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What We Build and Leave Behind

I recall returning to college in the fall of my junior year at the Milwaukee School of Engineering after an energizing and successful summer of employment where I made significant contributions for the mechanical and structural systems of two small commercial buildings. Upon entering my first class, I observed a tombstone on the board and wondered if I was in the right class. The professor was making a point, stating that we were in the early stages of our lives, and if we did not think about our futures, a tombstone would be the only legacy we leave behind.

The professor stated that each day engineers make important and meaningful contributions which better humanity and advance society. He explained that it was our responsibility to determine our positive legacy, no matter how large or small. I reflected on this lesson, and it drove me to complete my doctorate degree, pursue a career in higher education, and make an impact by working with students during a critical stage in their personal development. My hope is that the collective impact of our students on the world is greater than my contributions as an individual.

The ethos of societal contribution and legacy reflects the culture of our engineering students and those in the workforce today. The stories in this magazine are proof of this claim. This issue features current students, faculty, and recent and experienced alumni who are building a legacy with their societal impacts.

This year, we are implementing a college-wide shared strategic plan to provide greater opportunities for students to develop the means to leave behind their own legacy. The vision that propels us is “The Cal Poly Pomona College of Engineering’s Learn by Doing education prepares engineers to transform imagination into reality.” This quote from Albert Einstein best describes our vision: “Logic will get you from A to B. Imagination will take you everywhere.” If we examine the human brain, the left side is logic and the right side is imagination. We strive to teach our students how to use both.

Our goal in the College of Engineering is to not graduate left-side engineers, but ‘Whole-Brain Engineers.’ The strategic plan will be a guide for the college to further this goal, advance priorities and make positive investments over the next seven years. These investments will help to further increase the quality of our graduates, elevate the visibility and reputation of the college regionally and nationally, as well as reinforce the value of a degree from the Cal Poly Pomona College of Engineering.

As dean, my personal mantra and approach is “Greatness through excellence, one student at a time.” If you share the same belief, please consider giving back and investing in the people who are at the core of why we exist—our students.

It is impossible to capture all the great work of the college’s engineering and engineering technology students, and the contributions of our phenomenal faculty in just 32 pages, but this issue provides insight into the amazing work and progress of the Cal Poly Pomona College of Engineering. Your involvement, advocacy and input are important to us, and I welcome your feedback and suggestions by contacting us at engineering@cpp.edu.

Go Broncos!

With warm regards,

Joseph J. Rencis, Ph.D., P.E.
Dean, College of Engineering
2015-16 President American Society for Engineering Education (ASEE)

“All good men and women must take responsibility to create legacies that will take the next generation to a level we could only imagine.”
—Jim Rohn, entrepreneur, author, and motivational speaker
THE CAL POLY POMONA ENGINEERING ADVANTAGE

The college exists in the rare intersection of quality education, affordability, proximity to industry, and social mobility.

STARTING SALARY
College of Engineering graduates are some of Cal Poly Pomona’s top earners.

* Average starting salary according to NACE Winter 2018 Salary Survey report.

SOCIAL MOBILITY
The college’s student body is as socioeconomically diverse as it is ethnically diverse. The college lowers the financial barriers to opportunity, giving all students the opportunity to transcend their economic class.

BEST VALUE
Our college is recognized for its low cost, a dozen accredited undergraduate engineering degree options and a high average starting salary of our graduates.

INDUSTRY NEIGHBORS
We are surrounded by industry eager to recruit our workforce-ready graduates. In 2017, approximately 150 employers attended the Engineering/High-Tech Career Fair at Cal Poly Pomona. Further, there are more organizations recruiting at Cal Poly Pomona than at any other Cal State University.
IN BRIEF

**HARVEY MUDD COLLEGE PRESIDENT INAUGURAL SPEAKER FOR ENGINEERING’S COMMENCEMENT**

Dr. Maria Klawe, president of Harvey Mudd College, was the inaugural speaker for the 2018 College of Engineering commencement ceremony. A renowned computer scientist and scholar, and the first woman to lead Harvey Mudd College, Klawe spoke to a graduating class of over 1,300. She told students to pursue passion where there is a need, to be open to the unexpected and unwanted, and that it is never too late to learn something difficult. “All of you are capable of doing great things,” says Klawe. “An education from the College of Engineering at Cal Poly Pomona is an excellent preparation for making the world a better place.”

**ALUMNI’S $145,000 GIFT SUPPORTS WATER PROJECT**

A $145,000 gift was donated by Craig Netwig (’71, chemical engineering) to sponsor civil and mechanical engineering senior projects, including a multidisciplinary and award-winning effort to develop the Decentralized Renewable Off-Grid Wastewater Treatment (DROWT). “Cal Poly Pomona helped stimulate my natural curiosity for chemistry and engineering. This fact and knowing the gift will be used for the further development and optimization of the water reuse system made giving back an easy decision,” says Netwig. Headed by Dr. Reza Baghaei Lakeh, mechanical engineering assistant professor and Dr. Ali Sharbat, civil engineering associate professor, the gift will go towards further development of water reuse projects.

