TURNING POINT
An education at Cal Poly Pomona College of Engineering is an opportunity for a better life, and for many, that prospect has become a reality. p. 12

STICKING TOGETHER TO SUCCEED IN STEM
The first graduates from the Femineer Program reveal positive results. p. 8

FORGING NEW LEADERSHIP PATHWAYS
Renowned for producing some of the best engineering graduates in the country, the college is not content to rest upon its laurels. p. 20
An aerospace student team provides instruction to NASA divers via a command center on how to use an asteroid chipping tool designed by the team. (Story on page 26.)
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Message From the Dean

A young woman graduated from Cal Poly Pomona College of Engineering. With a degree in hand, and the possibilities of life broadened forever by her engineering education, these formative years would define the future ahead of her. That young woman was me.

My college education was a transformative experience, and this holds true for the many alumni whose lives have been changed by the engineering education received here. Now, as interim dean, I see that the College of Engineering remains as dedicated to its students as it was when I graduated.

In the pages that follow, you will find stories that demonstrate how students and alumni are afforded opportunities of a better life for themselves, their families and their communities. At the same time, these stories communicate our priorities and how we are upholding the mission of the college to prepare engineering students to be problem solvers, effective communicators, collaborators and lifelong learners.

For many of our students and alumni, their years spent in this college shape aspirations and solidify passions. You will see this reflected in our cover story, which offers a glimpse into the lives of four unique individuals whose paths led them to Cal Poly Pomona, and whose futures are brighter for it.

You will read about two research experiences on campus led by our talented faculty that exemplify our Learn by Doing pedagogy. Through a summer research program, the college hosts students from universities across California to investigate solutions for a multitude of traffic problems. Aquaponics research offers students a hands-on education in sustainable food production.

In this issue, we also expound on the value of an inclusive community, and feature one of our highly successful outreach efforts—the Femineer Program—which guides female high school students through a three-year series of projects encouraging them to pursue a college education, especially in science, technology, engineering and mathematics (STEM).

Our faculty and staff endeavor to offer the best possible education and support so that students can thrive. Stories of student success include a team of aerospace engineering students who were invited by NASA to the Johnson Space Center in Houston to test an asteroid chipping tool that the student team designed and built. Another student team won an international paper competition for their innovative, sustainable methods of generating power for large communities.

The success of our students and many of the College of Engineering’s initiatives are dependent upon the support of our alumni and industry friends who understand personally the value of higher education and the need to continually invest in it. The alumni and industry representatives featured in this issue highlight the need for philanthropic support to maintain the college’s status as a center of excellence and innovation in engineering education.

I am proud to share with you the latest edition of the College of Engineering magazine. It is my hope that you are inspired by the stories within and are moved to reflect on the significance of your own experience with the college as we all work together to continue a tradition of excellence.

Dr. Cordelia Ontiveros (CHE ’78)
Interim Dean, College of Engineering
WHY IS AN INCLUSIVE COMMUNITY IMPORTANT?

If we, as an advanced industrial nation, want to be successful, we must encourage as many talented people as possible to pursue careers in engineering and science. The College of Engineering is committed to maintaining our nation’s place in the global economy.

**Total U.S. Population**

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**Total Engineering Workforce**

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**Total College of Engineering Undergraduate Students**

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FACULTY AND STUDENTS ACROSS CALIFORNIA COLLABORATE TO SOLVE TRAFFIC PROBLEMS

If there is something besides nice weather that Californians can relate to, it is traffic—a problem that eats away at time and health. With the many traffic challenges in mind, Cal Poly Pomona hosts the UCCONNECT (University of California Center on Economic Competitiveness in Transportation) summer research program. The 10-week program investigates solutions for a multitude of public transportation problems, prepares students to enter the workforce and encourages them to pursue graduate-level studies in transportation.

Led by civil engineering associate professor Dr. Wen Cheng and Dr. Xudong Jia, civil engineering department chair, UCCONNECT invites college students encompassing six different majors from UC campuses at Irvine, Los Angeles and Riverside, and CSU Fullerton to join with Cal Poly Pomona students for the program. Throughout the summer, students collaborate with faculty members on a transportation-related research project of their choice.

“The work being presented here is the finest work by faculty and staff in preparing our students to become tomorrow’s problem solvers, entrepreneurs, leaders, teachers, artists and scholars,” says Dr. Winny Dong, chemical & materials engineering professor and director of OUR.

“Transportation plays an important role in our lives in so many different ways,” say Cheng, who serves as UCCONNECT program director. “With a more efficient system in California, we can improve our productivity and economic competitiveness.”

During this year’s program, 12 faculty members advised 20 students on several transportation topics, including gas emission, infrastructure construction, planning, safety, intelligent transportation systems and more. At the end of the summer, students presented their findings and received a certificate of completion, as well as compensation for their efforts.

Established in 2013 through funds awarded from the U.S. Department of Transportation and Caltrans, the summer program receives approximately $105,000 each year from UCCONNECT to cover faculty costs, student stipends and training workshops.

“I like that the research is flexible and not rigid,” says Cal Poly Pomona civil engineering senior Sara Anjali Mathews, who studied how pedestrian traffic flows in and out of transportation stations and large buildings. She says the program gave her the opportunity to work one-on-one with a professor and conduct research outside of the classroom, which helped her gain real world experience.

Cecilio Navarro, also a civil engineering senior at Cal Poly Pomona and a UCCONNECT participant, researched new materials to improve the structural integrity of concrete and steel bridges. “People often take it for granted, but transportation infrastructure impacts so many lives every day and is very important to society as a whole,” says Navarro. “The UCCONNECT program has inspired me to obtain a master’s degree in structural engineering and pursue a career in transportation.”

