Fall 2001: Dr. Edward C. Hohmann, former dean of the College of Engineering, speaks during the building 17 opening ceremony. Hohmann passed away in early 2017, and the college is raising funds in honor of his legacy. See page 9 for more details.
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This edition of the College of Engineering Magazine is in memory of Dr. Edward C. Hohmann (1944-2017).
The Journey Ahead

I am Dr. Joseph J. Rencis, and I am honored and privileged to serve as dean of the College of Engineering at Cal Poly Pomona. I joined the college because of our proud Learn by Doing heritage, great people and bright future. In my first few months on campus, I have been continually impressed by the quality, character and passion our students, faculty, staff, alumni and friends have for the college. This year, I am learning how our college does what we do, what is important to us, what are our aspirations and dreams are, and what it means to be a Bronco.

The major priority for the college this year is putting us on a path for future success. The college is a very productive unit composed of strong academic departments—we are the largest college in Cal Poly Pomona; nearly 5,800 are enrolled in the college this year, and approximately 1,100 graduate from the college every year. The whole is greater than the sum of these parts, so the focus of this effort is on that greater sum: college-wide goals and actions that transcend the boundaries of its departments and other colleges.

You may ask why the college needs to change. We have to be adaptable to a changing world and engineering environment, and to changes in the way students think, and in technology. For example, engineering education still stresses skills that are no longer critical in the new world and seems to ignore those that are gaining prominence. The world is transitioning from the state of a Knowledge Society—know what you know, know what you can do with what you know—to a Global Learning Society—know what you need, know how you can acquire it, know how you can use and apply what you have acquired. Doing things the same way is not an option—we must be creative, bold and strategic for the college to be a national leader and role model in engineering and engineering technology education. The college can and, more importantly, must serve in this leading role. Taking on such a challenge is who we are.

The journey before the College of Engineering in the next few years is electric with possibilities, and that journey requires the support of many to make it happen. As you read this issue of the College of Engineering Magazine, you will read of many opportunities where you can provide your support. Now more than ever, it is time for you to get involved and make a difference. Join us in helping the college be the national leader and role model in engineering and engineering technology education!

Let’s go Broncos.

With warm regards,

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

“There are many ways of going forward, but only one way of standing still.”
– Franklin D. Roosevelt
COLLEGE OF ENGINEERING: PROGRESS & OPPORTUNITY

Money is not everything, but it is important enough. It is one of the means to transform your life, and the lives of people around you. The College of Engineering aims to provide a transformative education, and here are some of the facts of how we fulfill that aim.

TOP 10 ENGINE OF UPWARD MOBILITY
Cal Poly Pomona has one of the highest income mobility rates in the nation, according to The Equality of Opportunity Project. Cal Poly Pomona ranks ninth in the nation for helping students rise from the bottom fifth to the top fifth in income earnings.

STARTING SALARY:
College of Engineering graduates are some of Cal Poly Pomona’s top-earners.
*An average engineering starting salary according to the NACE Winter 2017 Salary Survey

$66,000*

TOP COLLEGE OF ENGINEERING EMPLOYERS:

JPL  Northrop Grumman  Boeing  Chevron

“Cal Poly Pomona’s hands-on approach to learning gives aspiring engineers great foundational skills and, just as importantly, the inquiring perspective that Boeing values.”
- Rudy Duran, director, Boeing SoCal Design Center

California is an engineering and technological hub, and the College of Engineering has a powerful reputation in industry:

44% FIRST-GENERATION ENGINEERS
Many of our recent graduates are the first in their families to graduate from college, empowering themselves and their families.
California is categorized as a high-risk state for most likely experiencing a damaging earthquake in the next 50 years, according to the U.S. Geological Survey. Natural disaster is inevitable, but California’s engineers have been keen on mitigating the scale of tragedy by building with seismic risk in mind, and there are several ways to go about it.

Dr. Giuseppe Lomiento, civil engineering assistant professor, is a big believer in a particular method: seismic base isolation. This method disconnects a structure from the ground, and is instead built on top of base isolators. These devices are able to respond to tremendous seismic activity by accommodating the severe lateral movements an earthquake creates, minimizing the seismic strain put on buildings. What is crucial in the isolator device is its ability to stretch and conform to the demands from earthquakes, and that is where Lomiento is onto something promising.

