional endeavor. Indeed, teaching is not only valued at Cal Poly but promoted through awards and peer reviews. The Cal Poly Center for Teaching, Learning and Technology (CTLT) offers resources and workshops. Additionally, many engineering faculty members participate in American Society for Engineering Education conferences. I am proud that so many of our faculty are active in innovating and advancing pedagogy.

Our last batch of faculty awards were presented in December. I hope you’ll take a moment to read about these outstanding teachers (see page 18). It’s notable that donors Don and Paula Heye established an endowment to provide new awards for club advising and teaching excellence. The Don & Paula Heye Award for Outstanding Teaching drew 45 nominations, indicating that faculty appreciate outstanding teaching by their colleagues.

I’m not sure it’s widely understood outside of academia that professors don’t simply stroll into class and recite a lecture. The profession requires a rigorous intellectual investment to develop practices that are relevant and powerful for students today. They create and manage environments that encourage learning.

And our faculty are making that investment! In 2014-15, engineering faculty from every single department spent a combined total of 1,040 hours involved in teaching development activities sponsored by CTLT alone. They attended workshops, participated in learning communities to develop new understanding about student learning, presented instructional innovation showcases, and more. CTLT Director Patrick O’Sullivan notes that engineering faculty contribute a great deal to the culture of teaching at Cal Poly. “They spend the time to keep learning and to also collaborate with colleagues across campus,” he said.

Engineering faculty members are also undertak-
Haas Inspires Generations of Cal Poly Engineers

Support from both the company and foundation includes new equipment, scholarships, upgrades to labs and funding for student projects.

The indelible footprint made by Haas Automation and the Gene Haas Foundation at Cal Poly includes lab support, funding, scholarships, equipment, in-kind donations and support for student projects.

For more than 27 years, in fact, the company and the foundation have served as leaders in building Cal Poly’s manufacturing engineering program.

In recognition of Haas Automation and the Gene Haas Foundation, the College of Engineering dedicated the Haas Netshape Laboratory and the Haas Advanced Manufacturing Laboratory in late January. These are the second and third labs named in Haas’ honor at Cal Poly.

In his remarks at the dedication, President Jeffrey D. Armstrong noted that Haas has “helped foster an environment where enterprising students are encouraged to face new challenges, develop solutions and grow into the innovative global leaders the engineering industry needs.”

“Haas Automation and the Gene Haas Foundation have inspired generations of graduates who are igniting a renaissance in U.S. manufacturing,” he said.

Support from Haas includes:
- The company provided entrusted CNC machines that give students experience with the latest equipment.
- The Gene Haas Foundation provides annual scholarships for students interested in careers in manufacturing.
- In the past three years alone, the foundation has given $90,000 to support and upgrade three manufacturing laboratories.
- Haas regularly donates new tooling and materials, such as cutting tools, steel and aluminum, and other in-kind gifts.
- Haas provides support for student projects, offers mentorship and sponsors department events.

Haas is a steady provider of internships and job opportunities for students and graduates.

Haas has established a visible presence on campus through participation in advisory boards and by presenting class and tech talks. Haas has also promoted manufacturing education nationwide by sponsoring annual Haas Technical Education Center Conferences, which give CNC educators and practitioners a chance to collaborate.

Cal Poly had the honor of hosting the four-day event in July 2015, thereby strengthening its reputation as a workforce provider and a national leader in manufacturing education.

“The Gene Haas Foundation has been a model for how industrial partners can collaborate with education institutions,” noted Jose Macedo, chair of the Industrial and Manufacturing Engineering Department.

EXCELLENCE IN TEACHING: From left, Professors Steffen Peuker, Bridget Benson and Brian Self with Dean Debra Larson.

For more on the Cal Poly Engineering faculty awards, see https://engineering.calpoly.edu/news/cal-poly-engineering-announces-faculty-and-staff-awards/.
A $350,000 grant from the W.M. Keck Foundation (Keck) will promote the integration of research and education in Cal Poly’s growing interdisciplinary program in human motion biomechanics. Cal Poly’s Human Motion Biomechanics (HMB) Lab established in 2014 has enabled applied research in the field. Keck’s support will boost the clinical and educational goals of the HMB program by providing additional funds for student projects and curriculum development.

“The Keck grant will provide opportunities for teams of students from the Biomedical Engineering, Kinesiology and Mechanical Engineering Departments to undertake targeted biomechanics research,” said Professor Stephen Klisch, HMB Lab director. “Additionally, we will develop an interdisciplinary undergraduate course in biomechanics along with inquiry-based, hands-on learning modules in several existing courses.”

In addition to Klisch, HMB campus partners include Scott Hazelwood (Biomedical Engineering), Brian Self (Mechanical Engineering), Robert Clark (Kinesiology) and Kevin Taylor (Education).

An example of student-led research currently taking place in the HMB Lab is a project to determine knee loads for normal weight and obese subjects during walking and cycling. The work done by mechanical engineering students Alejandro Gonzalez-Smith, Juan David Gutierrez-Franco, Luke Kraemer and Nina Yadlowsky may help reduce the risk for knee arthritis in overweight individuals by showing that cycling produces lower knee loads and reduces long-term wear. According to Klisch, the Keck award provides a solid foundation for the HMB program moving forward, including the purchase of key equipment and funding for approximately 14 students each year to work on research projects aimed at encouraging weight loss and exercise while preventing or slowing the progression of knee arthritis.

“The grant from the W.M. Keck Foundation positions Cal Poly to become a leader in engaging large, interdisciplinary undergraduate student teams to conduct motion analysis experiments with clear clinical outcomes,” said Klisch.

IN MOTION: Mechanical engineering students Nina Yadlowsky and Juan David Gutierrez-Franco attach reflective markers on Alejandro Gonzalez-Smith in Cal Poly’s Human Motion Biomechanics Lab. At right, infrared cameras mounted around the lab record Gonzalez-Smith’s movement.

SAFETY FIRST: Shop practices will be the focus of PG&E Student Safety Tech Ryan Baskett and new Safety Coordinator Karen Bangs.

College Promotes Safety with Support from PG&E

A new Earn by Doing student safety tech position sponsored by PG&E — along with the appointment of a collegewide safety coordinator — adds momentum to the College of Engineering’s safety initiative.

“We feel strongly that safety awareness and training is a career imperative for engineers,” noted College of Engineering Dean Debra Larson. “To strengthen our overall safety culture and thereby enhance our Learn by Doing environment, we’ve appointed Karen Bangs as safety coordinator to implement best practices and procedures across the college.

“We’re delighted that PG&E supports these efforts by funding a student safety tech to assist Ms. Bangs. PG&E’s gift reflects the fact that our external partners appreciate our emphasis on safety.”

“The safety of our customers, our employees and the communities we serve is always our top priority,” said Jan Nimick, PG&E senior director of nuclear services. “This partnership with Cal Poly allows us to share our safety values and practices with the next generation of engineers and energy sector workers.”

During her three-year appointment, Bangs, a 1986 industrial engineering graduate and lecturer in the Industrial and Manufacturing Engineering Department, will develop a plan in consultation with Cal Poly Environmental Health and Safety, faculty, the technical staff and the Dean’s Office.

“I’m very big on planning,” said Bangs. “I look forward to conducting root-cause analyses and risk assessments and developing mitigation methods. I’m also excited to welcome Ryan Baskett as the PG&E Student Safety Tech.”

Baskett, a mechanical engineering senior, will assist Bangs in undertaking environmental scans and building a database of the labs and hazardous material storage areas. “We also want Ryan to serve as a liaison with student clubs in order to create an overall student safety climate,” said Bangs.
Cal Poly Exceeds State’s Water Conservation goal


“I am very pleased to report that Cal Poly achieved a reduction in total water use of 31 percent, exceeding both the California State University system’s original 10 percent target and the governor’s subsequent 25 percent goal,” said Dennis Elliot, Cal Poly’s director of Energy, Utilities and Sustainability.

Elliot attributed the savings to Cal Poly’s 2015 Drought Response Plan, a collaborative effort between Facilities, Housing, Associated Students Inc.; Campus Dining; and the College of Agriculture, Food and Environmental Sciences.

One of the newest clubs on campus, Cal Poly RainWorks, is helping with the effort. The club, an interdiscipli- nary group of engineering and architecture students, created a green infrastructure master plan for Cal Poly as part of the Environmental Protection Agency’s annual Campus RainWorks Challenge.