ANNUAL CONFERENCE CELEBRATES RESEARCH

More than 300 Cal Poly Pomona students participated in approximately 160 presentations at the 4th Annual Student Research, Scholarship, and Creative Activities (RSCA) Conference on campus. Hosted by the Office of Undergraduate Research (OUR), the event celebrated the student research community at Cal Poly Pomona. As a part of the conference, College of Engineering student teams displayed their research and many college faculty served as judges. Several engineering teams received top honors in their respective presentation sessions, with research ranging from computer modeling for advanced materials to more efficient power use in electric vehicles.

“Aerospace student Emerson Baker presents his research at the 4th Annual Student Research, Scholarship and Creative Activities Conference at Cal Poly Pomona.

“The work being presented here is the finest work by faculty and staff in preparing our students to become tomorrow’s problem solvers, entrepreneurs, leaders, teachers, artists and scholars,” says Dr. Winny Dong, chemical & materials engineering professor and director of OUR.
As California struggles with drought and other ecological woes, a class at Cal Poly Pomona is looking for ways to help. One such effort is that of Dr. Maryam Shafahi from the mechanical engineering department who leads a team of students conducting aquaponics research—a sustainable food production technology that combines aquaculture (fish cultivation) and hydroponics (water-based planting) to grow fish and plants together in a symbiotic environment.

“Aquaponics is a closed circle between fish and plants, using fish waste to feed the plants, so you don’t need any chemical fertilizer for the system, and there is no water wasted,” Shafahi explains. “The only water lost is through evaporation.”

Additionally, in agricultural hot beds like Central California, nitrates from fertilizer runoff are polluting the environment and drinking water. With this system, there is no nitrate runoff.

To demonstrate the positive potential of this field of study, Shafahi and her students built an aquaponics system at the university’s John T. Lyle Center for Regenerative Studies, an interdisciplinary learning environment that seeks to develop safe and healthy approaches toward a sustainable future. The 1,000-gallon system is currently growing approximately 250 heads of lettuce and is comprised of two large tanks holding 200 gallons of water each, as well as about 15 tilapia fish. The remaining 600 gallons of water flows through three filters, a shallow grow bed for vegetables, and associated pipes and pumps.

Mechanical engineering student Brandon Lace, who is a member of Cal Poly Pomona’s Aquaponics Club, says the societal benefits of water conservation in aquaponics is destined to be a big part of the future.

“This is important since California is in a drought and the valuable resource of clean water is being depleted,” says Lace. “The idea behind aquaponics is that there is no soil to soak up the water, so plants are able to get the nutrients they need from the constant flow of water.”

Another benefit is that aquaponics can be mobile and flexible. According to Shafahi, the systems can be built vertically and placed indoors or outdoors. As long as they get enough solar rays or LED lighting, they can function, she adds.

Funding is essential to spread the word about aquaponics. Fortunately, the program receives internal funding from Cal Poly Pomona, as well as from the Metropolitan Water District, for which Shafahi designed a display system on efficient agriculture water use for the Three Valleys Municipal Water District.

“In terms of conserving water, protecting the environment, and eating healthier, aquaponics is the way to go,” says Shafahi.
In the world of engineering, women are largely underrepresented. The National Science Foundation states that only 19 percent of bachelor’s degrees in engineering are awarded to women.

Cal Poly Pomona’s College of Engineering set out to change this concerning dynamic. In 2013, the college created the Femineer Program to inspire more females in high school to pursue science, technology, engineering and mathematics (STEM) in their college education and careers. Today, the first Femineer high school graduates demonstrate that this initiative is working.

An initial cohort of two-dozen high school freshmen and sophomore girls from Fremont Academy in Pomona Unified School District participated in the pilot program. Since then, 10 of the girls have completed their senior year of high school, and all 10 will be attending college this fall, with five of them pursuing STEM majors. This represents a 100-percent success rate for college admission, and a 50-percent decision rate toward STEM subjects—figures that are above historical averages for Fremont.

Why the impressive shift? Look no further than the Femineer Program itself. What’s unique about this three-year
remont Academy high school student Juana Cerda was crowned Pomona Princess in the 2016 Miss Pomona Scholarship Pageant. The annual pageant awards scholarships to female high school juniors or seniors residing in the city of Pomona for their academic and community achievements.

Granted a $1,500 scholarship, Cerda maintains a 4.0 GPA and serves as editor of the "Femineer Newsletter," a monthly publication for Femineers. Cerda also mentors elementary school students through after-school programs, organizes toy drives for underprivileged youth and supports a thriving school garden. After graduating from high school, she plans to pursue a career in mechanical engineering.

“Juana is the kind of person we need in the engineering profession—a motivated and talented individual who cares about her community and can one day help solve problems in society,” says Dr. Mariappan Jawaharlal, mechanical engineering professor and co-founder of the Femineer Program.

The Femineer Summit invited approximately 200 K-12 students to Cal Poly Pomona to learn more about the College of Engineering and have them showcase their STEM projects.

The Femineer Program is also growing in popularity. Since its debut, this program has now expanded to a total of 10 local schools and more than 250 girls. That could mean a strong influx of female students pursuing STEM majors in the near future.

“Over the next few years, we are definitely looking forward to seeing how the enrollment in our college and other STEM majors might increase, as a result of students participating in the Femineer Program,” says Cole. “It’s truly exciting to realize the impacts from this program.”

**MISS POMONA PRINCESS 2016: FEMINEER AND ASPIRING MECHANICAL ENGINEER**

Fremont Academy high school student Juana Cerda was crowned Pomona Princess in the 2016 Miss Pomona Scholarship Pageant. The annual pageant awards scholarships to female high school juniors or seniors residing in the city of Pomona for their academic and community achievements.