**ISOLATING AN ANSWER**

Lomiento has been doing experimental testing over many years. He began with researching traditional isolator types and recognizing their inherent limitations.

“When they undergo deformation during an earthquake, there are thermal effects involved, and the whole thing warms up,” says Lomiento. “If you can’t control the thermodynamics of the object, then you can’t control the properties of the isolator. So that’s a shortcoming; that means you need to overdesign the isolator so you need to spend more and more for those negative effects that you can’t control.”

So, any isolator needs to be able to carry the vertical force and the weight of the building but at the same time stretch laterally, and be able to do all of the above under immense heat generation. This is a crazy behavior and not easily engineered. Yet Lomiento and a few of his colleagues designed what is
called an architected material that does all of that and is cheaper. And, unlike traditional isolators, the material would be laid out like a yoga mat, acting as a layer between the ground and the structure. It can be used for seismic isolation of not only critical structures, like bridges, but also potentially for residential areas.

“I’m creating material which has the vertical bearing capacity of concrete and the lateral flexibility of rubber,” says Lomiento.

SOUNDS LIKE ALCHEMY

“Well, actually, that’s a good word—alchemy. The architected material is part of the largest group of material which is called metamaterials. Meta in Greek means beyond, going beyond nature,” he says.

And beyond nature is where Lomiento found the answer that saves the most amount of lives, mitigates the amount of chaos an earthquake brings with it and is cost effective. The material is inspired by metamaterials used in aerospace applications that are light yet have the necessary toughness. Lomiento has done years of testing, and he now has a proven design that has been patented.

WHO’S INTERESTED?

The National Science Foundation (NSF), for one. NSF’s Small Business Innovation Research/Small Business Technology Transfer program awarded Lomiento a Phase I (of two) grant earlier this year and is working with him to help commercialize his work.

Student researchers are attracted to Lomiento’s work as well, seeing promise in the technology. Arsen Adzhemyan (CE ’16, MSCE ’17) has worked with Lomiento to develop and analyze experimental models for an isolation system.

“Seismic isolation is a technology that interested me, has proven itself effective, and has great future potential. I consider myself lucky to be able to learn about base isolation and conduct research with one of the best experts in this field,” Adzhemyan says.

Lomiento hopes the students he has worked with find the value in this research.

“It’s good that they have this kind of exposure because this is the generation in the future that may be using this, and the idea is that the promotion of this is not a luxury. It’s not ‘Oh, well, we can do that.’ No, it’s, ‘We should do that.’

Want to support worthy research endeavors like Lomiento’s? Contact Carrie Geurts, senior director of development, at 909.869.4468 or clgeurts@cpp.edu.
INSTRUMENTAL UPGRADES

The college invests $4 million to upgrade its classroom technology and laboratory equipment.

Mastery of an array of lab equipment and technology helps students become the powerful, workforce-ready thinkers they can be—it is an essential component of the College of Engineering curriculum. However, some of the instruments are old and aging. Thanks to donations from alumni and industry, as well as other funding sources, the college has invested $4 million to revitalize some laboratory and classroom spaces, punching past contemporary and aiming towards cutting edge.

These upgrades are made possible by several networks of support. Donations from alumni and the Dean’s Leadership Board total approximately $160,000. Funding from the U.S. Air Force for $1.5 million is dedicated to unmanned aerial systems, structure and propulsion instruction, and research opportunities. Also, the National College Research Foundation is providing $1.67 million to expand the aerospace rocketry program.

“As technology evolves, we need to keep pace. As competition intensifies, we need to up our game. Our students are counting on us to keep them competitive in the marketplace, whether for industry positions or graduate studies.” — Dr. Vilupanur Ravi, chair, chemical & materials engineering department.

Ravi, who is internationally recognized for his pioneering research in corrosion, is purchasing equipment to conduct electrochemical and surface characterization, enabling him and his team of students and faculty researchers to study corrosion much more in depth than ever before.

Likewise, the industrial & manufacturing engineering (IME) department is acquiring new equipment, including a Siemens programmable logic controller system, a 3D printer, and a coordinate measurement machine with a Faro arm. Additionally, the production laboratory has been renovated with Haas computer numerical control equipment, including milling machines and lathes.