“The main goal of our master plan was to mitigate the effects of stormwater runoff while keeping the effects of climate change in mind,” said environmental engineering student Jessica Duffey, co-founder of the club.

Another Enrollment Record

Nearly 57,000 first-time freshmen and transfer students sought to enroll at Cal Poly for the 2016-17 school year, a record number of applications for the university. Of the Cal Poly hopefuls, 17,413 were for spots as College of Engineering freshmen and transfer students.

“This was the largest undergraduate applicant pool in Cal Poly history with 48,215 first-time freshmen and 8,553 upper division transfers submitting on-time applications,” said James Maraviglia, associate vice provost for marketing and enrollment development.

It was a 2.8 percent increase from the 46,897 incoming freshmen who applied in 2014 and a 7.7 percent rise in the number of transfer students who applied.

The College of Engineering applicants faced a highly competitive pool. The average high school grade point average for the first-time freshmen applicants is 4.17.

Flying High: Cal Poly Named a Top University for Aerospace and Defense Industries

Cal Poly was named a top school for the aerospace and defense industries (A&D) in the 2015 Workforce Study compiled by “Aviation Week & Space Technology.”

The magazine compiled its list of top schools based on preferred suppliers of skills, where the most graduates were hired in 2014, and the top schools as identified by young professionals who believe their alma mater and its reputation has a direct correlation to their career success.

Cal Poly ranked first in the category in which young professionals assessed the reputation and impact of their alma mater on their careers. Embry-Riddle Aeronautical University was second, Purdue University third and Iowa State University fourth. Fifth place was a tie between Pennsylvania State University and the University of Washington.

In response to Cal Poly’s high ranking, Beth Anderson, 1985 Cal Poly aerospace engineering alumna and vice president of supplier management payloads and systems for Boeing Commercial Airplanes, said, “I am not surprised! For over a century, Cal Poly’s Learn by Doing approach has graduated generations of engineers that possess the curiosity, confidence and passion needed to blaze trails in this fascinating industry. Going into the next century, the future is bright for aerospace and Cal Poly!”

Since 1997, “Aviation Week” has tracked employment opportunity and compensation in the A&D industry. The 2015 Aviation Week Workforce Study surveyed corporations, 1,156 university engineering students and 1,371 young professionals. The data collected indicates that despite a 2 percent reduction in the A&D workforce population, 55,000 jobs will be filled this year, with about 10 percent hired from university campuses.
Meet the New Engineering Advisors

Many factors can influence student retention and graduation rates, but academic advising and a full range of student support services are essential to student success. With enrollment now nearing 5,700 undergraduates, the College of Engineering added two additional staff in its Engineering Student Services (ESS) program to meet student needs. ESS includes the Engineering Advising Center, Multicultural Engineering Program and the International Exchange Program.

Ashlee Burt and Meghan Palaszewski joined Cal Poly during winter quarter, bringing a wealth of experience. Burt has a degree in cognitive science, psychology and sociology from UC Irvine and a master’s in counseling and guidance from Cal Poly. She has served as a therapist for children with autism, case worker for students with developmental disabilities, and a health volunteer in the Peace Corps in Mongolia. “I hope to collaborate across campus to bridge students’ social and academic lives,” she said.

Palaszewski earned her bachelor’s and single subject credential at Cal State Long Beach, and taught middle school and high school English for two years before starting the counseling and guidance master’s program at Cal Poly. At ESS, she serves as an advisor to the Multicultural Engineering Program and student clubs, and co-facilitates programs and workshops with industry. She also advises the College of Engineering Cal Poly Scholars and plans service and career-oriented programs for the group. “I’ve found engineering students to be highly motivated and passionate about what they do,” noted Palaszewski.

“With Ashlee and Meghan on board, we are excited to not only meet student demand but also be proactive with our advising and support services,” said Kim Marsalek, ESS director. “We hope to grow connections to faculty and industry, and provide new programs to retain and engage engineering students.”

Cal Poly Showcased as Exemplary in Engineering Ethics Program

Cal Poly was recognized as a top university for ethics in engineering education. The National Academy of Engineering (NAE) included Cal Poly among 25 universities in the report “Infusing Ethics into the Development of Engineers: Exemplary Education Activities and Programs.”

Published by the NAE’s Center for Engineering Ethics and Society (CEES), the report is a resource for institutions and educators working to strengthen and expand their ethics programs and improve the capabilities of practicing and future engineers.

Cal Poly’s inclusion in the report is based on work done by Aerospace Engineering Professor Dan Biezad. Before his retirement in 2009, Biezad developed an unconventional curricular approach to ethics. Rather than teaching a particular code of ethics, Biezad developed an ethics curriculum based around the history of philosophy and mathematics, presented in class weekly in a short story format.

“The intent is to show the evolution of ethics from antiquity to the present,” said Biezad, “with the goal of having a lasting impact on engineering graduates throughout their working careers.”

The CEES report noted that “Ethical practice in engineering is critical for ensuring public trust in the field and in its practitioners, especially as engineers increasingly tackle international and socially complex problems that combine technical and ethical challenges.”

Faculty Research Provides Student Project Opportunity

The five students working with Biomedical Engineering Professor Kristen Cardinal on a research collaboration with Medtronic Neurovascular are gaining valuable research experience developing tissue-engineered blood vessel models to evaluate devices that treat aneurysms. “The goal is to allow early stage testing on how human cells respond to implanted aneurysm devices,” explained Cardinal. “The work involves cell and tissue culture, electrospinning of biomaterials, and designing and prototyping custom parts.”

Biomedical engineering students Kristen Temnyk and Zach Cutts are working on cell culture and creating the tissue-engineered vessels for their respective senior and master’s thesis projects. Kaylee Keck, biomedical engineering graduate student, provides immunostaining and vessel analysis. Mechanical engineering undergraduates Adam Evard and Brandon Puccini are designing and prototyping components for the electrospinning process used to create biomaterial scaffolds.

“This project came to us via Marc Dawson, a Cal Poly alumnus working in Medtronic’s research and development group,” said Cardinal.

BB-8 Awakens at Cal Poly

A fully functional BB-8 will soon navigate campus far from the planet Jakku. The newly beloved robot featured in “Star Wars: The Force Awakens” has been recreated by the Cal Poly Robotics Club with funding from Boeing.

The project team, 11 students in all, included mechanical, electrical and computer engineering majors. Team co-leader Matthew Ng explained that the electrical engineers created a power distribution board to power up the three motor drivers and an inductive charger. To make the robot move, the computer engineers coded and tested the Arduino microcontroller. And the mechanical engineers “worked on the rotating shaft, chassis construction, and a way to connect the two hemispheres besides using tape.”

After three quarters of work on the project, the highlight for the team was seeing the droid come to life. “Working on BB-8 has helped my co-leader, Mytch Johnson, and I land internships at HPE and ViaSat, respectively,” said Ng. “We’ve put theory into practice and gained strong leadership, technical and problem resolution skills.”

Ng speculated that Boeing funded the club project because the company is working on using an inductive charger to charge the robot wirelessly. “Or, they could just be big ‘Star Wars’ fans.”

Entreprenernial Project Marries Virtual Reality with E-Sports

Hoping to eventually take their product to market, a multidisciplinary senior project team is developing a way to stream 2D e-sports content into multiple views in virtual reality (VR) headsets.

The entrepreneurship team “ObservVR” includes computer science senior Annie Liu; computer engineering seniors Nikhil Ahuja, Jacob Copus and Justin Cellona; and business seniors Lucas Toohey and Matt Twohig.

“When utilizing the growing VR technology and the expanding e-sports industry, we feel that our
PROJECTS  From Page 7

product is addressing two hot and rapidly growing markets,” said team co-leader Liu. “Our product includes a web application where users will be able to customize their video streams and preferences and a VR application to deploy the content for users to watch.”

Going forward, ObservVR plans to continue developing prototypes to show the concept to potential investors and content creators. Additionally, the team is taking advantage of the array of competitions and accelerators offered through Cal Poly’s Center for Innovation and Entrepreneurship.

“I’ve really enjoyed learning about the business side of a startup along with the software side,” said Copus. “Working on this project as part of this new class experience has allowed me to be more involved in every aspect of the project — it’s been a great way to cap off my experience at Cal Poly.”