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“Juana is the kind of person we need in the engineering profession—a motivated and talented individual who cares about her community and can one day help solve problems in society,” says Dr. Mariappan Jawaharlal, mechanical engineering professor and co-founder of the Femineer Program.
As the son of Holocaust survivors, Cal Poly Pomona alumnus Jacob Lipa grew up viewing the world through a unique lens of compassion and gratitude. “How could I compare my challenges to theirs or even dare to disappoint them?” says Lipa. Although his parents lost their entire families during World War II, they managed to provide him and his siblings with a normal childhood, raising them with strong values. “My parents taught us to never hate anyone, to take responsibility for ourselves and to support the community around us,” says Lipa. “They also stressed the importance of education.”

Lipa’s upbringing profoundly influenced his decision to travel to the U.S. from Israel and complete his bachelor’s degree in civil engineering at Cal Poly Pomona within just two-and-a-half years. He later went on to earn a master’s in civil engineering from Cal State Northridge. Upon graduating from Cal Poly Pomona in 1976, Lipa’s first engineering position was for a small civil engineering firm where he introduced work procedures taught to him by his professors with industry experience. A few years later, Lipa secured a position as design engineer in the Los Angeles office of Psomas, one of the nation’s top-ranked engineering firms. Primarily focusing on large infrastructure and real estate development projects with an eye toward environmental stewardship, Lipa consistently moved up the ranks and ultimately became president of Psomas in 2002. He is currently CEO of Micropolitan, a subsidiary real estate development company of Psomas that purchases and develops apartment properties within walking distance of employment centers and public transportation.

“At Cal Poly Pomona, I discovered the satisfaction of design and construction and balancing it with environmental principles such as clean air, clean oceans and habitat enhancements,” says Lipa. “My civil engineering professors made a point of not just solving single technical issues, but looking at the life cycle of systems, imparting the philosophy that every design requires compromises and developing the most efficient solution requires teamwork, listening to all involved and continuing to learn and improve your craft.”

By applying the collaboration skills and social responsibility he first learned in college, Lipa has helped Psomas achieve considerable growth and become a pioneer in sustainable design. The tenet of building sustainable communities that improve quality of life is so ingrained in the firm’s culture that “balancing the natural and built environment” is now a company motto. An advocate of lifelong learning, Lipa has led the charge to develop technical, project management and leadership classes at Psomas. He also credits much of his own success to continual learning and the hands-on technical education he received at Cal Poly Pomona.

“With the rapid evolution of technology in our industry, it’s more important than ever before to keep up and to support higher education in order for individuals and companies to compete,” says Lipa.
Leanne Swanson is an example to all for what a bona fide power pro looks like. As the principal manager of distribution engineering at Southern California Edison (SCE), she’s responsible for system planning of the electric grid within the company’s 50,000-square-mile service territory. This includes all of the capital improvement projects, design initiatives and actual construction required to keep Southern California powered and moving forward.

“My passion really is about keeping the lights on—and working with the operations team to support the grid,” says Swanson, a Cal Poly Pomona Distinguished Alumna 2016. Thanks to engineering skills learned while she was in college, she is living that passion every day.

Swanson earned her bachelor’s degree in electrical engineering at Cal Poly Pomona in 2001. After graduation, she joined SCE where her initial role as an entry-level engineer was working on power systems and the power grid. From there, she leveraged her expertise to take on more advanced positions.

“Many utility workers come up through the ranks after serving as linemen; and while female linemen do exist, they are very rare,” she says. “Because of my engineering training at Cal Poly Pomona, I was able to serve in positions like managing lineman, but also overseeing a large engineering department. I’m now able to work in those areas where it would normally be much more difficult for a female to advance in places that were considered to be more “traditional.”

Today, Swanson works hard to make sure other young women have similar opportunities. At SCE, she leads the company’s Women in Engineering Steering Team to attract and nurture female engineers. She also serves as the liaison to Cal Poly Pomona’s Women in Engineering Program, designed to recruit more female engineering students, while supporting the ones who are already working toward graduation.

“At SCE, we’re seeing more and more demand for engineers, and diversity has become increasingly important,” says Swanson. “Not only do we have a shortage of engineers, we also have an even greater shortage of female engineers. We’re trying to change that.”

Fortunately, Cal Poly Pomona is equipping all engineering students—both male and female—for the most successful careers possible.

“SCE brings on quite a few student interns from Cal Poly Pomona, and we have a very high success rate of turning those interns into full-time entry-level engineers,” says Swanson. “The students that graduate from Cal Poly Pomona are really a different caliber of students. We find that these students are well-rounded individuals who are able to transition between detailed analytical calculations and high-level theoretical work supporting non-engineers. Because of their Learn by Doing education, they are better prepared for the type of work environment we have at SCE. It’s a great fit.”
Peter Silva (CE ’77), 2015 Hall of Fame and College of Engineering Dean's Leadership Board member, is president of Silva-Silva International. Prior to his current position, Silva was appointed by President Obama to be assistant administrator for the Office of Water at the U.S. Environmental Protection Agency.
We believe in the power of education to transform lives and communities, and we see the truth of this in the many alumni whose lives have been changed by the engineering education they received at Cal Poly Pomona,” says Dr. Cordelia Ontiveros, interim dean of the College of Engineering. “The college is continuing to build an inclusive community through our student support programs and activities that are reaching more people than ever before who traditionally have not considered engineering as an option.”

Meet three Cal Poly Pomona alumni and one engineering senior who exemplify the transformative power a hands-on education the College of Engineering provides. The comprehensive educational experiences they received have enabled them to reach great heights, develop a heart for serving others and produce notable engineering achievements.

Peter Silva

President
Silva-Silva International
BS Civil Engineering, Cal Poly Pomona, 1977

Growing up in a family of farm workers in the Imperial Valley of Southern California, Peter Silva learned at a young age about the importance of water to his family’s livelihood and the food products they produced. It is no surprise that Silva has dedicated his career to the field of water, protecting this vital natural resource.