“These laboratory additions give students the chance to operate state-of-the-art equipment used throughout various industries, and will support research efforts including those in additive manufacturing,” says Dr. Nicole Wagner, assistant professor in the IME department.

In addition to conducting more in-depth research and teaching marketable skills, Allan Ng, civil engineering faculty, sees new technology as a method for nurturing student interest and imparting a passion for lifelong learning.

“We want our students to be successful and to continue their education after they graduate,” says Ng. “Exposing them to flashy, high-tech equipment is a key ingredient for cultivating this mindset.”

Primarily for use in a digital mapping course, the civil engineering department is purchasing a Trimble TX8 3D laser scanner, which replaces a 10-year-old Trimble device. The scanner, coupled with its related building information modeling software, is used to create a digital 3D model of an existing site or structure for civil surveying, engineering and construction purposes.
Some new lab equipment for the college includes: 1) Microscopes for the water analysis laboratory; 2) Haas milling machines; 3) Total organic carbon analyzer to measure carbon content of organic substances in water; 4) Siemens programmable logic controller systems.

According to Ng, the new unit’s improved data quality and scanning time is 200 times faster than the old scanner, significantly enhancing student learning and providing more time for post processing and digital 3D modeling training.

“It was important to invest in modern equipment because technology is changing so rapidly and our student experiences must remain relevant with the pace at which industry is moving,” says Brian Jaramillo (ET ’87), president of Tilden-Coil Constructors. Jaramillo and his wife, Vesta (COM ’90), committed their personal support, and rallied his company to help the civil engineering department purchase the Trimble 3D laser scanner.

Jaramillo was not the only alumni to help with the effort. Larry Gates (CE ’87), president of DRC Engineering, gave to the endeavor as well. “Updated laboratory facilities are vital to educate students in practices that are relevant to the industry and thus make the graduates more valuable to employers,” says Gates.

Alumni support also came from Lynne Lachenmyer (CHE ’80), vice president of safety, security, health and environment of ExxonMobil and Marty Colombatto (ET ‘82), independent consultant, and his wife, Stefanie.

“We thank our current supporters and renew our call to alumni and donors to join with us and invest in our legacy of excellence,” says Ravi. “As technology evolves, we need to keep pace. As competition intensifies, we need to up our game. Our students are counting on us to keep them competitive in the marketplace, whether for industry positions or graduate studies.”

LAB FUND IN MEMORY OF DR. EDWARD C. HOHMANN

In February 2017, Dr. Edward C. Hohmann, a former dean of the College of Engineering with a tenure at Cal Poly Pomona of nearly four decades, died of complications from Alzheimer’s disease.

“Ed made so many contributions to the college that his memory should be preserved in a lasting way,” says Darcel Hulse (ME ’70), alumnus, friend and one of the original members of the Industry Action Council that Hohmann created for the college. In honor of his legacy, the College of Engineering raised funds towards naming a chemical & materials engineering laboratory in his name, and held a dedication ceremony in October 2017 in memory of Hohmann. Funds will be used to purchase equipment for lab revitalization and modernization to maintain the Learn by Doing teaching model and to support student success.

If you would like to give in honor of Hohmann’s legacy, contact John Huynh, director of development, at jhuynh1@cpp.edu or 909.869.3236.
Women constitute just under 20 percent of the engineering workforce. The percentage of women CEOs is a fraction of that, which tells you that meeting someone who lands at the intersection of female engineer and female CEO would be rare and exceptional.

Well, then meet Patti Wagner (CHE ‘84), CEO at Southern California Gas Company, who leads the nation’s largest natural gas distribution utility. Since first joining Sempra Energy (the utility’s parent company) in 1995, she has held several leadership positions, including president and CEO of Sempra U.S. Gas & Power. Under her leadership, their renewable electric generation business nearly tripled in size.

During her time at Cal Poly Pomona, Wagner found the curriculum tough. She juggled her class load with food service jobs and spent many late nights with her classmates studying in the library or working up to the last minute to meet group project due dates.