**CROSS-CAMPUS COLLABORATION BRINGS REMOTE LAB TO CLASSROOM**

To address historically low pass rates in a junior-level systems dynamics course, Dr. Nolan Tsuchiya, mechanical engineering assistant professor, integrated a remote laboratory component to offer a real-time visual learning experience in an otherwise lecture-only course.

Through a collaboration between Cal Poly Pomona College of Engineering and San Francisco State University (SFSU) School of Engineering, College of Engineering students are able to conduct experiments and collect real data over the internet on a remote shake table at SFSU. “Since adopting the technology into the classroom, student performance has improved and general interest in the subject has increased,” says Tsuchiya.

Above: Dr. Nolan Tsuchiya, assistant professor for the mechanical engineering department, led the effort to integrate the remote lab component in the high-level engineering course.

**INTERDISCIPLINARY FACULTY TEAM EARNs AWARD FOR CURBING FAILURE RATES**

A team of seven Cal Poly Pomona faculty from the Department of Mechanical Engineering and the Department of Psychology & Sociology earned the national Online Learning Consortium’s Digital Learning Innovation Award for reducing failure rates by two-thirds in a bottleneck engineering course. The national award included a $10,000 prize to continue their work. To increase pass rates, Dr. Paul Nissenson, mechanical engineering associate professor, “flipped” the course—students reviewed video lectures before class and class time was used for solving problems and group activities with Nissenson.

Above: Dr. Juliana Fuqua (left), psychology and sociology associate professor and Dr. Paul Nissenson (right), mechanical engineering associate professor, receiving the Online Learning Consortium’s Digital Learning Innovation Award.
College of Engineering Makes a Trio of Conferences Possible

1 **ASME E-FEST WEST 2018**

The College of Engineering recruited faculty, student volunteers and alumni judges for ASME (American Society of Mechanical Engineers) E-Fest West 2018. Held at the Pomona Fairplex, more than 600 attended the three-day event which included student competitions, panels from industry experts, and professional and career development workshops for engineering students, practicing engineers and anyone interested in the discipline.

2 **99TH AAAS MEETING**

Approximately 600 scientists and students from all over the region attended the 99th Annual Meeting of the Pacific Division of AAAS (American Association for the Advancement of Science). Dr. Vilupanur Ravi, chemical & materials department chair and 2017-18 AAAS Pacific president led the effort for this three-day meeting. “Dr. Ravi’s leadership and commitment helped allow this meeting to be held at Cal Poly Pomona for the first time and accommodate a record number of symposia,” says Dr. Joseph Rencis, dean for the College of Engineering.

3 **UESI 2018 SURVEYING & GEOMATICS CONFERENCE**

Cal Poly Pomona hosted the inaugural ASCE (American Society of Civil Engineers) UESI (Utility Engineering & Surveying Institute) 2018 Surveying & Geomatics Conference. With nearly 300 attendees and four keynote sessions, the conference was chaired by Allan Ng, civil engineering faculty and Dr. Francelina Neto, former civil engineering professor. With the theme of “Surveying: A Foundation to Sustainable Infrastructure Development”, the conference included exhibitors, special plenary sessions, workshops, and keynote speakers.

MOTOROLA GRANT EXPANDS FEMINEER® PROGRAM

The Cal Poly Pomona College of Engineering Femineer® Program has received a grant for $20,000 from Motorola Solutions Foundation. This funding will enable the Femineer® Program to create a new year of curriculum to equip female middle school students with the tools to excel in computing and engineering.
The College of Engineering is proud of our recent graduates who have begun their careers, and are climbing the economic ladder while bettering themselves and their families. At Cal Poly Pomona, students have tremendous access to internships and employment opportunities. Here are three recent graduates who have benefited from this advantage.
DEVIN ANDERSON OPERATES ON THIS STANDARD FOR LEARNING: HAVE A MASTERFUL UNDERSTANDING OF THE SUBJECT; ANYTHING ELSE IS INSUFFICIENT.

“I don’t see the point of doing something halfway. If you’re going to be there, you might as well actually put in an honest effort,” says Anderson.

An honest effort for Anderson as a College of Engineering student meant days that started before the sun peeked over the horizon and ended close to midnight. An honest effort meant five days of classes and weekends locked away in a quiet space, poring over every theory, problem, equation, example, note, inquiry, and text until his understanding of what was being taught was as close to total as he could achieve.

“Cal Poly Pomona students are very different than all other students. If you look at engineers from the top-ranked engineering universities across the nation like MIT, Caltech and Stanford, they’re all great, don’t get me wrong,” says Anderson. “Their theory is on point, but we’re a hands-on university. That makes Cal Poly Pomona stand out, and that is what makes the top companies in the engineering industry desire Cal Poly Pomona engineering graduates for advanced positions within their companies.” In fact, JPL recruits more engineering graduates from Cal Poly Pomona than from any of those institutions and is almost in the number one spot.

Anderson graduated in mechanical engineering with honors and a 3.91 GPA. Currently, he is on track to graduate this year from USC with a Master of Science in mechanical engineering and works at NASA’s JPL.