While working for regional water boards and districts in Southern California, Silva experienced firsthand the water quality issues he studied in college. His career took off during his tenure as resident engineer of the San Diego office of the International Boundary and Water Commission where he oversaw important water issues between the United States and Mexico. In this pivotal role, he became a recognized leader in the water industry, gaining the attention of various regional and national water boards.

In 2009, Silva reached the highlight of his career when he was appointed by President Obama to the position of assistant administrator for the Office of Water at the U.S. Environmental Protection Agency in Washington, D.C. Eventually, Silva returned to San Diego to start his own firm where he continues to make societal impacts, addressing water policy and regulatory concerns on a global scale.

The first in his family to attend college, Silva attributes much of his career success to the tutelage and care he received from his professors at Cal Poly Pomona. He says his hydraulics professor, Donald Wells, enlightened him about the connection between water and engineering, giving him the motivation to follow through with his rigorous academic and work schedule.

“Mr. Wells had a knack for making us feel like we mattered and could succeed,” Silva recounted. “Many of my professors also had real-world experience. I believe it was this link between classroom learning and application to real-life situations that made my Cal Poly Pomona experience so beneficial.”
Emily Nguyen

Tortilla Chip Processing/Senior Supply Chain Leader
Frito-Lay, PepsiCo
BS Chemical Engineering, Cal Poly Pomona, 2010

Born in a Malaysian refugee camp, Emily Nguyen migrated to the U.S. with her family at a young age. As a first generation college student, Nguyen struggled to find a career that interested her, but she knew she wanted to lead. Fortunately, one of Nguyen’s professors in community college suggested she try chemical engineering, prompting her to pursue an engineering degree at Cal Poly Pomona.

She immediately felt welcomed and supported by faculty and staff who helped her navigate her college career. Taken by their enthusiasm for her success, Nguyen became immersed in student life and honed her leadership skills by serving in high-level positions for Engineering Council and Society of Women Engineers, and as a founding member of the engineering sorority Phi Sigma Rho. “My club involvement and academic experiences helped me refine my leadership style and pushed me to step out of my comfort zone,” says Nguyen.

Over the last six years, Nguyen has worked in various departments at the Frito-Lay plant in Rancho Cucamonga, Calif., where she trains new supply chain leaders and oversees financials, production and machinery. Landing this role after interning for brewing company Anheuser-Busch her junior year in college, Nguyen is responsible for producing some of the world’s favorite brands of snack foods.

She attributes her academic and professional success to hard work and guidance from mentors, and has been returning the favor ever since. Nguyen has spoken at several Society of Women Engineers events, engaged in recruiting efforts at Cal Poly Pomona and mentored members of Phi Sigma Rho.

“I wouldn’t be where I am today if it weren’t for my well-rounded education and mentors who helped me along the way,” says Nguyen. “Teachers and industry professionals helped me when I was struggling to find my way. Now, I want to be an example for other females in the technology field.”

Clark Rucker

Senior Manager, Quality
Phantom Works,
Boeing Defense, Space and Security
The Boeing Company
BS Engineering Technology, Cal Poly Pomona, 1983
MBA, Claremont Colleges – Peter F. Drucker School of Executive Management, 1986

Instrumental to the success of notable aerospace engineering projects such as the International Space Station, Clark Rucker’s work has improved the lives of countless many. Nevertheless, he says his proudest professional achievement is not any of these projects; it’s watching the light bulb come on in engineering students when he helps them achieve their own professional goals.

Rucker has worked for engineering giants such as General Dynamics, Northrop Grumman and Boeing, and he wants to
Lilliana Ochoa

Cal Poly Pomona College of Engineering
Mechanical Engineering Senior
McNair Program Scholar

Life-altering experiences begin for engineering students at Cal Poly Pomona the moment they set foot on campus. For College of Engineering senior Lilliana Ochoa, it was no different.

As a first generation college student without any engineering role models, Ochoa says her decision to study engineering was a leap of faith. Nevertheless, three years after embarking upon an academic career at Cal Poly Pomona, Ochoa is flourishing personally and professionally.

Ochoa says her engineering studies and participation in student engineering organizations have taught her how to think in a clear, concise manner and have helped her with time management.

“My professors taught me that learning is a matter of understanding what is happening, not memorizing how to solve specific problems,” explains Ochoa. “Additionally, balancing my time between work, clubs, extracurricular projects and classes has helped me learn to push myself as an engineer, while also enabling me to recognize my time limitations.”

Ochoa has already put this knowledge to good use while interning with the City of Pomona’s Department of Public Works, along with NASA’s Armstrong Flight Research Center and Jet Propulsion Laboratory. Additionally, she has applied these concepts while participating in the university’s McNair Scholars Program, which prepares eligible undergraduate students for doctorate programs. As part of this program, Ochoa conducted research on the mechanical properties of 3D printed materials, and presented her studies during the Annual Ronald E. McNair Undergraduate Research Symposium.

Ochoa says she will pursue a career in the aerospace industry, and would like to contribute to future missions in space exploration. After establishing her career, she has her sights set on returning to Cal Poly Pomona to teach part-time.

“I’d like to teach students the importance of thinking outside the box and critical thinking,” says Ochoa. “Most importantly, I want to show them that any goal is reachable if you’re willing to put in the effort.”
WITH recent and prolonged conflicts over the past 15 years, a large and quickly rising number of veterans are entering higher education. Cal Poly Pomona’s Veterans Resource Center (VRC) provides the tools for faculty, staff, and administrators to understand veterans and prepare to meet their needs. College of Engineering students make up nearly a third of the campus veteran population—engineering students make up the largest group of student veterans that participate in the program.

WHAT IS THE VRC?