Reaching Consensus on Hip Surgery

Consensus Orthopedics designs and manufactures total joint implants and instruments — it’s senior director of research and development is Cal Poly alumnus Justin Creel, a 2002 materials engineering graduate. This connection resulted in a multidisciplinary project opportunity for seniors Mark Sidor (biomedical engineering), Michael Rumery (mechanical engineering) and Anton Gebert, an international student from Sweden. The group is redesigning a tool for total hip replacement surgery. The instrument is used specifically for minimally invasive procedures, which involve more difficult geometries and mechanisms than direct surgeries. Sidor, Rumery and Gebert hope to manufacture and test a tool that will improve ease of use and durability during surgery.

“I’m interested in the field of orthopedics and this project was a great introduction,” said Sidor. “Observing several orthopedic surgeries including two total hip replacements at Marian Regional Medical Center helped the team immensely.”

“The large problem we faced as a team was to design a feature that is extremely durable with delicate details,” explained Gebert. “Much later in the design phase, we realized we had made a fatal mistake. But as a group, we got the creative juices flowing, and with some good feedback from Consensus, today we have a much better concept.”

A Crop of Innovation

On a two-acre parcel of Cal Poly’s idyllic farmland, a growing number of engineering students are producing a crop of innovation. They are actively involved in a certified-organic “maker space” known as the Student Experimental Farm.

“It’s a space for creativity and invention,” said Jordan Baxter, a graduate student in water engineering. “And it’s open to all — not just designers or engineers.”

Students in disciplines that span engineering architecture, agriculture, science, city and regional planning and more, converge in this living laboratory that combines interdisciplinary learning, appropriate technology and tinkering.

The wide-ranging projects are facilitated by Pete Schwartz, a physics professor specializing in renewable energy, appropriate technology and collaborative education. Among the projects:

* An aquaponics project based on wetland ecosystems, in which plants and animals support each other. Fish waste breaks down into nitrates that can be absorbed by plants. The plants, in turn, filter the water for the fish.
* DC House is being developed to demonstrate how less expensive DC electricity can be drawn directly from renewable sources.
* A solar stove, designed as an alternative to open-fire cooking, gets high cooking temperatures with very little power. The project addresses two widespread and inter-related problems in developing countries — indoor air pollution and deforestation.
Simply Outstanding

Cal Poly Society of Women Engineers honors five Outstanding Women in Engineering for 2015

The Cal Poly Society of Women Engineers (SWE) announced five recipients of the 2015 Outstanding Women in Engineering (OWE) award at its Evening with Industry in late January. More than $44,200 in scholarships were also awarded.

Attended by almost 1,000 students, faculty, staff and industry representatives, the banquet honored student accomplishments. In addition to the OWE honorees, 39 student scholarships were awarded by Bert and Candace Forbes, Boeing, Cal Poly SWE, Chevron, Eaton, Fluor, Lam Research, Lawrence Livermore National Laboratory, Maxim Integrated, Mazzetti, Phillips 66, Raytheon, Skyworks, Solar Turbines, Southern California Edison and SWE Central Coast Region.

The OWE awardees were chosen based on four criteria: faculty recommendations, demonstrated leadership, related work experience and grade point average. The recipients were:

**Vanessa Forney**
A computer science graduate student, Forney has a special appreciation for her field: “Everything in computer science is simply a puzzle that needs the pieces put together in a certain way to work.” For Forney, it all came together in her first computer science class. “It wasn’t about memorization,” she said, “it was about learning and applying concepts.” This winter, in partnership with classmate Myra Lukens, she developed an iOS app for Cal Poly students called Poly Rides, a long-distance ride-sharing app. The idea won the Elevator Pitch Award from Cal Poly’s Center for Innovation and Entrepreneurship and, more recently, earned a place in the Apple store, where the app has already been downloaded by more than 1,200 Cal Poly students.

**Michallynn Hoffman**
An industrial engineering major who graduated in December, Hoffman is drawn to global challenges. For the past two years, Hoffman has been project manager for Engineers Without Borders (EWB) - Cal Poly, leading its newest Thailand project, which included setting the course for engineering projects to be implemented by the team and community over the next five years. Her EWB work introduced her to the world of composting, and she became keenly interested in the topic because of its relevance to the Thailand project and the larger world. “I was extremely impressed with her ability to learn about and grasp topics very different from her formal training, and her desire and formidable capacity to do so has made her an ideal EWB leader and team member,” said project advisor Chip Appel, professor of environmental soil chemistry. Hoffman recently gave a presentation to an international audience of soil science and crop science professionals. Although she was the only presenter with no formal training in sustainable agricultural systems, her presentation took first place.

**Samantha Rawlins**
An aerospace engineering senior, Rawlins has accrued a list of impressive space-related learning experiences. Two years ago, she was selected to serve as a student ambassador at NASA, the first Cal Poly student to receive the honor. In 2012, she interned at the NASA Propulsion Academy in Huntsville, Ala., where she joined a team made up mostly of college graduates and master’s-level students. Last year she represented Cal Poly on the winning team at the Caltech Space Challenge, where two teams of 16 students representing 20 universities and 14 countries had five days to design a detailed mission to land humans on an asteroid and extract resources from it. “I found myself in the presence of the most intelligent people I have ever met,” said Rawlins. “But I felt more than qualified, thanks in large measure to my Cal Poly education.”

**Krista Purser**
Purser is a graduate student in civil engineering, specializing in transportation. The current president of the award-winning Institute of Transportation Engineers student chapter, and a key player on several of its championship teams, Purser is also leading the development of a new area for student project work. Purser is known for her work ethic and initiative at Cal Poly, financing her education through a combination of scholarships and work. Observed Helene Finger, advisor for the Cal Poly Society of Women Engineers, “Krista demonstrates one of the highest levels of commitment that I have witnessed at Cal Poly or anywhere else in my 27-year career.”

**Martina Kroener**
An international Fulbright Scholar from Germany, Kroener selected Cal Poly for her master’s work in industrial engineering. During her undergraduate studies in business and engineering at the University of Applied Sciences in Munich, she spent a semester at Cal Poly. Particularly significant during her time in San Luis Obispo was her participation in the technical project management class known as PolyHouse, where a house is remodeled for a family in need. Kroener’s experience as an intern at a local energy supplier in Munich exposed her to power plant operations that used renewable as well as conventional production methods. “It made me realize that I want to work in the environmental sector and contribute my engineering and business knowledge to protect our environment.”

**SWE HONOREES:** The Cal Poly Society of Women Engineers Outstanding Women in Engineering recipients for 2015 included, left to right, Vanessa Forney (computer science), Krista Purser (civil engineering), Samantha Rawlins (aerospace engineering), Michallynn Hoffman (industrial engineering) and Martina Kroener (industrial engineering).
A Powerful Performance
Cal Poly Engineers sweep residential energy modeling competition

Cal Poly students swept the Residential Energy Modeling Competition sponsored by the California Association of Building Energy Consultants (CABEC). General engineering senior Mia Sheperd placed first; Aaron Feinstein, a mechanical engineering junior, placed second; and civil engineering senior Chase Hemming placed third.

The contest required students to create an energy model for a single-family residential project using the California Energy Commission-approved compliance software tools.

“We have an energy budget filed for every new or altered building, there are currently fewer than 200 people statewide registered as certified energy consultants,” noted Melinda Keller, an instructor in the Mechanical Engineering Department. “With this energy modeling competition, CABEC is striving to encourage new people to learn the trade.”

First place winner Sheperd is president of the Cal Poly Zero Waste Club. “I have wanted to get into energy modeling since I first heard about it,” she said. “My goal is to become a certified energy engineer. Thanks to my major, general engineering, I’ve had the chance to get my hands on more energy-related projects.”

Feinstein entered the contest to learn EnergyPro, energy compliance software approved by the California Energy Commission. “It was interesting to see how the energy consumption of a building could change based on factors we were altering in the program,” he said. “Cal Poly has contributed to my success because professors like Melinda Keller take the time to coach and help students learn, even outside of the classroom.”

“As a civil engineering major,” said Hemming, “it was useful to get practice reading plan and elevation drawings and then inputting that information into the energy modeling program. In the future, I’m interested in designing sustainable infrastructure. This competition helped introduce me to the energy side of that field.”

The students won free trips to Lake Tahoe in April to participate in the CABEC conference, where they will be presented with the awards and monetary prizes.

FANS OF ENERGY CONSERVATION: Instructor Melinda Keller, left, coached Cal Poly Engineering students Chase Hemming (civil engineering), Mia Sheperd (general engineering) and Aaron Feinstein (mechanical engineering) to a sweeping success at a national energy modeling competition.