At JPL, Anderson is part of the Mars 2020 team. The team is working to send a new rover to Mars in the next two years to determine if the red planet can support life. Anderson’s working on creating a hermetic seal for the sample test tubes that will be sent to Mars, which involves a lot of research, and daily meetings with scientists and engineers to discuss topics like contamination control, planetary protection, and testing propositions and design iterations. To keep the project on schedule while finishing his master’s program, he continues to work long hours, much like he did as an undergraduate student at Cal Poly Pomona.

His supervisor and mentor at JPL, Eric Kulczycki, robotics mechanical engineer of the extreme environment robots group, has taken notice.

“Devin has a superior work ethic; he comes in at the crack of dawn and works his tail off,” says Kulczycki. “He would be a highly sought after candidate for full-time employment at JPL.”

“We’re a hands-on university. That makes Cal Poly Pomona stand out.”

—DEVIN ANDERSON
(’17, MECHANICAL ENGINEERING)
ALLISON SERVEY

‘17, Mechanical Engineering
Development Program Management Associate,
Mattel Corporation

ALLISON SERVEY DEVELOPED A LOVE OF WORKING WITH HER HANDS EARLY ON, OFTEN HELPING HER DAD MAKE REPAIRS AROUND THE HOUSE.

“I was my dad’s right-hand man,” says Servey. For three years in high school, she did mechanical design for the robotics team, which sparked her interest in engineering. “It was the jumping–off point for me to know what I wanted to do for a living,” says Servey. “The team wasn’t highly ranked, but we did well considering we didn’t outsource any of our stuff. We did everything ourselves.”

At Cal Poly Pomona, Servey applied her hands-on acumen as a volunteer for the Cal Poly Rose Float and eventually as design chair on the 2017 float “A New Leaf”. Servey was responsible for directing team decisions on design, the budget for the part of the project she oversaw, as well as managing a team of 10 volunteers.

“The chassis was the only thing already built, but otherwise, we built everything,” she adds. “One of the most important things we got out of the whole experience is we did all of our own work—all of our own welding, all of our own sculpting. Then we go to the parade and go up against professional companies. The most impressive thing to see is the commitment and the learning curve, as well as what we’re able to do with so little.”

She would take her project management skills with her to Mattel. What started as an internship at the El Segundo-based multinational toy company was later a full-time project management job, which thrilled Servey.

“The artists do the toy design, and then we take their sketch or idea and turn it into something that can be manufactured and feasible within our budget,” she says. “The best part of the job is getting to see the product and test it out.”

At Mattel, Servey has worked on a toy line for the summer tent pole movie “Jurassic World: Fallen Kingdom” and miniature figures from the “Teen Titans Go!” cartoon.

“I had great classes, but that is only part of what you need to succeed in the working world. Working effectively with other people and the experience you get by actually building a project; you learn more that way than you do learning about the theory. You learn more practical things.”

This article has been adapted from the full profile by Melanie Johnson in Cal Poly Pomona’s digital magazine, Bronco.

“Working effectively with other people and the experience that you get by actually building a project; you learn more that way than you do learning about the theory.”

—ALLISON SERVEY
‘17, MECHANICAL ENGINEERING
“My greatest experience has been sitting down with students doing mock interviews and forwarding their resume to companies.”

—VACHE GARABEDIAN
(’18, CONSTRUCTION ENGINEERING TECHNOLOGY)
Our faculty ensure that our students develop and flourish as day-one workforce-ready engineers. Here, we highlight faculty with recent achievements.

**Dr. Pejman Akbari**  
Assistant Professor, Electromechanical Engineering Technology  
SUMMER FACULTY FELLOW—AIR FORCE RESEARCH LAB (AFRL), WRIGHT-PATTERSON AIR FORCE BASE  

For the second consecutive year, Akbari earned the U.S. Air Force Summer Faculty Fellowship to conduct research at the AFRL in Ohio. Akbari has over a decade of experience in designing advanced propulsion and power generation systems, is the author of over 55 peer-reviewed journals/papers and holds three patents. As a faculty fellow, Akbari tested a prototype turbine engine he invented to evaluate and prove his prototype, which is lighter, more efficient, smaller, and cheaper to manufacture compared to existing gas turbines.

**Dr. Ghada Gad**  
Assistant Professor, Civil Engineering  
EXCELLENCE IN TEACHING AWARD—NORTHROP GRUMMAN  

Among Gad’s achievements, she was a 2016 ASCE (American Society of Civil Engineers) ExCEEd Fellow, co-taught the summer abroad program in Germany and founded the Cal Poly Pomona chapter of the Design-Build Institute of America. She consistently receives high marks in student evaluations and was nominated by her students for the George P. Hart Award, which is awarded to faculty who display the highest traditions of academic life and the outstanding personal qualities of an academic.