Wagner’s first engineering job was in the water treatment facility of a pharmaceutical
manufacturing plant. While there, the Learn by Doing ethos armed her with the mindset to ask the right questions about the technical aspects of her projects, and to actively seek new information.

“I loved learning a new area, and found that I became very collaborative when I wasn’t the resident expert on a subject,” says Wagner. “Being inquisitive, and respecting the skills, talent and knowledge of others enabled me to continue learning in each of my career roles.”

With each new role came new responsibilities, and her career trajectory proves definitively that she is a stand out in her field. In recognition of this, Wagner was inducted into the 2017 College of Engineering Hall of Fame for her career achievements, and to inspire future generations of engineers.

For these future generations, Wagner sees plenty of market segments where Cal Poly Pomona engineering students can apply their developing abilities. She sees tremendous opportunities evolving in the energy industry—particularly in addressing how the energy arena integrates with waste, water and transportation infrastructure.

She also believes that traditional fields like civil, industrial, chemical and mechanical engineering will continue to experience ongoing growth, giving today’s engineers a multitude of areas in which they can apply themselves and shape the world.

Even today, with decades of work experience now under her belt, Wagner’s educational foundation continues to help her devise solutions for projects every day.

“The knowledge I gained at Cal Poly Pomona has given me the groundwork to approach issues from a very practical and results-focused perspective—and that fuels my internal drive to make tangible progress and get things done,” says Wagner. “I have learned to be a good listener, and I seek input from a variety of sources and individuals with diverse backgrounds. I believe this approach has improved my decision-making and makes me a better leader.”
SHINING LIGHTS:
Meet three College of Engineering student teams who illuminate.
College of Engineering students are encouraged to take advantage of every resource, including national and international student competitions. These experiences propel student learning and provide essential presentation skills, bringing worldwide academic acclaim to the college while bettering the industries they serve. The college facilitates this effort by providing the guidance and support of its faculty and staff, as well as its physical spaces and equipment.

Meet three student teams who have leveraged this opportunity and have achieved success at demanding student competitions.

**Team: Asbed Khachatourian, Christian Garcia, Miro Zaroukian, Sevan Hovsepian and Tade Mirzakhanyan**

**Organization:** American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

**Award:** First Place – Student Design Competition, System Selection Category

Five students from the mechanical engineering department received first place in the International 2016 ASHRAE Student Design Competition, marking the first time Cal Poly Pomona has attained this honor. The student team was tasked with evaluating and selecting a heating, ventilation and air conditioning (HVAC) system for a new office building in Beijing, China.

“In about five months, we had to choose a design that considered fluctuating climatic and environmental conditions while meeting owner requirements and following ASHRAE guidelines,” says Christian Garcia (ME ’16), student team member.

After calculating how much cooling, heating and ventilation was needed, the team narrowed their selection to three potential systems, then ran a cost analysis on each before choosing the best one for the application. The team used the latest technology in the computer labs at Cal Poly Pomona to perform energy modeling of the building and generate an animated 3D model video presentation for the competition.

Garcia says their entry stood out among the other student teams because it represented emerging technology. Their solution also met owner requirements for safety, cost, user comfort, flexibility and sustainability.

“This is the first time these students had the opportunity to work on a real-world HVAC engineering design problem,” says Dr. Henry Xue, mechanical engineering associate chair and professor, and the team’s faculty advisor. “Students conduct extensive studies and consult with myself and many professionals, gaining knowledge and problem-solving skills to help them find the best solution to the problem.”

Xue, who has been advising students in the industry competition since 2007, says each year the competition problem varies, providing him and his students with expertise in the latest industry advancements. “In addition to benefiting student learning, the competition attracts many excellent students to the HVAC industry,” says Xue, “giving companies involved in ASHRAE a chance to recruit them.”

Likewise, Sevan Hovsepian (ME ’16), who was part of the award-winning team, says that he and his fellow teammates also joined the ASHRAE student chapter and participated in the competition to create connections in the HVAC industry that would help them find jobs after graduation. Their strategy paid off—both Hovsepian and Garcia are now working in a related field.