Reaching Out to 4th Grade Engineers
As part of National Engineers Week in February, Cal Poly’s Society of Women Engineers (SWE) visited 14 local fourth-grade classrooms to expose students to the possibilities of engineering by engaging in hands-on activities and interacting with SWE role models. At left, Kenny Ainslie (materials engineering) works with students at Bishop Peak School. Below, siblings Melanie and Logan Thatcher work with students at Pacheco School on a design to land cupped marshmallows safely to earth. Melanie is a materials engineering student while younger brother Logan is studying computer science.
Four Engineering Students Honored in Sacramento

California lawmakers recognize CSU students for scholarship

Twenty-one Cal Poly students, including four engineering majors, were recognized for their awards and other accomplishments by state lawmakers on the floors of the Assembly and Senate in Sacramento on Monday, Feb. 1. “We want to honor these students for their success in the classroom and for their extracurricular activities that have been honored regionally and nationally,” said President Jeffrey D. Armstrong, who accompanied the students to both legislative chambers.

The group was introduced to the Senate by Majority Leader Bill Monning, D-Carmel, and to the Assembly by Assemblyman Katcho Achadjian, R-San Luis Obispo. In addition, the students met with the Office of Governor Jerry Brown, Office of the Lt. Gov. Gavin Newson and representatives from their respective Senate and Assembly districts.

Each of the honorees received a national award as an individual or contributing team member, or was significantly involved in a high-profile event such as the Cal Poly Rose Float or the U.S. Department of Energy Solar Decathlon. The Cal Poly Engineering honorees include:

Kevin Carstens is a student in civil and environmental engineering with a concentration in transportation engineering, and business administration in the Orfalea College of Business. Carstens was president of the Cal Poly Institute of Transportation Engineers that was named the 2015 international chapter of the year. Carstens was also part of the foursome that won the title in the ITE Collegiate Traffic Bowl Grand Championships. Carstens develops transit analysis apps for Bishop Peak Technology and assists Cal Poly professors with their research.

Joyce Lin is majoring in civil and environmental engineering. She was a member of Cal Poly’s Concrete Canoe team that won the Innovation Award and earned second place overall at the National Concrete Canoe Competition, held in Clemson, S.C., last June. This was Cal Poly’s 16th trip to the nationals, including back-to-back national titles from 2010 to 2012. Lin is project manager for the 2015-16 team, overseeing fundraising, finances, scheduling and material procurement.

Morgan Montalvo, a mechanical engineering major, was the Cal Poly Rose Float construction chair for the award-winning 2016 float, “Sweet She-nanigans.” This was the second straight year the entry received the Lathrop K. Leishman Trophy for the most beautiful non-commercial entry. Working on the float team seemed a natural evolution for Montalvo, who has been designing and building robots since the sixth grade. She received a four-year, $70,000 family scholarship from the SME Education Foundation.

Ryan Smith, a graduate student studying structural engineering, earned a bachelor’s in civil engineering from Cal Poly in 2015. He was president of the Cal Poly Society of Civil Engineers when it received the 2015 American Society of Civil Engineers’ Robert Ridgway Award, which recognizes the most outstanding chapter of 323 student groups in 16 countries. “This honor only goes to the best of the best, and it reflects our Cal Poly chapter’s extraordinary efforts, achievements and leadership,” said Dean Debra Larson.


Engineers Help Cal Poly March to Success

The Cal Poly Mustang Band took first place in the adult marching band category for the third consecutive year at the Southwest Airlines Chinese New Year Parade in late February in San Francisco.

Nearly half of the band’s 210 musicians are engineering majors. The parade, named one of the top 10 parades in the world by the International Festivals and Events Association, celebrated the Year of the Monkey with floats, lion dancers and other festive entries.

“I think for the students, it’s impressive to perform along a parade route lined by 1.2 million people — a mass of humanity that spans so many generations and nationalities,” said Christopher Woodruff, associate director of bands. “There was also a live television broadcast, which I understand was shared on an international feed.”

This is the third year the band has been invited to perform at the event, which was started in the 1860s by San Francisco’s Chinese community to educate and share their culture with the greater community. The parade and festival have since grown into the largest celebration of Asian culture outside of Asia.
Like Ford, General Motors or any of the giant automakers, Cal Poly Racing has discovered the efficiency of building multiple vehicles on the same chassis. When Cal Poly Racing unveiled its three Society of Automotive Engineers (SAE) competition cars for 2016 in early March, the big news was the club was ahead of last year’s pace because of streamlined manufacturing processes.

“It’s efficiency with both design and manufacturing,” said Formula SAE Team Lead Matt Rounds (computer engineering). “Obviously, it’s a lot easier to make the same part two times rather than design and make two separate parts. For example, this year the suspension is nearly identical on both the combustion and electric Formula cars. The only difference is in the rear geometry on the electric car because of the mounting of the motor. All the linkages and the steering system all the way through to the uprights are identical on both cars.”

Rounds said the increased efficiency and ability to start the test drives early should pay off when Cal Poly Racing’s three cars return to competition. The 2016 SAE schedule is:

- Formula SAE Michigan (combustion only), May 11-14 at Brooklyn, Michigan.
- Formula SAE Nebraska (combustion and electric), June 15-18 at Lincoln, Neb.
- Baja SAE California, May 19-22 at Gorman, Calif.
Cal Poly Engineers Thrive in Heat of Competition

Team wins ASHRAE Applied Engineering Challenge with portable structure designed to treat heat-induced illness

Four Cal Poly mechanical engineering seniors put the heat on to win first place in ASHRAE’s 2015 Applied Engineering Challenge. It was the second win in a row by a senior design team from Cal Poly’s Heating, Ventilating, Air Conditioning and Refrigerating engineering program.

This year’s event challenged students to design a portable structure that could be quickly assembled in the field to treat heat-induced illness, including heat stroke and exhaustion. The competition specifically targeted construction sites in the hot-and-dry and hot-and-humid climates of Sacramento, Calif. and Atlanta, respectively.

ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) presented the award at its winter conference held Jan. 23-27 in Orlando, Fla. The award included a $2,000 cash prize.

“Cal Poly participated for the first time last year, and this back-to-back win demonstrates how outstanding our students are,” said Jesse Maddren, mechanical engineering professor and faculty advisor.

The Cal Poly team, all of whom have now embarked on their careers, included Miren Aizpitarte, a project engineer at Critchfield Mechanical Inc.; Cinthya Mendez, a mechanical engineer at Western Allied Mechanical; Julia Stone, a mechanical facilities engineer at Intel; and Willis Tang, a design engineer at ACCO Engineered Systems.

“One of the greatest challenges was finding the most effective solution within the constraints of the contest,” said Tang. “For starters, we were limited to storing our shelter within a container no larger than 3 feet long by 3 feet wide by 3 feet high, and it could weigh no more than 150 pounds.”

The team proposed a pentagonal structure with an airbed and chilled
pad inside. The structure is cooled by a portable air-conditioning unit with an evaporative cooling option for dry climates. The tent walls, doors and roof are thinly insulated and feature air gaps and layers of nylon shading material. There is also a clear plastic observation window.

Team members credit their developing a simulated model of the shelter for giving them an extra edge.

“Using computer software, we were able to model our portable shelter and see the effects of cooling on a victim’s internal body temperature over time,” said Tang. “We could see exactly which solution presented the best results.”

“I was most proud of how these tools validated our research and proved — for us as well as the judges — that our solution was best,” added Mendez.

ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The society and its more than 50,000 members worldwide focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability.

For more: www.ashrae.org/news.

Five Cal Poly Engineering Students Win Scholarships from the American Council of Engineering Companies

Cal Poly students received five of 11 scholarships awarded by the American Council of Engineering Companies (ACEC) California. The group’s foundation awards scholarships annually to graduate or undergraduate college students working toward a degree in engineering or land surveying.

The Cal Poly recipients include Audrey Fremier, environmental engineering junior; Youlen Ghazalian, industrial engineering senior; Chase Laybourn, civil engineering senior; and Amy Poehlitz, architectural engineering senior. The Cal Poly students won a total of $8,000 in scholarship funds.

“These accomplished students represent California’s bright future, and I’m proud ACEC California can play a role helping them achieve their full potential,” said Brad Diede, executive director at ACEC California. “The engineering and land surveying industries play an important role in California’s economic strength, and it is critical to support students who are working hard toward entering these professions.”

In addition to Cal Poly, the scholarship recipients represented CSU Chico, Santa Clara University, Stanford and Cal Poly Pomona.