**Dr. Mariappan “Jawa” Jawaharial**  
Professor, Mechanical Engineering  
OUTSTANDING TEACHING AWARD—AMERICAN SOCIETY FOR ENGINEERING EDUCATION (ASEE), PACIFIC SOUTHWEST SECTION  

To increase retention and pass rates in difficult mechanical engineering courses, Jawa implements scenario-based learning to teach his courses. Jawa helped develop ME (Mechanical Engineering) Online—an online video resource that provides learning modules for students. Outside of the classroom, Jawa is the founder and director of Robotics Education through Active Learning (REAL), a K-12 outreach robotics program. He also co-founded the White House-recognized Femineers® (Female Engineers), which aims to inspire young females to pursue STEM (Science, Technology, Engineering, Mathematics) in their education and career.
Dr. Shokoufeh Mirzaei
Associate Professor, Industrial & Manufacturing Engineering
VISITING FACULTY—DIVISION OF COMPUTATIONAL SCIENCE, LAWRENCE BERKELEY NATIONAL LABORATORY (LBNL)

Mirzaei’s research aims to refine prediction methods to determine how proteins—chains of amino acids that constitute the building blocks of biological systems—assume the structures that define the mechanism of life. Since 2014, Mirzaei has been part of an international collaboration with researchers from the LBNL and the Ben-Gurion University of the Negev in Israel to research this phenomenon. Together, they have co-authored two journal papers and three conference papers.

Dr. Jessica Perez
Assistant Professor, Electromechanical Engineering Technology
MARA H. WASBURN ASEE WOMEN IN ENGINEERING EARLY ENGINEERING EDUCATOR GRANT—AMERICAN SOCIETY FOR ENGINEERING EDUCATION (ASEE)

Perez’s interests and efforts focus on inventive instructional techniques that engage and retain students, such as blended flipped classroom in statics, use of small learning communities in core classes and peer-to-peer mentoring in instructional techniques. This work complements her role as the First Year Experience course coordinator for the college—Perez works for every student to have a relevant experience that connects students to the university and the field. Informed by her own sense of isolation she felt in the STEM fields, Perez’s research focus has been in the area of equity and inclusion for women, minorities and other marginalized groups in technical disciplines.

University & College Recognition

Dr. Wen Cheng
Associate Professor, Civil Engineering
OUTSTANDING TEACHING AWARD—COLLEGE OF ENGINEERING

Dr. Keith Forward
Associate Professor, Chemical & Materials Engineering
OUTSTANDING SERVICE AWARD—COLLEGE OF ENGINEERING

Dr. Yong X. Gan
Associate Professor, Mechanical Engineering
OUTSTANDING RESEARCH, SCHOLARLY & CREATIVE ACTIVITY AWARD—COLLEGE OF ENGINEERING

Dr. Mehrdad Haghi
Professor, Mechanical Engineering
OUTSTANDING FACULTY ADVISOR—CAL POLY POMONA

Dr. Mingheng Li
Professor, Chemical & Materials Engineering
PROVOST’S AWARD FOR EXCELLENCE IN SCHOLARLY AND CREATIVE ACTIVITIES—CAL POLY POMONA
Cal Poly Pomona engineering faculty and students are having similar breakthrough moments and enjoying well-deserved recognition thanks to the college’s new scanning electron microscope (SEM).

“The SEM has really energized the students,” says Dr. Vilupanur Ravi, principal investigator and chair of the Department of Chemical & Materials Engineering. “It has added a lot of credibility to their work as well.”

Guided by Ravi, and co–principal investigators Dr. Keith Forward, chemical & materials associate professor and Dr. Laila Jallo, chemical & materials assistant professor, students are participating in new research that has real–word, benefits including improving longevity of medical implants, enhancing power plant operations, developing more effective medications, and more.
Acquired through a grant from the National Science Foundation, the instrument provides students with amazing insights, strengthens their research, publications and presentations, and helps them garner many awards.

Unlike a modern optical microscope, the SEM scans surfaces with electrons, which interact with atoms in the sample, revealing the sample’s topography and chemical composition. It also allows viewers to see objects at much higher magnification levels.

“The scanning electron microscope has really energized the students. It has added a lot of credibility to their work as well.”

—DR. VILUPANUR RAVI, CHAIR, DEPARTMENT OF CHEMICAL & MATERIALS ENGINEERING

Shahan’s group recently won first place in their section at the RSCA (Research, Scholarship and Creative Activity) competition and their work was also published in JOM: The Journal of the Minerals, Metals & Materials Society. “Being able to do this kind of research has changed my whole outlook,” says Shahan.

**Optimizing solar thermal energy production**

Materials engineering graduate student Carinne Lukiman used the SEM in research aimed at optimizing solar thermal power plants. Most plants of this type use expensive nitrate salts in the energy conversion process. Lukiman’s team wanted to learn whether more economical chloride salts would work equally well, but needed to study their corrosive effects on the stainless-steel fixtures which contain them.

The SEM enabled her to obtain high-quality images and chemical composition information to characterize the corrosive attack on the test samples. “Every time we used the SEM there was an ‘a-ha moment,’ it seemed,” says Lukiman, who won first place for her presentation in the ASM International Los Angeles Chapter’s Annual Poster Contest.

**New worlds await**

The SEM has and most certainly will continue bringing new research possibilities for Cal Poly Pomona engineering students across many different fields of study, many of which could greatly benefit humanity.