The VRC provides veterans and military personnel a centralized source for information support, guidance and community.

COLLEGE OF ENGINEERING 2016 VALEDICTORIAN:
Matthew John Lowry (ME ’16), USMC Veteran

Prior to attending Cal Poly Pomona, Matthew served in the United States Marine Corps for five years. Upon return, Matthew went on to achieve a perfect 4.0 GPA in mechanical engineering and now works as a design engineer for Chevron.
My mother once told me that “much of what you will ever have in this world may be taken from you, but an education, once earned, is yours forever.” I do not know if she heard this, or if she just came to understand it. She did not go to college as a young adult, choosing instead to raise a family as she witnessed others leveraging education for professional success in the lives of those around her.

After my siblings and I were grown, she switched her focus, attended college and earned an associate degree in early childhood development. My father, the first in the Jaramillo family to graduate from high school, went on to earn a bachelor’s degree with financial aid from the GI Bill and later earned a master’s degree in education.

Living through the dark days of the Great Depression, my parents attributed their education as the catalyst that changed their lives and the lineage of our family from agriculture and factory workers to professionals. Excellent role models for our family, they were humble in their accomplishments, taught me to combine my vocation and avocation, and above all, cherished the value of education.

My path to Cal Poly Pomona was as a transfer student from a community college. While earning a two-year associate degree, I gained critical discipline, career clarity and the focus necessary to apply myself. At Cal Poly Pomona, as my focus sharpened, new doors opened for me: doors to learning that I had never experienced, to working in and leading teams and clubs, to scholarships and to industry.

I began my engineering career in 1986 as an intern at Tilden-Coil Constructors in Riverside where I was provided with abundant opportunities for challenges. The Cal Poly Pomona experiential learning philosophy of Learn by Doing inspired and prepared me to start a new chapter of industry and company specific learning. That same philosophy taught me personal responsibility for discovering more effective building methods and how to lead our company’s efforts in continuous improvement.

Some 30 years later, Tilden-Coil Constructors has experienced dramatic growth while adapting to tremendous changes in order to stay relevant in the market. With more than 100 managerial employees, and over 30 of them Cal Poly Pomona engineering alumni, we are positioned to continue to adapt and serve by applying the same philosophy that gave us our start—Learn by Doing.

Perhaps my story has caused you to reflect on your own. I would encourage us all to support education, as have I for my alma mater, in our own spheres of influence in the following ways:

Students, be open to everything you are taught even when it seems irrelevant. The disciplines you will build and the adversity you will overcome will be transformational for you, even more so than the subject matter.

Educators, keep learning and challenge yourself to understand and connect with industry. Your ability to stay relevant and integrate opportunities for enduring attributes like teamwork and leadership into our learning environments is critical to arm graduates with the tools necessary for personal and professional success.

Alumni industry leaders, I urge you to return to the university and stay connected through your support and service. Just as others have done for us, it is our time to provide the resources and input to enrich the experiences of our students and educators.

Brian Jaramillo (ETC ’87) is the president of Tilden-Coil Constructors. He serves as chair of the Dean’s Leadership Board for the College of Engineering at Cal Poly Pomona.
FRANK FLORES:
Cultivating Engineering Talent is His Mission

As a child growing up in East Los Angeles, Frank Flores didn’t have any role models who were engineers or even college graduates. It wasn’t until his middle school pre-algebra teacher enlightened him about the opportunities available to students in the fields of science, technology, engineering and mathematics (STEM), that he became inspired to attend college and pursue a career in electrical engineering.

Today, Flores is passionate about exposing youth to the fascinating field of engineering, and says it’s “awesome” that doing so is a part of his role as vice president of Engineering Growth and Advancement for Northrop Grumman Aerospace Systems’ Engineering and Global Product Development (E&GPD) organization.

“It’s critical to our nation from an economic and security standpoint that we continue to lead the world in technical innovation by producing a strong engineering workforce well-grounded in technical education,” says Flores, who has been a member of the College of Engineering Dean’s Leadership Board since 2003, and often speaks to students about aerospace topics.

Flores holds both bachelor’s and master’s degrees in electrical engineering from the University of Southern California and has worked at Northrop Grumman since 1978. His engineering career spans a wide range of roles in functional management, business development and program management.

“Our company’s mission is all about defending and preserving freedom for our nation and allies, as well as advancing human discovery,” says Flores. “The breadth of areas our people get involved with to perform that mission is quite incredible.”

As a long-term investment in developing technical talent, Northrop Grumman has developed a robust university and STEM relations program. “Our STEM relations focus on sharing the excitement of engineering with young people and then building lasting relationships with them through the university level. Through university collaboration, we support and participate in creating education programs that become effective pathways to help the students attain and excel in aerospace careers,” explains Flores.

As a part of this initiative, Northrop Grumman has supported the College of Engineering at Cal Poly Pomona for decades. The investment in the college has paid dividends, as it provides a wealth of workforce-ready engineers for the company.

“With approximately 65 summer interns and close to 900 Cal Poly Pomona alumni currently employed at Northrop Grumman, our relationship is rewarding all around,” says Flores. “The university’s Learn by Doing philosophy that prepares students to apply their education quickly and make immediate contributions is a key differentiator for Cal Poly Pomona graduates.”

Among other contributions, the company donated an RMAX autonomous helicopter to the UAV (unmanned aerial vehicle) Club, and engineers from its integration and testing group set up a wind tunnel for aerodynamic studies.

In 2010, Northrop Grumman started the annual UAV Systems Program, which is a collaboration between Cal Poly Pomona and Cal Poly San Luis Obispo. In this program, student teams from both universities work together on a joint design/build project, which has grown to include ground, air and underwater segments.

Technical experts from Northrop Grumman also review Cal Poly Pomona students’ capstone project presentations and host a Northrop Grumman Day, featuring technical and company presentations.