About ACEC

ACEC California is a statewide association representing more than 950 private consulting engineering and land-surveying firms. ACEC California is dedicated to enhancing the consulting engineering and land surveying professions, protecting the general public and promoting the use of the private sector in the growth and development of the state.
A-Maizing Project Earns EWB Honor

Cal Poly Engineers Without Borders Team Wins 2016 Premier Project Award for bicycle-powered maize mill design

Cal Poly students won the 2016 Premier Project Award from Engineers Without Borders USA with a bicycle-powered maize mill. Cal Poly was one of three student chapters out of more than 200 nationwide to receive the award.

The Engineers Without Borders (EWB) - Cal Poly Malawi team designed the mill for residents of Kumponda, Malawi, who face a limited growing season and other food production challenges. In order to grind maize into flour to make nsima, a regional food staple, villagers must travel hours by foot twice a month to use a costly electric maize mill that is also unreliable due to power outages.

The student-designed bicycle-powered mill makes maize production more economical and reliable. The EWB Malawi team made up of some 20 students, has designed and developed prototypes on campus with help from industry mentors. "Throughout the year, we continually communicate our progress and incorporate suggestions from Kumponda via our NGO partner, Action for Environmental Sustainability," explained team member Chris Apple (environmental engineering).

In December, four members of the team traveled to Kumponda to present the prototype and provide instruction on how to build mills using locally available, low-cost parts. In addition to Apple, visiting EWB students included civil engineering majors Jennifer Tuttle and Spencer Jemes, the team leaders, and Cate Kraska.

"The community members have shown unbelievable commitment and enthusiasm toward the project," said Jemes. "They impressed us every single day with their ideas for the mill, while keeping an open mind for collaboration."

Noted Kraska, "When our implementation visit was over, everyone was excited about the progress we and the Kumponda community made toward implementing a sustainable solution to hunger."

Engineering Student Teams Win Startup Grants

Two student startups became Cal Poly’s first teams to receive $5,000 grants from VentureWell, a nonprofit that supports invention, innovation and entrepreneurship in higher education, government and philanthropy. VentureWell defines an E-Team (entrepreneurship team) as a multidisciplinary group of students, faculty and industry mentors collaborating to bring a new product to market.

The winning Cal Poly teams, Higea Technologies and Mantis Composites, have been active participants in Cal Poly’s Center for Innovation and Entrepreneurship (CIE), which offers a wide range of programs to foster new student ventures. Both companies also completed the CIE SLO HotHouse Summer Accelerator program, an intense 13-week program aimed at helping new ventures succeed.

Higea Tech, which uses magnetic nanotechnology to clean up oceanic oil spills in a faster, cheaper, and more environmentally friendly way, was launched in early 2015 at CIE’s Innovation Quest competition, where the team won the $10,000 Parsons Innovation Award. The team also took the top prize at the fifth annual TechPitch, another program sponsored by CIE.

Higea Tech team members include Tanner Cook, chief executive officer, a mechanical engineering senior; Wyatt Nelson, product development director, an aerospace engineering senior; Morgan Gramling, director of fundraising, a recent environmental management and protection graduate; and Parker Sommerville, director of chemical development, a biochemistry junior. A new member of the team, Zoheb Mohammed, an industrial engineering graduate student, serves as the company’s business development director.

Mantis Composites aims to take rapid prototyping in new directions by using 3D printing technology to construct and print carbon fiber materials. They are also continuing to work with CIE through the Hatchery program, an on-campus program that fosters entrepreneurship initiatives among the student body.

“Our goal is to create functional components — such as lightweight brackets — not just prototypes,” said Michael Chapiro, the company’s chief technical officer and a materials engineering senior.

In addition to Chapiro, the Mantis Composites team members include aerospace students Ryan Dunn and David Zilar, the chief executive officer and chief operations officer, respectively; Michael Delay, an electrical engineering major; and Ning Jeng, a bioresources and agricultural engineering major.
**Fostering Biotech Research**

*Cal Poly’s regenerative medicine program receives $2.6 million grant*

Founded in 2009 with a grant from the California Institute for Regenerative Medicine (CIRM), the Golden State’s stem cell institute, Cal Poly’s regenerative medicine program has graduated 50 specialists now working in the biotech industry, the medical device industry, health care professions and in academic labs. Eight of them continued in Ph.D. programs.

A second five-year, $2.6 million CIRM grant helps ensure that Cal Poly plays an ongoing leading role in regenerative medicine. Cal Poly was among just 15 programs funded by CIRM to support the training of a workforce capable of accelerating stem cell treatments to patients with unmet clinical needs.

Offered to 10 students each year, the master’s degree specialization in regenerative medicine includes graduate students from biomedical engineering, biology and animal science. “Students complete a year of laboratory-intensive coursework and an independent project before they join a biotech company or research institute for a nine-month internship,” explained Trevor Cardinal, program coordinator. New components made possible by the second CIRM grant include patient engagement, inclusion of healthcare professionals in a seminar class and community outreach.

Program graduate Leah Elliot did her internship at ViaCyte in 2014. The company turns stem cells into insulin-producing beta-cells to treat Type 1 diabetes. Elliot developed a process to package the insulin-producing cells into an immunoisolation device, which protects the transplanted cells from patients’ immune systems. This process is now used to prepare the devices that are implanted into patients for ViaCyte’s clinical trial. Elliot was subsequently hired by ViaCyte as a research and development engineer.

“Leah’s internship project is a perfect example of what Cal Poly student’s do best: use hands-on experience to tackle very challenging applied research problems,” noted Cardinal. “The project may earn her a patent and it will improve the health of patients.”

“The added CIRM funding allows us to incorporate events for students to interact with patients, so they can better appreciate the potential personal impact of cell-based therapies,” Cardinal said.

To educate the public on the current state of regenerative medicine, Cal Poly Biology Professors Elena Keeling and Sandra Clement are developing a science communication seminar that will include communication training and an outreach activity for schools or community groups.

Additional faculty involved include Biomedical Engineering Professors Kristen Cardinal and Lily Laiho and Animal Science Professor Daniel Peterson.

For more information on Cal Poly’s Regenerative Medicine Program see https://regenmed.calpoly.edu/.
A study conducted at the Cal Poly National Pool Industry Research Center (NPIRC) found that considerable water savings could be realized if outdoor swimming pools were covered by market-available covers. Use of pool covers could reduce 95 percent of evaporation from California pools, saving more than 55,000 acre-feet of water per year — enough to supply a city of approximately 500,000, said principal investigator Misgana Muleta, an associate professor in Cal Poly’s Civil and Environmental Engineering Department.

The study was sponsored by the National Plasterers Council (NPC), the California Pool and Spa Association, the Association of Pool and Spa Professionals, and the Independent Pool and Spa Service Association.

“Given the severity of drought in California, this potential water saving is substantial,” said Alan Smith, chair of NPC’s Research Committee.

The study involved taking daily water-level measurements and weekly water-chemistry readings for eight pools at the NPIRC for 90 days, starting in July. Climate data included air temperature, wind speed and rainfall collected at a Cal Poly weather station.

Several companies and associations donated funds, supplies and equipment needed to conduct the 90-day protocol.

Bequest Helps Build Cal Poly HVAC&R

A recently realized $500,000 bequest made by Mary King helps assure the future for Cal Poly’s heating, ventilation, air-conditioning and refrigerating program (HVAC&R).

King’s long relationship with Cal Poly began with her husband, Emmett King, a 1951 graduate from the air-conditioning and refrigerating engineering program. After Emmett passed away in 1996, Mary remained a generous benefactor.

King’s bequest provides long-term stability for HVAC&R by adding to the program’s existing endowment. “The Air Conditioning and Refrigeration Education Endowment is our primary funding source,” explained Jesse Maddren, HVAC&R director. “It funds student field trips and conference attendance, lab supplies and equipment, travel for faculty to attend seminars, among other expenditures.”

The King bequest will also be used to create a teaching laboratory in a planned new student projects building.

“The purpose is not to create additional lab space,” said Maddren, “but to provide additional instrumentation to the building’s heating and cooling systems that will allow students to monitor their performance and undertake experiments on the building itself.”

Mary and Emmett King believed that Cal Poly puts students on the road to success. Their legacy is helping create leaders in the field of heating, ventilation, air conditioning and refrigeration.

Saving Water Resources

Cal Poly study shows pool covers can reduce evaporation from California pools by 95 percent

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The complete study can be downloaded at NPConline.org.