Pharmaceuticals is a prime example, as Dr. Jallo explains. “The SEM has shown my students how particles mix at the nano level,” she remarks, “which is a critical step in the development of new, more effective drugs.”

**Advancing the science of metal coatings**

Mechanical engineering student Shahan Kasnakjian used the SEM to study coatings and their effect on metal substrates.

In their research, Shahan and the team applied diffusion-based aluminate coatings to the surface of several austenitic stainless steels. Using the SEM’s Energy Dispersive X-Ray Spectroscopy (EDS) function, the team discovered that austenite stability inhibits the diffusion of aluminum. “Our work on advanced metallic coatings has the potential to impact a broad range of industries, including power, chemical, and aerospace sectors,” says Ravi.

From left to right: Carinne Lukiman, materials engineering graduate student, is guided by Dr. Laila Jallo and Dr. Vilupanur Ravi, assistant professor and chair, respectively, for the chemical & materials engineering department.
Employers seek out engineering students with SAE team experience.

Students in Cal Poly Pomona’s Formula and Baja Society of Automotive Engineers (SAE) design teams compete internationally to build race cars capable of outperforming other universities throughout the world. They are doing more than building cars to compete; they are also being recruited by engineering companies such as NASA, SpaceX, Boeing, Ford, General Motors, and Honda, which all attend the competitions to serve as judges and scout new talent.

“At competitions, employers are able to see exactly what the students can do and how they work in teams while operating in a real-life work environment,” says Scott Boskovich, Formula SAE (FSAE) advisor and electromechanical engineering technology assistant professor.

This is how Kyle Craig (‘17, mechanical engineering), former Baja SAE design team captain, landed a job with a large aerospace firm. SpaceX eagerly recruited Craig based on his SAE team experience.

As a lead during the 2016-2017 Baja SAE season, he met representatives from SpaceX while working on the assembly and design of a lightweight, fully-custom gear box—an innovation that helped the team garner third place at a competition in Illinois, beating out Cornell University among others.

“I submitted an application on a Sunday evening, and the following Monday a recruiter called,” says Craig. “The main outlier on my resume was my leadership experience on the Baja SAE team, which demonstrated my well-rounded abilities as an engineer and many other aspects.”

Bryan Kitahara (‘17, mechanical engineering), who was the manufacturing lead for the Baja team, also secured a position with an aerospace company. Kitahara was recruited to work as a mechanical engineer at NASA’s Jet Propulsion Laboratory by extensively discussing Baja during a 30-minute presentation to a group of company managers. “I treated the presentation as a design review, which seemed to get the engineering audience engaged and interested in my work,” he says.

“I owe my experience and resulting job to Baja SAE,” explains Kitahara. “It gave me the practical foundation that allowed me to talk about my work, design, process and manufacturing logically and confidently and taught me how to translate 3D CAD into appropriately tolerated parts.”

For aerospace companies, recruiting SAE vehicle team members is a common practice according to a Los Angeles Times article, “Where do SpaceX and other aerospace companies find engineers? On the race track.”
The back of the 2016 FSAE vehicle in Lincoln, Nebraska. The team placed third overall.
The article also highlights the Cal Poly Pomona FSAE team and a recent graduate recruited by Raytheon. “Race cars and rockets are pretty similar,” says Bill Riley, a competition judge and a senior director of design reliability and vehicle analysis at SpaceX, in the article. “It’s lightweight, efficient, elegant engineering. Those basic principles are the same, no matter what you’re designing.”

Automotive companies seek out SAE team members as well. For Brandon Marshall (’17, mechanical engineering), he caught the attention of Honda through his research in building light, efficient engines and calibrating them. Marshall soon became a development engineer in the company’s Performance Development Department.

“I plugged into the engine’s computer making changes to the way the engine runs by changing fueling and ignition parameters,” says Marshall.

“The Formula SAE team absolutely helped start my career in automotive racing. If it weren’t for my work with the Formula team, I wouldn’t have been able to answer many of the questions presented in my interviews.”

—BRANDON MARSHALL
(’17, MECHANICAL ENGINEERING)

Brandon Marshall (’17, mechanical engineering), left, gives a thumbs up at Formula Student Germany 2015. They were the best team in California and placed in the top 20 overall.

“Multiple companies cherry pick students directly from these teams because participants gain practical, real world experience that is directly applicable in the workplace,” says Marshall.

Cal Poly Pomona’s SAE teams have a record of international success, and employers are naturally interested in the best teams.

In May 2018, the Formula team took first place in the acceleration section at a major competition in Michigan. The team placed third overall in Lincoln, Nebraska in 2016, and in 2014, the Formula race car garnered fourth in Lincoln and ninth in Germany, making it the best team from California that year.

The college’s Baja team, which competes in three international competitions each year, is a perennial California favorite. The team ranked fourth overall in Kansas in 2017 and top 10 in Tennessee in 2016.