“This was by far the most challenging and worthwhile experience I had at Cal Poly Pomona,” says team member Tade Mirzakhanyan (ME ’16). “I personally gained a lot of confidence in my problem-solving skills and learned how to approach the unknown without feeling overwhelmed. I highly recommend all university students take advantage of an opportunity like this. It will help them flourish and thrive in their careers.”
Twin brothers Mohammed (left) and Bader (right) Alhathal, first place winners in the IISE Global Undergraduate Student Technical Paper Competition.

**Team: Bader and Mohammed Alhathal**  
Organization: Institute of Industrial and Systems Engineers (IISE)  
Award: First Place – Undergraduate Student Technical Paper Competition, Regional and Global Levels

Twin brothers Bader and Mohammed Alhathal took first place in the 2017 IISE regional and global undergraduate student technical paper competitions. The brothers attribute their IISE competition triumphs to the support of their faculty advisors and other professors in the industrial & manufacturing engineering department, including their senior project advisor Dr. Saeideh Fallah-Fini who had faith in them and was a continuous source of inspiration throughout their undergraduate experience.

“Without Dr. Fallah-Fini, we wouldn’t have had this chance to present our paper,” says Bader. “She is great at pushing us to the limit. She would say, ‘You guys can do more. This isn’t your limit.’ That was one of the main reasons she wanted us to compete.”

The brothers earned bachelor’s degrees in industrial engineering in spring 2017, with Bader earning the distinction of valedictorian for the industrial engineering program, narrowly surpassing his brother by only one-tenth of a grade point. They are now pursuing a master’s degree in finance at USC.

Mohammed, who presented the winning paper at the competitions, says this was an enriching growth experience that taught him how to engage an audience and perform under pressure. He gives credit to his faculty advisor Dr. Kamran Abedini, industrial & manufacturing engineering department chair, for coaching him and providing essential tips.

Under Abedini’s guidance over the past 17 years, students from Cal Poly Pomona have placed first 15 times in the western region competition. Even more impressively, the college is a three-time first place champion in the global competition, and placed among the top three teams seven times—a notable honor with 12 global regions competing.

Abedini has also received recognition at both competitions, earning Regional Advisor of the Year many times and Global Advisor of the Year twice.

“We have become known at the IISE conventions as the university to beat,” says Abedini. “Our participation has made a name for Cal Poly Pomona within industry in Southern California and internationally. We are clearly recognized for quality education among the universities and top students participating.”

**Team: Bowen Du, Crystal Mena, Daniel Andrade, Joshua Pham, Justine Nguyen, Kyle Miller, Mohammad Massoud Modabernia, Pui Yuen Ng and Thuan Nguyen**  
Organization: Metropolitan Water District  
Award: Second Place – Spring Green Expo Eco Innovators’ Showcase

Recognized as the world’s greatest challenge in recorded history, 10 percent of people across the globe and 80 percent living in rural areas go without safe drinking water.
On Desalination: Expert Thoughts

Jacob Lipa (CE ’76),
CEO, Micropolitan LLC:

I look at ocean desalination as an additional tool that we need to have in our fresh water production tool box. Since it is energy intensive, environmentally problematic and very expensive, it shouldn’t be the first tool we grab. We should start with conservation and continue with intensive recycling, and only if after these two efforts we still don’t produce enough water for a robust living experience, then we should continue with desalination.

As the population and economy grow, we have exhausted close to all traditional water sources (i.e. fresh water rivers, lakes, man-made dams and fresh groundwater). Desalination has a comparatively large energy requirement and as a result, large carbon footprint. However, with the advancement of desalination membrane technologies and use of renewable energy sources, engineers have successfully reduced the energy requirement considerably over the past decade. With the advancement of research and development, desalination technologies soon will be a more effective component of the water portfolio.

Dr. Ali Sharbat, civil engineering assistant professor:

To combat this global threat, nine graduate and undergraduate mechanical and civil engineering students collaborated with faculty to devise DROWT, a multi-level filtration system that recycles gray water—waste water not contaminated with feces—for reuse. The unit can also desalinate and treat surface water and groundwater for potable, or drinkable, use in areas where access to water is limited.

The DROWT project is managed and advised by Dr. Reza Baghaei Lakeh, mechanical engineering assistant professor, and is supported by Metropolitan Water District’s Innovative Conservation Program through a $100,000 research grant. The faculty co-investigators of the project are Dr. Ali Sharbat, civil engineering assistant professor and Dr. Kevin Anderson, mechanical engineering professor.