“With the incredible information and technologies available today, new engineers are more prepared to enter the workforce than ever before,” adds Flores. “It’s really an exciting time for these students, and it’s up to those of us already in the industry to cultivate the next generation of engineers and help ensure their success.”

International Collaboration with Ganpat University

Faculty in the College of Engineering build relationships with other universities around the world in an effort to enhance academic experiences for students. In spring 2016, the college invited students and leadership from Ganpat University in India to participate in the Baja SAE California student off-road vehicle design competition. The college assisted the nascent India team by welcoming them to work in their student project lab and offering a close-up look at the Cal Poly Pomona Baja SAE vehicle.

“This is a particularly special international collaboration because the founder of Ganpat University is an engineering alumus from Cal Poly Pomona,” says Dr. Cordelia Ontiveros, interim dean for the College of Engineering. “We look forward to continuing to find opportunities that benefit students at both universities in the future.”
Learning ideas in a classroom is one thing. Attempting to test those theories in the real world is quite another. That’s why hands-on laboratories are such an integral part of Cal Poly Pomona’s College of Engineering curriculum.

After all, labs are where students try new ideas and test their academic muscles. It’s where theory becomes knowledge, and where knowledge becomes skill.

Marty Colombatto, who graduated from Cal Poly Pomona with an engineering technology degree in 1982, is a firm believer in the importance of engineering laboratories. It’s also why he’s so passionate about lab revitalization within the College of Engineering.

“These labs were a big part of my own learning experience,” says Colombatto. “In my electrical engineering classes, I learned how to build circuits and what circuits are supposed to do; but the process of actually building a circuit, testing it, and debugging it in the laboratory is really what drove the learning home. That’s where the knowledge sunk in and stuck.”

So when Colombatto and his wife Stefanie were taking a tour of the lab facilities at Cal Poly Pomona in 2011, he was surprised to see that students were still using the same equipment he used during his undergraduate years, back in the early ’80s.

“At a time when state-of-the-art electronics turn over every year, I was sad to see that students were working with outdated equipment,” Colombatto says. “Everything in electronics today has gotten faster, more advanced and more precise. If your measurement equipment is not keeping up, your circuits will be behind the times. That’s really what motivated our gift to renovate all of the equipment in the electrical engineering lab and provide students with modern testing equipment.”

In 2012, the Colombattos gave a $100,000 donation to the college for the purchase of new equipment for the Colombatto Family Laboratory. The gift funded 70 new pieces of equipment in the electrical and computer engineering department, including digital multimeters, oscilloscopes, voltage generators, power supplies and Dell OptiPlex computers to help students practice building, testing and troubleshooting electrical circuits.

“Everything in the lab now is capable of working with state-of-the-art electronics, and it’s a better representation of the instruments being used in today’s corporate environment, which is very important,” says Colombatto. “This equipment will help students hit the ground running in their new careers.”

The Colombatto gift is a great start, and many other engineering laboratories at Cal Poly Pomona have significant needs for updated equipment. Colombatto currently serves as the chairperson of the Lab Revitalization Committee, which strives to motivate others to get involved through fundraising.

“Not only do I credit Cal Poly Pomona’s Learn by Doing experience—and the labs were a big part of that—but I also had exposure to some really great instructors and mentors who helped guide my career choices,” added Colombatto. “That’s why I feel indebted to Cal Poly Pomona, and why I want to make sure the next generation of students has that same opportunity.”

Joe (ARD ’72) and Grace (ACC ’74) Yee attending the annual Southern California Tasting & Auction at Cal Poly Pomona.
Thanks to the Dean’s Leadership Board, along with funding from individuals and corporations, the college is seeking new ways to improve leadership qualities in its students.

“Many of our students obtain strong leadership experience and training by participating in campus clubs, competitions and projects,” says Dr. Phil Rosenkrantz, professor emeritus in the industrial & manufacturing engineering department. “Nevertheless, we would like to improve upon that number to better ensure that every student is prepared to excel in the workforce upon graduation.”

In response, Rosenkrantz and members of the Dean’s Leadership Board have developed a college-wide leadership initiative and have formed focus groups to determine the best ways to interject leadership lessons throughout the curriculum. A key result of this effort is the new interdisciplinary project already underway between the colleges of engineering at Cal Poly Pomona and San Diego State University.

Dr. Kenneth Lamb, assistant professor in civil engineering at Cal Poly Pomona, is leading this capstone technical leadership project, which began in fall 2016. The new senior-level
leadership experience encompasses three courses taken in the fall, winter and spring quarters. During each course, students develop leadership skills while completing a technical project related to water issues.

Participants from both universities will also collaborate on projects in order to learn how to lead remote teams. Northrop Grumman is sponsoring the virtual team activity, with representatives from the aerospace company serving as mentors to the students involved.

Lamb, a water resource engineer and consultant prior to joining Cal Poly Pomona, says he aims to strengthen the communication skills of students by helping them realize who they are as people. “This is very important for big water projects, which involve extensive communication and leadership abilities to win public and stakeholder approval,” he adds. “If the engineering is right, but the public perception is wrong, the project will not go anywhere.”

During the fall session, students are focusing on topics such as recycling wastewater for potable use by studying recent San Diego water projects. “Although the engineering and technology is readily available in San Diego, the idea of recycled wastewater largely failed when it was originally introduced due to a negative public perception,” says Lamb. The drought and growing public acceptance is changing this view, with plans now in place to make millions of gallons of reused wastewater drinkable in the coming years.

“The course will not only teach students about the engineering dynamics of water projects, but will also give them the opportunity to examine how those involved could have led the project better,” says Lamb.

Various campus clubs are also providing students with new opportunities to enhance their leadership prowess. For example, the existing day-long Engineering Club Leadership Retreat (ECLR) plans to offer more specific leadership training for approximately 300 participants.