“Taking a design from its initial concept through preliminary and critical design review, all the way to manufacture and build is a common practice in industry,” says Dr. Nolan Tsuchiya, Baja SAE advisor and mechanical engineering assistant professor. “The type of collaborative team effort learned in the Baja and Formula programs is the most important experience these students will take away from our university.”
THE SPIRIT OF COMPETITION

WINNING FORMULA

For half a decade, the college’s Formula SAE and Baja SAE teams have often ranked top 15 in international competition and frequently rank as the top California team. Teams design and build their vehicles from scratch, something other well-funded international teams can’t claim.

INDUSTRIOUS ACHIEVERS

The Department of Industrial & Manufacturing Engineering’s students have maintained a record of international success at technical paper competitions for nearly two decades. In 2018 and for the second year in a row, they took first in the IIESE global undergraduate technical paper competition.

LOOKIN' ROSY

The Cal Poly Universities Rose Float is the only student-designed and -built float in the annual Tournament of Roses Parade. Engineering students play a big role in making the floats a reality. Since the first Cal Poly Universities Rose Float in 1949, the floats have earned a total of 57 trophies.

VICTORY LAUNCH

In the past decade, the Department of Aerospace Engineering has earned 18 honors on national and international stages, primarily in senior aircraft and spacecraft design. In 2018, an undergraduate team earned second place in the annual international AIAA (American Institute of Aeronautics and Astronautics) Space Systems Design Competition.
The students and faculty of Cal Poly Pomona’s Liquid Rocket Lab (LRL) program are vying to become the first university to launch a liquid-propelled rocket into space. For all their ambition, the team has been constrained by space, working in makeshift locations. That will soon change with the construction of a new, state-of-the-art research and testing facility.

“The new rocket lab is a pretty big deal for students in the LRL program, because our team has been homeless, as far as projects go, for the past year,” says Richard Picard, aerospace engineering student and project lead for the LRL. “After jumping from lab to lab and sharing space, we have come to a tipping point where we cannot proceed any further without a large, dedicated lab to conduct our work. The rocket is very big, and a lot of people simultaneously work on it. With the addition of the new lab, we will have the space we need to propel our rocket-building efforts.”

The 1,000-square-foot lab, designed by Higginson Architects Inc., is scheduled to break ground in 2019, with the lab expected to open in summer 2019, providing a dedicated learning environment focused on liquid propulsion. Located next to the College of Engineering’s Wind Tunnel Complex, the permanent lab will provide resources for faculty and more than 70 students from across disciplines as they aim to be the first university to develop a liquid-fueled rocket capable of reaching space.

Last year, the National College Resources Foundation (NCRF) provided a $1.67 million gift to establish a LRL program at Cal Poly Pomona. This generous donation not only helps fund the new laboratory, but also gives students the opportunity to study and conduct research on liquid rocket propulsion in a modern, hands-on learning environment and prepares students to work in the aerospace industry.

“This research is important because it’s building excitement among students to become the next generation of aerospace engineers,” says Dr. Frank Chandler, aerospace engineering assistant professor, faculty director of LRL and advisor for the LRL program. “Students who may not have gone into the aerospace industry previously are now getting trained to enter the marketplace in aerospace engineering.”

Colby Truong, aerospace engineering student and the project’s engine team leader, says, “The hands-on experience obtained from the LRL program provides great preparation for anyone entering the aerospace industry. It is a unique opportunity that many students throughout the country do not have the chance to experience.”

“What we’re doing is not very different from the work of professionals in the aerospace industry,” continues Truong. “This makes students working on the liquid-rocket project look appealing to potential employers. In fact, several LRL students from the past year have obtained internship and job offers because their work in the program helped them stand out among other applicants.”

A highlight of the LRL team’s current work is the university’s first liquid-fueled rocket. Dubbed Bronco 1, the 115-pound rocket will be powered by liquid methane and is being designed and built to enter the FAR-MARS (Friends of Amateur Rocketry-Mars Society) competition in March 2019. Once complete, Bronco 1 will stand 15 feet tall and reach supersonic speeds of Mach 1.5. Though not designed to go beyond the earth’s atmosphere, Picard says it will be capable of reaching an altitude of about 45,000 feet, the goal altitude of the competition.
ON THE HORIZON

Design concepts for the new permanent Liquid Rocket Lab.
Held in the Mojave Desert, the competition is jointly sponsored by the Mars Society, headquartered in Lakewood, Colo. and California-based FAR. The contest will be the first big test for the Cal Poly Pomona rocketry team, as they will compete against other universities to see who can achieve an estimated altitude of 45,000 feet. After the competition, the team will improve upon their design to have their rocket breach outer space by surpassing an altitude of 330,000 feet, or 62 miles—and Cal Poly Pomona hopes to be the first university to do it.

“I believe Cal Poly Pomona is the furthest ahead as far as flight testing goes,” says Picard. “We have completed three successful flight tests of our recovery system and our flight computer. These were launches of similar-sized vehicles to the actual rocket, and it contained exact replicas of our recovery system, with nose cone, flight computer, camera and instrumentation. According to Picard, the team has successfully built four engines: two regenerative cooled and two ablative. The regenerative engine uses the fuel to cool itself down and the ablative uses high-temperature composite material to burn away at a very slow rate to prevent heat from getting into the body of the engine and destroying it.