Students Visit JPL

Aerospace Engineering Professor Kira Abercromby and aerospace engineering seniors in the spacecraft design course visited the Jet Propulsion Laboratory (JPL) in December for a design review. The course requires seniors to design a spacecraft in response to an annual request for proposal. This year’s project involved returning three samples from the far side of the moon with constant real-time feedback to Earth for all parts of the mission. The students annually visit numerous industry locations for feedback on their project from members of the department’s Industry Advisory Board. The women in this year’s Spacecraft Design, pictured at right, include (left to right) Jacquelyn Svoboda, Abercromby, Ana Cubas, Yanina Hallak, and Samantha Rawlins. Alumna Christina Diaz (B.S./M.S., Aerospace Engineering, 2013) now a JPL engineer, joined the Cal Poly group.

Mechanical engineering students Jennifer Arellanes and Colin Murphy take water pressure readings in the Cal Poly HVAC lab.

Civil Engineering Professor Misgana Muleta (left) and graduate student research assistant Ernesto Jimenez check water levels under different types of pool covers at the Cal Poly National Pool Industry Research Center.
Cal Poly's online master's degree program in Fire Protection Engineering (FPE) was ranked among the best in the country according to U.S. News and World Report's 2016 Best Online Programs rankings released in January. Cal Poly was tied for 25th place overall and ranked fifth among universities in the West in the Online Graduate Engineering Programs category.

"Both on campus and online, Cal Poly's Fire Protection Engineering graduate programs provide outstanding education that meets the needs of today's professional seeking advanced degrees," says Debra Larson, dean of Cal Poly's College of Engineering.

For the 2015 Best Online Graduate Engineering Programs rankings, U.S. News compiled a list of public, private and for-profit colleges and universities in the U.S. that offer master's degree programs online, then collected data from each of those schools. In calculating the rankings, U.S. News officials looked at student engagement, faculty credentials and training, peer reputation, admissions selectivity and student services.

Cal Poly offers a Master of Science degree and two graduate certificate programs in fire protection engineering — the only such programs offered on the West Coast. The programs build on the Learn by Doing philosophy that has ranked Cal Poly as the best public master's level university in the West by U.S. News and World Report for 23 years in a row.

"Fire protection engineering professionals are in high demand, particularly on the West Coast," said Fred Mowrer, FPE director. The discipline applies scientific and engineering principles to minimize the damage done by destructive fire.

Mowrer was a recent recipient of the John L. Bryan Mentoring Award, presented by the Society of Fire Protection Engineers, which recognizes outstanding commitment to educating, training and advising fire protection engineers.

More information about the program is available online at http://www.fpe.calpoly.edu/.

Growing up without electricity, Electrical Engineering Professor Taufik has focused his research on technology that can provide electricity for people living in remote areas.

Taufik's work, the DC House project, maximizes the use of available renewable energy sources via a highly efficient, low-voltage DC electrical distribution system that is able to combine multiple renewable energy sources into DC electricity for residences.

"The DC House project helps address the global issue of bringing electricity to about 1.5 billion people, or a quarter of the world's population who still have no access to electricity," said Taufik. "An estimated 79 percent of these people reside in the developing countries, including the 50 poorest nations. Furthermore, since DC House project utilizes renewable energy sources, the project supports the effort in reducing the global use of fossil-based fuels for greener environment."

Having completed a prototype at Cal Poly, Taufik took to the road on his sabbatical to disseminate the technology and establish international collaborations to construct prototypes abroad. He visited several universities in Indonesia with established DC House research groups to help bring prototypes online. Sponsored by the U.S. Agency for International Development as a visiting professor at the Technological Institute of the Philippines, Taufik also assisted DC House research at that campus.

By the end of his sabbatical, Taufik had visited 19 universities in Indonesia and one in the Philippines in order to establish more international partners.

"There are still children who walk miles away from their homes to the nearest airports just so that they have lights to finish their homework," Taufik said. "I feel that I need to do something to help."
Cal Poly Engineering Announces Faculty and Staff Awards

The College of Engineering celebrated outstanding faculty and staff at its collegewide meeting held Dec. 8. Recipients of industry and donor-sponsored faculty awards and outstanding staff awards included the following:

Raytheon Excellence in Teaching & Applied Research Award

Tryg Lundquist
Widely recognized as one of the top experts in the field of algae biofuels, Lundquist (Civil and Environmental Engineering) has received approximately $3 million to date for research on the use of algae for simultaneous wastewater treatment and biofuel production. He employs many graduate students in his work and also incorporates teaching into his applied research. For example, he introduced a course that pairs undergraduates with a graduate student doing independent thesis research.

Don & Paula Heye Award for Outstanding Teaching

Gary Perks
The electrical engineering instructor teaches a wide range of classes in both electrical engineering and industrial and manufacturing engineering. In addition to the high evaluations he receives from students, he is recognized for pioneering online course delivery for the Electrical Engineering Department (EE) and for the College of Engineering, including the innovative use of testing centers for online delivery of exams for students across the nation. Perks recently received a grant to develop online lectures for the EE courses he coordinates for non-majors.

Don & Paula Heye Award for Outstanding Club Advisor

Garrett Hall
Hall (Civil and Environmental Engineering) has served as advisor to the award-winning Cal Poly Concrete Canoe Team for more than seven years. For the past three years, Hall has also co-advised the Cal Poly Society of Civil Engineers, which was recognized in May as the single most outstanding chapter out of 323 student groups in 16 countries. Hall encourages students to think critically about their own work and use both technical and ethical judgement in the activities they plan and pursue.

Outstanding Staff Awards

Martin Koch
An expert in the area of casting and computer-aided design manufacturing, Koch joined Cal Poly in 1984 and has served as both technician and lecturer for the Industrial and Manufacturing Engineering Department. He was instrumental in the development of Cal Poly’s welding facility and continues to facilitate the acquisition of the latest technology for the lab. Koch hosts an annual summer technology education conference for secondary and community college teachers. Last year, Koch was a primary organizer of HTEC 2015, a principal training conference for educators of computer numerical control systems that automate component design.

Lani Woods
The analyst specialist in the Electrical Engineering Department since 2007, Woods is considered “indispensable” by faculty and department leadership and the “go to” person for anyone needing help with a department-related issue. She has been a strong advocate of the Academic Resources Conference, encouraging the attendance of her colleagues and attending each year to expand her knowledge base and strengthen her own expertise. In addition to supporting the work in her department, Woods has served as a resource to Computer Engineering and Computer Science, offering her knowledge and expertise to help both areas thrive.

Lemieux Awarded Patent for Auto Air Cycle Machine

Patrick Lemieux (Mechanical Engineering) was awarded a patent for an automotive air cycle machine, along with alumnus Chris Forster (B.S., Mechanical Engineering, 2007; M.S., Mechanical Engineering, 2009), now finishing his Ph.D. at Georgia Tech, and industry professional Dennis Moore.

The novel automobile air conditioner uses a technique found in passenger and military aircraft. The Air Cycle Machine (ACM) lowers vehicle weight, improves turbocharger efficiency and employs an environmentally friendly refrigerant.

“The coupling of the ACM with a turbocharger is what’s new,” Lemieux said. “In addition, if the cold air produced is not needed for air conditioning, we use it to cool the intake air to the engine, which improves the performance of the engine itself.”
Faculty Notes

Dean’s Office

Debra Larson, dean, spoke before a joint session of California lawmakers on “Women in Aerospace and Engineering.” Larson was among a select number of industry, government and education leaders asked to testify before the Assembly Select Committee on Aerospace and the Senate Select Committee on Defense and Aerospace. The hearing was focused on women’s experiences in the engineering field; the programs that have helped them excel; and the programs their company, institution, or organization have in place to help girls and women who are interested in the fields of aerospace and STEM (science, technology, engineering and mathematics) to succeed.

Rakesh Goel, associate dean, published “Evaluation of In-Ground Plastic-Hinge Length and Depth for Piles in Marine Oil Terminals” in Earthquake Spectra (Vol. 31, no. 4, pp. 2397-2417, Nov. 2015). Goel’s work was funded by the California State Lands Commission.

Multidisciplinary

Trevor Harding (Materials Engineering) and Steffen Peuker (Mechanical Engineering) were selected by the National Academy of Engineering to participate in the prestigious Frontiers of Engineering Education symposium, which brings together some of the nation’s most engaged and innovative engineering educators in order to promote effective, substantive and inspirational engineering education.