Computer engineering major Kirandeep Uppal is doing her part. As president of the college’s Engineering Council, Uppal is coordinating workshops and events to help campus club members and officers improve their leadership skills.

“We invite industry leaders to come and speak about the importance of leadership,” she says. “The speakers lead by example and share what they have done to get where they are.”

“I aspired to serve as president because my leadership skills have improved over the past year,” adds Uppal. “From my coursework and various activities at Cal Poly Pomona, I’ve learned how to work with other students; when to listen and when to speak my mind, and those are critical leadership traits.”
Top-left: Dr. Mingheng Li, Professor
Top-right: Dr. Subodh Bhandari, Professor
Middle-left: Dr. Mariappan Jawaharlal, Professor
Middle-right: Dr. Donald Edberg, Professor
Bottom: Dr. Amir Rezaei, Professor
OUTSTANDING RESEARCH, SCHOLARLY & CREATIVE ACTIVITY AWARD
Dr. Mingheng Li, Chemical & Materials Engineering
Ph.D., UCLA
Li has published 40 peer-reviewed articles in top-tier journals and has had his work sponsored by the American Chemical Society Petroleum Research Fund, the Department of Energy and the California Energy Commission. This year, Li’s research work, co-authored with a student team, was accepted by premier international journal, Desalination. Li currently serves as an associate editor for the Journal of Renewable and Sustainable Energy, published by the American Institute of Physics.

OUTSTANDING FACULTY ADVISOR AWARD
Dr. Subodh Bhandari, Aerospace Engineering
Ph.D., University of Kansas
Bhandari utilizes his research, as well as his industry experience and connections to not only guide students throughout their academic career, but to present them with opportunities for internships and full-time positions within various industry and aerospace companies. He pushes his students to pursue publication opportunities and presentations at national conferences, to strengthen their academic skills and resumes. Bhandari has a reputation for reaching out to students that are struggling to ensure they make the successful transition from college to career and become a meaningful part of the workforce. “He is wholeheartedly dedicated to advancing students’ technical and soft skills, and he consistently provides opportunities and support to the students he advises,” says one of his students.

PROVOST’S AWARD FOR EXCELLENCE IN TEACHING
Dr. Mariappan Jawaharlal, Mechanical Engineering
Ph.D., University of Massachusetts, Amherst
Jawaharlal practices a guided discovery method to facilitate student learning. Affectionately known as Jawa, he provides engaging learning experiences to all his students through thought experiments, creative projects, current events, real world challenges and hands-on activities. He has played a pioneering role in developing and implementing a scenario-based learning approach to teach complex engineering concepts. His approach to teaching focuses on inspiring students to uncover principles on their own. Jawa is also passionate about K-12 education—he developed the first engineering service-learning course at Cal Poly Pomona. This enables College of Engineering students and faculty to collaborate with local K-12 schools and reaches thousands of students each year. Jawa is also a co-founder of the Femineer Program that was recognized by the White House for increasing educational outcomes and opportunities for Hispanic K-12 students.

OUTSTANDING TEACHING AWARD
Dr. Donald L. Edberg, Aerospace Engineering
Ph.D., Stanford University
Since Edberg began teaching in the aerospace engineering department in 2001, he has combined 20-plus years of industry experience at various aerospace companies like NASA’s Jet Propulsion Laboratory and Boeing into his curriculum. Edberg draws from real life engineering scenarios for his assignments, preparing his students with the tools to address similar situations when they enter the workforce. Numerous student design teams advised by Edberg have gone on to win national competitions, including a 2015-16 undergraduate team that earned first place in the American Institute of Aeronautics and Astronautics (AIAA) Graduate Team Aircraft Design Competition, a competition typically undertaken by graduate-level students.

OUTSTANDING SERVICE AWARD
Dr. Amir Rezaei, Mechanical Engineering
Ph.D., Ohio State University
Rezaei has a rich history and devoted record of service to the department, college and university by participating in various capacities of chairing the College of Engineering assessment committee for three years. He has served in the Pacific Southwest (PSW) section of the American Society for Engineering Education (ASEE) for the past 10 years and was chair of the section for 2015. He was also the recipient of the Ralph R. Teetor Educational Award from the Society of Automotive Engineers (SAE) in 2005-2006. He enjoys working with his students and one of his students wrote: “as a graduating senior, some of the best memories I’ll retain from this university involve Dr. Rezaei. The majority of these memories stem from our work together in growing ASME, where the foundation of our connection began. I can guarantee that no award would grant him the same satisfaction he gets from seeing his students succeed.”
The Air Force is in need of exceptional engineers willing to push the boundaries of aerospace innovation. Cultivating the talent necessary is the goal behind the Air Force Research Laboratory’s (AFRL) Educational Partnership Agreement (EPA) with Cal Poly Pomona, placing a special emphasis on science, technology, engineering and mathematics (STEM) subjects.

The AFRL recently made a $1.5 million commitment to the College of Engineering. The college plans to use this funding to support student success, instruction and research in the areas of propulsion, autonomous unmanned systems, as well as wind tunnel and structural testing.

Thanks to previous funding through the EPA, the Air Force procured new supersonic and subsonic wind tunnels for Cal Poly Pomona, giving aerospace engineering students like Rita Eick the opportunity to more effectively pursue areas of study related to air elasticity and high-speed aerodynamics. Wind tunnels are an essential part of testing wing vibrations, nose cone aerodynamics and pitot tubes (critical aircraft instruments that measure air speed).

“Cal Poly Pomona is different from many other schools,” says Eick. “It’s not as theoretical. With our motto of hands-on you really feel like you’re making progress on practical applications just like you would while working in industry.”