To prepare for the FAR-MARS competition, Picard and Chandler say the team still needs to do a lot of testing on engine firing and performance, as well as get the weight down on the rocket and build a functioning test stand.

These are impressive achievements for the LRL group, considering they started from scratch last year without a dedicated research facility to conduct work. “Since last year, we have made quite a bit of progress on building the rocket,” says Picard. “The design is complete. We are now building the last few components and then will test it to make sure everything is working correctly.”
Aerospace engineering students Leslie Montes and Chris Chang put together piping for the liquid rocket motor.

Dr. Frank Chandler, aerospace engineering assistant professor, faculty director of the LRL program and advisor of the LRL program, with students at a makeshift lab. The new permanent space will provide resources for faculty and more than 70 students across several engineering disciplines.

The team preparing for a test launch of their scale Patriot missile rocket to test the upper fuselage assembly. Will Morris, aerospace engineering student and launch vehicle lead says, “The launch was truly picture perfect, and we couldn’t have asked for things to go any better.”

Kenny Villanueva, aerospace engineering student, works on piping for the liquid rocket.

President Soraya Coley with the donated rocket monument, the figure piece for the permanent Liquid Rocket Lab, on display behind her as she speaks during the Race to Space kick-off event at Cal Poly Pomona in December 2017.
Esteemed Boeing executive shares how Cal Poly Pomona empowered her career success in aerospace and opening opportunities for students that followed.
Joan Robinson-Berry has seen and done a lot in her 36-year career, but in her current role as The Boeing Company’s vice president of engineering, modifications & maintenance for Boeing Global Services, what she loves most is providing solutions that truly change the world.

“Boeing makes products and services to improve mankind,” says Robinson-Berry. “We have the honor of connecting people with airplanes, protecting people through defense products, and providing people with services they need to keep aircraft flying. I measure my success not by my personal accomplishments, but what I can do to improve life for others. I feel very strongly that working for Boeing helps me accomplish my mission.” Attaining success, however, wasn’t always easy. It required dreaming, encouragement, hard work, and diligence.

Robinson-Berry grew up in a large family in the city of San Gabriel. She was naturally gifted in math and science, but her high school discouraged her from pursuing a technical field. Her friends and a Cal Poly Pomona counselor thought otherwise and she was urged to attend the university and pursue engineering. She enrolled as an engineering technology student and overcame academic and financial challenges to graduate as one of the few women in the program. She was also one of the first black women in her community to graduate with an engineering degree.

“Cal Poly Pomona opens the doors for students to succeed in the workplace through its experiential–designed curriculum and dedication to providing real-world job-related experiences,” she says. “The skills and lessons I learned at Cal Poly Pomona have helped me to open the pipeline for thousands of diverse students interested in aerospace.”

Not long after graduation, Robinson-Berry co-founded a small engineering company in inner-city Los Angeles. The experience nurtured her program management skills and soon her engineering career evolved into management. She joined McDonnell Douglas (later The Boeing Company) in 1986 as a senior engineer in aircraft production. At Boeing, she has built a successful career with the diverse business opportunities that the global aerospace company offers: from senior engineer, to manager of the MD 80/90 commercial airplane program, to directorships of engineering processes and technical workforce excellence, and finally to leadership positions in Boeing’s multibillion dollar supply chain system.

Her rise to success hasn’t gone unnoticed. Through the years, Robinson-Berry has received extensive recognition for her work in science, technology, engineering and mathematics from global organizations, including the National Society of Black Engineers and various members of Congress. She was also named among Women’s Enterprise magazine’s 2017 Top 100 Leaders in Corporate Supplier Diversity, as well as one of the Most Powerful Women in Business by Black Enterprise magazine. She received the Women of Color Professional Achievement Award in 2015 by the Career Communications Group, and that same year, was inducted into Cal Poly Pomona’s 2015 College of Engineering Hall of Fame.

Not only is Robinson-Berry a powerful force in the industry, she’s a positive force in her community—and a proud champion for diversity. She is a highly sought inspirational speaker and has helped empower women and minorities with presentations at the Women of Power Conference and the South Carolina Women’s Caucus Luncheon. She has been instrumental in launching two community action teams—one for Hispanic leaders and the other for African American leaders—focused on business relations, social issues and civic responsibility.

Reflecting on her distinguished career, Robinson-Berry is quick to recognize and appreciate the value of her time at Cal Poly Pomona.

“My degree from Cal Poly Pomona provided a meaningful foundation for the problem-solving skillset that makes someone marketable in any technology company. My degree helped give me the competitive edge in engineering and has given me the skills needed to grow and rotate through almost every discipline in aerospace. I am extremely grateful for my education and the opportunities that have helped me along the way.”
Preparing for a successful engineering career requires more than great education. Successful students also need networking opportunities, mentor relationships, and guidance on effective career pathways. Support programs and partnerships open these doors and help students develop into capable engineers that are sought by industry.