Thomas Katona (Biomedical Engineering), Lynn Metcalf (Marketing) and Jonathan York (Industrial Technology) participated in a panel session, “Universities Accelerators: Entrepreneurial Launchpads or Unsustainable Fads?” at the United States of America Small Business and Entrepreneurship national conference in San Diego.

Liz Schlemer (Industrial and Manufacturing Engineering) presented “Taxonomy of Faculty Assumptions About Students” with Aaron Estrada (Psychology and Child Development) at the Frontiers in Education Conference in El Paso, Texas.

Aerospace Engineering


Biomedical Engineering

Thomas Katona gave a presentation on the interdisciplinary entrepreneurship senior project course that was recently funded by a two-year VentureWell grant at the Global Consortium of Entrepreneurship Centers in Gainesville, Fla.

Civil and Environmental Engineering

Robert Bertini was inducted into the Order of the Engineer, and he was elected to the IEEE Intelligent Transportation Systems Society Board of Governors for a three-year term. He took part in a leadership panel at the Third Annual Institute of Transportation Engineers (ITE) Student Leadership Summit held at Cal Poly Pomona. Almost 30 students and faculty from Cal Poly’s ITE student chapter attended the event.

Bertini participated in the Transportation Research Board’s 95th Annual Meeting held in Washington, D.C. He chaired two sessions and led the Operations Section Executive Board Meeting. He also co-authored seven papers presented at the meeting, including:

• “Measurement and Assessment of Driver Compliance with Variable Speed Limit Systems: Comparison of United States and Germany” (Paper 16-3032).
• “Toward Assessing State Department of Transportation Readiness for Connected Vehicle and Cooperative System Deployment Scenarios: Oregon Case Study” (Paper 16-2057).
• “Perspectives on Transit: Potential Benefits of Visualizing Transit Data” (Paper 16-5474).

Aiming for the ‘Next Decimal Place’ in Precision

Walter Nederbragt, a visiting industry scholar for the Industrial and Manufacturing Department, has developed a new class that introduces Cal Poly Engineering seniors and graduate students engineering principles that help industry achieve the “next decimal place” in precision.

Over the past six months, Nederbragt, a mechanical engineer at Lawrence Livermore National Laboratory (LLNC), has developed, and now teaches, Precision Engineering Fundamentals — a course that he hopes will continue to be taught each spring.

“At present, precision engineering is largely learned on the job,” said Nederbragt. “The Laboratory (LLNC) is ‘lending’ me to Cal Poly to build a course around this exciting industry area that’s not being taught in most engineering colleges — and to give these students a set of relevant skills that most graduates don’t have.”

Walter Nederbragt, right, visiting industry scholar from Lawrence Livermore National Laboratory, works with Griffin Glenn (manufacturing engineering) in the metrology lab.

Computer Science Professor Named CIE Faculty Fellow

Computer Science Professor David Janzen has been named to Cal Poly’s Center for Innovation and Entrepreneurship (CIE) Faculty Fellow program, joining Architecture Professor Clare Olsen and Graphic Communication Professor Charmaine Farber as the program’s newest inductees.

“CIE faculty fellows become part of an interdisciplinary community that is committed to inspiring the next generation of entrepreneurs,” said Lynn Metcalf, CIE senior faculty fellow and Hood Professor of Marketing and Entrepreneurship. “They raise awareness of CIE programs and provide guidance to students and faculty with an interest in innovation and entrepreneurship.”

Janzen aims to engage students who have software development skills with concepts and ideas that have the potential to launch startups. Since 2006, he has led Cal Poly’s software engineering capstone sequence, working with Intuit, Amgen, Salesforce and General Atomics.

Janzen is founder of the CIE startup Steadfast Innovation, which launched the handwriting note-taking app Squid (formerly Papyrus).
Jose Macedo and Zachary Peterson have been awarded prestigious Fulbright Scholar awards. Selected on the basis of academic and professional achievement, Fulbright Scholars receive grants for study abroad.

The Fulbright Program is the flagship international educational exchange program sponsored by the U.S. government and is designed to increase mutual understanding between the people of the United States and the people of other countries.

Macedo, chair of the Industrial and Manufacturing Engineering Department, will travel to Lima, Peru, where he will teach and undertake research at the Universidad de Ingeniería y Tecnología (UTEC). His focus areas include quality, lean management, statistical analysis and automation, robotics and machine vision. Macedo also plans to conduct a benchmarking study of Peruvian manufacturing industry practices in conjunction with UTEC students.

In addition to his Fulbright, Macedo also recently received a Fellow Award from the Institute of Industrial and Systems Engineering (IIE) for his nationally recognized contributions to industrial engineering. A fellow is the highest classification of IIE membership.

For his Fulbright, Peterson, a member of the Computer Science Department, will conduct cybersecurity research at the University of College, London. He has previously developed cutting-edge curricula in the areas of secure storage systems, applied cryptography, and law and policy. With a grant from the National Science Foundation, Peterson has also undertaken research in cybersecurity education.

Professors Zachary Peterson, left, and Jose Macedo were named Fulbright scholars.

- On visits to Zhejiang University, Hangzhou, China, and the 2015 International Conference on Information Technology and Intelligent Transportation Systems in Xi’an, China, Bertinii gave presentations on “Toward Assessing State Department of Transportation Readiness for Connected Vehicle/Cooperative Systems Deployment Scenarios: An Oregon Case Study.”
- At a program on New Directions in Mathematical Approaches for Traffic Flow Management held at UCLA, Bertinii helped organize a workshop on Decision Support for Traffic, chaired a session and gave a presentation on “Multimodal Transportation System Simulation Manual (TSSM) Framework: From Theory to Practice.”

Robb Moss was named Associate Editor of the Year for work on the American Society of Civil Engineers Journal of Geotechnical and Geoenvironmental Engineering.

Moss co-authored “Seismic Hazard Assessment of Western Africa” for the 15th African Regional Conference on Soil Mechanics and Geotechnical Engineering.

- Dennis Derickson, chair, and electrical engineering graduate student Greg Bergdolf presented “1060 nm Vernier Tuned Distributed Bragg Reflector (VT-DBR) Laser for Swept-Source OCT” at the 2015 Optical Society of America Frontiers in Optics Conference in San Jose, Calif. This paper introduces the first wideband all-electronic-tuning semiconductor laser at 1060 nm.
- Anurag Pande co-edited the “Traffic Engineering Handbook, Seventh Edition.” The handbook reflects key changes in industry standards, including further focus on multimodal concerns and sustainable transportation solutions.

- Zachary Peterson was invited to speak at the inaugural Enigma conference hosted by the Advanced Computing Systems Association in San Francisco. The conference is a new event on emerging computer security threats and novel attacks. Peterson’s talk focused on the use of games and play for computer security education.


- Mohammad Noori co-authored the following papers: “An Adaptive Support Vector Regression Based Method for Structural System Reliability Assessment and Its Application to a Cable-Stayed Bridge” in the Journal of Risk and Reliability (pp. 1-17; Jan. 21, 2016) and “A Comprehensive Collapse Fragility Assessment of Moment Resisting Steel Frames Considering Various Sources of Uncertainties” in the Canadian Journal of Civil Engineering (Vol. 43, pp. 118-131, 2016).

- Noori served as managing editor of “A Systems Approach to Modeling Community Development Projects” by Bernard Amadei and published as part of the Sustainable Structural Systems Collection (Momentum Press, Oct. 2015). He was invited to give a talk on “Overview of Structural Health Monitoring and Recent Work in Emerging Areas” for the Civil Engineering Seminar Series at UC Irvine.
Alumna Honored for Humanitarian Technology

DayOne Response, Inc., a company that makes a water purifier the size of a backpack, was recently honored as “the best of Silicon Valley high-tech creativity that benefits others.” The DayOne Waterbag technology was co-invented by Tricia Compas-Markman (B.S./M.S., Civil and Environmental Engineering, 2009) and Professor Tryg Lundquist.

Compas-Markman accepted the Intel Environment Award, one of The Tech Awards presented by Applied Materials, at the Tech Awards Gala held in mid-November at the San Jose McEnery Convention Center in San Jose, Calif.

“The lightweight, backpack-sized DayOne Waterbag can be filled with tainted water and, with some additives, can produce pure water in about 30 minutes,” said Compas-Markman, citing the 2.4 billion people across the world without access to sanitation and 663 million people without access to clean water.