The Air Force partnership is led by Michael Huggins, an aerospace engineering alumnus and chief engineer of aerospace systems in Wright Patterson Air Force Base (AFB), Ohio and Edwards AFB, California. His impressive career has earned him a place in the College of Engineering 2015 Hall of Fame, and he was named a Cal Poly Pomona Distinguished Alumnus in 2007.

For Huggins, the partnership is paying off in a big way. “This is a great program,” he says. “We’re definitely seeing the benefits through the excellent caliber of people we hire.”

The college will be one of only a handful of universities in the country to be conducting this level of sophisticated hands-on engineering at the undergraduate level, adds Huggins. “Lots of schools are flying and driving robots, but very few are doing the multidisciplinary approach of autonomous ops.”

Thanks in part to the Air Force/Cal Poly Pomona partnership, Eick is looking forward to working in the field of structures or structural dynamics. The sky is definitely the limit when it comes to her career goals and for many other College of Engineering students enrolled today.

As technology increasingly depends on advanced materials, the need for the discovery and development of new materials with specific properties rises. The College of Engineering’s new Master of Science in Engineering with an Emphasis in Materials Engineering program at Cal Poly Pomona prepares graduate students for advanced work in materials science and engineering professions. The program is designed for students with various undergraduate engineering backgrounds and commenced in fall 2016. Students participating in the new master’s program have the option to complete a course of study individually tailored to their unique talents and professional goals, as well as opportunities for applied research.
Mechanical engineering professor Dr. Kevin Anderson and a talented team of Cal Poly Pomona College of Engineering students constructed a test site that proves compost waste heat can enhance the power-generating capacity of solar chimney power plants (SCPPs)—a structure that generates electricity from low temperature solar heat. Their subsequent paper won the prestigious Russell Ackoff Award at the International Conference on Solid Waste Technology and Management.

SCPPs are nothing new, but the team’s ideas are. By harnessing the heat produced from heaps of decaying organic matter, they discovered it was not only possible to improve an SCPP’s power generation, but their efforts could also deliver a number of ancillary benefits. These include reducing the burden on landfills as well as garnering substantial revenue by selling the by-product as commercial fertilizer.

Construction engineering technology student Souha Jouhar utilized her training in Revit® Building Information Modeling, plus her passion for architecture and construction, to craft a 3D model of the proposed facility. The model was so impressive that she was able to virtually “walk” the client, COMPO Energy Inc., through the entire design, leading to overwhelming approval. “This was a great opportunity and honor to put my education to work in a real-world setting,” says Jouhar.

A prototype facility was constructed at the John T. Lyle Center for Regenerative Studies, a Cal Poly Pomona interdisciplinary learning environment that seeks to develop safe and healthy approaches toward a sustainable future. Extrapolating the results obtained there onto a proposed 24-acre site, the team showed that a full-scale facility could potentially generate 100 megawatts of electricity—enough to power some 65,000 homes—while producing $83 million in annual revenue.

“The team leveraged their education to the fullest,” says Anderson. “We’re pleased to be getting interest from the U.S. government, and hopefully that will attract venture capital, allowing us to build a full-scale design and bring its many benefits to the community.”
SCIENCE FICTION COULD VERY WELL BECOME FACT AS TECHNOLOGY ADVANCES AND SCIENTISTS START PROBING ASTEROIDS AND PLANETS FOR STRATEGIC MINERALS. AND THAT MEANS CERTAIN CAL POLY POMONA STUDENTS MAY LIKewise SEE THEIR DREAMS COME TRUE WHEN ASTRONAUTS CARRY A SPECIAL DEVICE KNOWN AS THE RESEARCH TOOL FOR ASTEROID CHIPPING AND COLLECTING (RTACC) AS STANDARD-ISSUE HARDWARE.

Advised by Dr. Donald Edberg from the aerospace engineering department, a team of five aerospace engineering students designed and built this innovative device for NASA to help astronauts more easily obtain and break apart rock samples.

The project was conducted under the auspices of the California Space Grant Consortium. As part of the grant, students were asked to visit area schools to energize kids about science, technology, engineering and mathematics (STEM) subjects. That outreach team was headed by RTACC team member Paul Navarro who also contributed his ideas to the basic design of the RTACC. “It was so gratifying seeing the students get excited about these subjects,” says Navarro.

Then things got really interesting. After the RTACC prototype was complete, the team traveled to the Johnson Space Center in Houston, where they directed NASA scuba divers as they tested the device in an underwater facility, simulating zero-gravity environments.

NASA gave the team high praise, lauding the device for its simplicity. “NASA was very happy with the students’ design because it had only one moving part, required no power and was very easy to operate,” says Edberg. “Generally, the simpler an object operates the better.”

After serving as head of the outreach team on the RTACC project, Navarro went on to become a student lab manager of the aerospace department’s unmanned aerial vehicle (UAV) lab, and ultimately hopes to embark on a career in the aerospace industry working with UAVs.

“Studying at Cal Poly Pomona, participating in this program, and working with Dr. Edberg and these kids have all given me tremendous confidence to lead teams,” says Navarro. “It helps inspire me to do more.”

NEW ENGINEERING COURSE REDESIGN EFFORTS UNDERWAY FOR STUDENT SUCCESS

New engineering course redesign efforts are helping to ensure continual degree progress. One initiative is the launch of ME Online, a new virtual teaching resource for mechanical engineering students, which began in spring 2016. ME Online hosts a library of video tutorials for some of the department’s toughest and most in-demand courses. The website, which has hundreds of videos so far, complements the curriculum students are learning in class.

“We made this website in hopes that students who need help can review these video tutorials as many times as needed to learn the material,” says mechanical engineering assistant professor Dr. Paul Nissenson. New academic support resources such as ME Online are made possible by funding from the California State University to support campuses to incorporate technology in instruction.
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