Here are three programs at work and a spotlight on students who have benefitted from them.
CAL POLY POMONA WOMEN IN ENGINEERING (CPP WE)

CPP WE promotes a close community for female engineering students through proactive retention activities and seeks to create an environment in which women can thrive in the classroom and beyond in their careers. The program also provides greater participation by women through K-12 outreach activities, inspires prospective and current students to be successful engineers, and continues engagement with alumnae in engineering industries.

Shannon Nguyen
‘17, Civil Engineering
Design Engineer, BKF Engineers

What appealed to you when deciding to join CPP WE?
Cal Poly Pomona is a commuter school, so it’s hard to meet people—especially in engineering. There are many more males than females in all the classes, and it can be a little intimidating. Joining CPP WE gave me a place to meet other women, learn about their goals, and their plans for getting there.

The program provides members with resources and supportive services to succeed in engineering. Can you describe some of the resources and services and how they benefited you?
I took advantage of on-campus tutoring programs, and met alumni through quarterly lunch and learn events. Through interactions with the various alumni speakers, I learned about various career paths, how others got started and things they did to get to where they are today. In addition to being a program member, I was also a student ambassador and spoke at various events, which helped build my confidence and public speaking skills.

What advice would you give to students interested in joining the program?
This program is really beneficial because you don’t have to invest much time in it, but it provides so much in return. There’s always something to learn from everyone you meet. I would encourage people to join the program and attend as many events as they can.

Holly Everson, aerospace engineering student, has completed two internships at the NASA Langley Research Center.

PROJECT LEAD THE WAY (PLTW)

PLTW is a national nonprofit organization partnering with public schools, organizations in the private sectors, and higher education institutions to increase the number and quality of engineers graduating from our educational system. Cal Poly Pomona was a PLTW affiliate university since 2009, and was the largest in the state. In this capacity, it hosted numerous PLTW events for educators throughout the year, including information conferences, summer core training for K-12 teachers and core training refresher workshops.

Holly Everson
Aerospace Engineering Student
Robotics Intern, NASA Langley Research Center

How did PLTW influence your decision to enroll in the College of Engineering?
PLTW is so impactful because the learning is hands-on. At the College of Engineering, we pride ourselves on practical and applied learning, which was something I wanted to carry over from PLTW.

What did you learn in PLTW that was relevant for your engineering courses?
Throughout PLTW, I learned material from a wide range of engineering disciplines, which helped me narrow down a major. Once in my courses, I had more confidence in my abilities due to my PLTW experience—both the hard skills and the soft skills. By working in teams, PLTW prepared me well for the collaborative efforts of college and industry projects.

What do you tell a PLTW high school student transitioning to college?
First, know that you have a leg up. You are walking into engineering classes with existing experience, whereas your classmates may be trying engineering for the very first time. Now take everything you've learned and let it lead you to new roads.
Suthasinee (Sue) Virnig
Electrical Engineering Student
Substation Engineer Intern, Southern California Edison

A few of MEP’s core values are “promoting standards of excellence” and “producing engineering professionals, scholars, and leaders of all backgrounds.” In what ways do you believe the program’s core values were instilled in you? MEP’s mission of embracing diversity among all engineering students has given me the self-confidence to know that I can be just as successful as anyone else if I am willing to work hard. With several years of studying under my belt—along with a handful of valuable internships—I have seen firsthand how MEP’s core values are beneficial.

You were among the first cohort of transfer students admitted to MEP. Though transfer students have experienced other academic settings, what are some specific services that MEP provided that benefited you in a four-year setting? I was very fortunate because when I transferred to Cal Poly Pomona, I was not only admitted into MEP, but was also hired as a student assistant for the program, which helped me become heavily involved by working at the office, volunteering for events and attending MEP workshops. I had the opportunity to join the new Southern California Edison-MEP Corporate Mentoring Program, which connected me to a professional engineer. Through the program, I have met many peers who have become close friends and mentors. I also had access to many scholarship opportunities. I have received a few scholarships, including the MEP-Boeing Scholarship.

What advice would you give to students in the program now? As a transfer student, I understand the urge to get through college as quickly as possible and take on heavy course loads. Yet students shouldn’t ignore the wide variety of MEP opportunities available. By being involved, they will open a lot more doors for themselves.
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College of Engineering Facts

- 5,797 Enrolled Students
- 1,280 Degrees Awarded
- 302 Master of Science
- 5,495 Bachelor of Science
- 587 Aerospace Engineering
- 465 Chemical & Materials Engineering
- 1,246 Civil Engineering
- 1,017 Electrical & Computer Engineering
- 491 Electromechanical Engineering Technology
- 500 Industrial & Manufacturing Engineering
- 1,151 Bachelor’s Degrees
- 129 Master’s Degrees

Diversity & Social Mobility

- Underrepresented Minority Students: 41%
- First Generation Students: 44%
- Low Income Students: 43%
- Highest GPA: 1138
- Average Admit SAT: 3.71

National Rankings*

- 4th Nationally
  Best public undergraduate engineering program
- 5th Nationally
  Best civil engineering program
- 5th Nationally
  Best electrical engineering program
- 5th Nationally
  Best computer engineering program
- 12th Nationally
  Best mechanical engineering program