As a graduate student at Cal Poly, Compas-Markman received the prestigious Clinton Initiative Award. Since launching DayOne Response in 2010, she has been the recipient of awards including the Mother of Invention Award by Toyota, an Osaka Outstanding Young Person’s Award for social innovation and a Creativity Foundation legacy prize, and named an Unreasonable Institute fellow.

Compas-Markman co-founded DayOne Response with Amy Cagle (B.S., Business Administration, 2009) to bring the Waterbag to market. Another key member of the team is Adam Wegener (B.S., Manufacturing Engineering, 2009). Lundquist continues to advise the company on new water treatment designs and water treatment testing programs.

Disasters closer to home — whether natural, such as earthquakes, or manmade, such as the crisis in Flint, Mich. — are a new focus for the company.

Related links:
DayOne Response website: https://dayoneresponse.com/
Tech Awards video on DayOne Response: https://www.youtube.com/watch?v=NhJQB8NwCmE

Alumni in the News

2000s

O.J. Corulli
(B.S., Electrical Engineering, 2013)

The Cal Poly Power and Energy Society hosted Vince Bottoni and O.J. Corulli at an information session and seminar. Both presenters are electric power engineers for Roseville Electric Utility in Roseville, Calif. Previously with PG&E, Bottoni worked as an operations engineer and served as an electric distribution engineer in the East Bay, San Francisco and Peninsula divisions. Corulli was previously an electric utility engineer for the City of Lompoc.

Nicholas Turner
(B.S., Civil Engineering, 2000)

Nicholas Turner is the new general manager of the Montecito Water District, bringing more than 15 years of water industry experience to the agency. A former general manager of the Lamont Public Utility District, Turner was previously a district engineer and project manager for AECOM, a global leader in engineering design services, specializing in water and wastewater infrastructure projects for public agencies.

http://bit.ly/1YK15g9

Kevin N. Martin
(B.S., Industrial Engineering, 1993)

Kevin Martin was recently named director of sales and business development for AVATA, a global consulting firm focused on Oracle supply chain applications, supply chain services, and cloud solutions. He also serves as deputy mayor of Rancho Bernardo, Calif. As vice president for the RB Community Foundation, he oversees the growth in its endowment (valued at more than $400,000) and its donations to local charities.

http://bit.ly/1oJXRci

1990s

Taraneh G. Farazi
(B.S., Computer Engineering, 1993; M.S., Electronic and Electrical Engineering, 1994)

Gynesonics has appointed Taraneh G. Farazi as vice president of clinical affairs. The women’s healthcare company develops minimally invasive solutions for symptomatic uterine fibroids.

http://bit.ly/1oJXRci

Mike Kauffman
(B.S., Electronic Technology, 1990)

Mike Kauffman, a microwave engineer at Varian Inc., recently co-presented a talk at Cal Poly on radio frequency (RF) and electromagnetics in product development. For the past 25 years, Kaufman has used his knowledge of RF technology to design coils for chemical analysis and for animal evaluation. Since 2002, he has been at Varian Medical Systems where he has designed waveguide systems, components and linear accelerators. His special interests include electromagnetics, impedance matching and coupling structures.

1980s

Thomas F. Lebens
(B.S., Electronic Engineering, 1989)

The Cal Poly Alumni Association (CPAA) has honored Thomas Lebens with its Distinguished Service Award. A patent attorney at Fitch, Even, Tabin & Flannery in San Luis Obispo, Calif., Lebens is a past president of the CPAA, a current
Making an Impact in SLO County

Two Cal Poly Engineering alumni named to ‘Top 20 Under 40’ list

Two Cal Poly Engineering alumni were among the “Top 20 Under 40” young professionals recently honored by The Tribune newspaper for outstanding contributions to their career field and the community of San Luis Obispo, Calif. Carolyn Berg (B.S., Civil Engineering, 2008) and Eric Veium (B.S., Industrial Engineering, 2008) were among this year’s honorees.

“Wherever they go, our grads make an impact,” said Dean Debra Larson, “so it’s not surprising that Carolyn and Eric are among 13 Cal Poly alumni who dominated the list of up-and-coming professionals and community leaders right here in San Luis Obispo. It’s gratifying to see how the work of these two engineering graduates, in particular, is contributing to the environment and sense of community that our area is known for.”

As senior water resources engineer for San Luis Obispo County, Berg has developed numerous programs that protect the health and welfare of the county’s natural resources. She also played a key role in the local implementation of California’s Integrated Regional Water Management Program, and worked to secure grants of more than $23 million for local water projects. Her community outreach activities include educating students about water issues as well as critical issues facing women. She is a founding member of Many Hands for Change, a local organization dedicated to empowering girls.

Veium, an energy and sustainability analyst at Cal Poly, is helping advance a wide range of sustainability efforts across the university — and not for the first time. As a Cal Poly student, he co-founded Cal Poly’s Green Campus Program. He is also a leadership team member of SLO Clean Energy, a coalition committed to creating a local clean energy economy, and he helped create SLO City Farm, San Luis Obispo’s first urban farm, which spans 20 acres in the heart of the city.

Cal Poly Engineering alumni Carolyn Berg and Eric Veium were honored for contributions to San Luis Obispo County.

Christina Diaz: A ‘Super Heroine’ Who Has Her Eyes on Mars

The March issue of Vanity Fair Mexico featured 20 Latina women who “embody power,” including Christina Diaz, a Cal Poly alumna who has her eyes set on Mars. Diaz earned her bachelor’s and master’s at Cal Poly in aerospace engineering (2013) and now serves as a systems engineer at NASA’s Jet Propulsion Laboratory.

“The article is about women who are changing the rules and breaking down glass ceilings,” said Diaz. “The front cover of the issue says ‘Ellas Tienen El Poder’ meaning ‘they have the power.’

“I’ve come a long way from feeling self-conscious about being the only woman in the room or feeling that I couldn’t express my femininity or culture because I was an engineer in a traditionally white-male dominated field.”

Diaz works on the Mars 2020 project, which includes a comprehensive suite of scientific instruments focused on whether life on Mars was possible in the past, while helping to develop the technology necessary for future human missions. Diaz is the instrument engineer for one of the instruments, RIMFAX: a ground penetrating radar that will help explain what’s underneath the Martian surface.

As the interface between the instrument team and the JPL Mars Rover team, Diaz finds that her role allows her “to understand the balance between science and engineering.”

At Cal Poly, Diaz was involved in the Multicultural Engineering Program and the Society of Hispanic Professional Engineers. She attributes the strong support system as part of her success. “Professor Kira Abercromby was also a great role model,” she said.

member of the board of directors, and the chair of the Professional Development and Networking Committee. Lebens is also secretary of the Dean’s Advisory Council for the College of Engineering and a member of the Student Affairs Advisory Council. In addition, he has served as a member of the Cal Poly Corporation board of directors and volunteers for the Cal Poly Center for Innovation and Entrepreneurship.

Tony Aquino
(B.S., Electrical Engineering, 1986)

Jeff Norris
(B.S., Electrical Engineering, 1986)

Digital Journal reports that Tony Aquino and Jeff Norris have new positions at IXI Technology, a leader in the design, manufacture and support of tactical data communication solutions for military and defense, commercial and industrial applications, and test solutions. Aquino and Norris will serve as senior engineer and engineering manager, respectively.

http://bit.ly/1qjshfr
Rory Cooper (B.S., Electrical Engineering, 1985; M.S., Electrical Engineering, 1986), one of the world’s foremost authorities on wheelchair design, was recently issued his latest patent. His innovation, the Robotic Strong Arm, is designed to enable people with high-level injuries to live and travel more independently.

Cooper, partially paralyzed from a bicycle accident, uses a wheelchair himself. He started developing his first innovative wheelchair technologies as a student at Cal Poly.

Now a professor in bio- and mechanical engineering, physical medicine and orthopedic surgery at the University of Pittsburgh (Pitt), Cooper also serves as the founding director of the Human Engineering Research Laboratories. There, he presides over a cluster of labs that apply a range of solutions — from biomechanics and robotics to virtual reality — to bring new advances to adaptive technology.

The Robotic Strong Arm, designed with Pitt engineers Garrett Grindle and Mark McCartney, is strong enough to assist in transferring a person from one surface to another, such as from a wheelchair to a car. Although someone else must still be on hand, the arm itself “does the heavy lifting,” said Cooper.

http://www.herl.pitt.edu/person/rory-cooper
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To learn how you can work with student teams or sponsor projects, contact Associate Dean Rakesh Goel at rgoel@calpoly.edu.