As part of the grant, student researchers are required to participate in competitions. The first of which was the Metropolitan Water District’s 10th annual Spring Green Expo in which the student research team took second place for Version 1.0 of the developing technology. “Our award-winning system enables the user to recover 80 percent of the gray water used and reuse it for other non-potable purposes, like irrigation and flushing toilets,” says Daniel Andrade, a member of the winning team and mechanical engineering undergraduate student. “To make the system independent of a power grid, we incorporated solar panels,” he explained.

The DROWT project is an ongoing effort in the College of Engineering and is expected to have more student members from different disciplines. “We are further refining and improving the DROWT system and will engage more students in the team. Undergraduate research projects like DROWT are great opportunities to promote student success and enable us to close the achievement gap by including students from underrepresented minorities” says Lakeh.

The project is performed in the Mechanical Engineering Energy Lab with direct supervision of faculty. “I am very fortunate and thankful to have Dr. Lakeh as my advisor. He believes in Cal Poly Pomona’s Learn by Doing approach. Dr. Lakeh was critical and gave constructive criticism that ultimately led the team to a second-place victory. This project and its success really would not be possible without the mentoring of Dr. Lakeh.” says Andrade.
Alumni Achievements Celebrated to Inspire Future Generations

Nine additional alumni were inducted into the 2017 College of Engineering Hall of Fame, bringing the total to 40. Assiduously selected out of more than 27,000 alumni, inductees were chosen for bringing distinction to the programs of the college through their careers.

The Hall of Fame seeks to inspire current and future students and strengthen connections with the best and brightest alumni. Stories of their personal and professional success are displayed alongside their large framed photos, gracing the engineering halls for thousands of students to see.

Brothers Develop First Place Device at HackHarvard

Brothers Gerry Fernando Patia (CpE ’17) and Reyhan Fernando Patia (CS ’17) took first place in HackHarvard, a 36-hour hackathon hosted by Harvard University. Dubbed PolyGlot—which is defined as “knowing or using several languages”—the team built a one-way speech translator that translates foreign speech to English. Judges, which included representatives from Microsoft, Bloomberg and MIT, awarded the team with first prize for its impact, complexity, scope and innovation. The brothers have further ambitions to develop PolyGlot into a two-way communication device and add more languages to the device’s database.
Dr. Cordelia Ontiveros, former interim dean of the College of Engineering, is now interim associate vice president for Faculty Affairs at Cal Poly Pomona.

In Brief

Former Interim Dean Now Interim Associate Vice President for Faculty Affairs

Dr. Cordelia Ontiveros, former interim dean, assumed the role of interim associate vice president for Faculty Affairs at Cal Poly Pomona. Ontiveros provides leadership and oversight for faculty recruitment, retention, and professional development programs, serving all faculty on campus.

With over 30 years of experience in the CSU, Ontiveros led the development of several programs to inspire the next generation and promote student success. She led the establishment of a First Year Experience program for new engineering students and co-founded the White House-recognized Femineer® Program. The college’s Women in Engineering Program, founded by Ontiveros, helped to increase the percentage of female undergraduates by 50 percent.

Ontiveros continues to lead the college’s partnership with the national K-12 STEM organization Project Lead The Way (PLTW). The college provides training for hundreds of K-12 teachers every year. More than 1,700 teachers have received PLTW training at Cal Poly Pomona.

“It has been an honor and a delight to serve alongside so many dedicated faculty and staff, to help students achieve their dreams,” says Ontiveros.

Civil Engineering Student Team Wins First in Annual Showcase

Student teams across all college departments competed in the annual Project Showcase, presenting the results of efforts to solve real-world challenges. The civil engineering team earned first place in the 2017 Showcase for providing sustainable solutions for severely disadvantaged communities. Titled “Wastewater Sanitation and Reclamation: Solutions for Sustainable Living,” the team identified a severely disadvantaged community in Coachella Valley and consulted with the Coachella Valley Water District to present a low-maintenance, sustainable water and methane recovery system for small, low-income desert communities. The 2018 Engineering Project Symposium & Showcase will be held on June 1, 2018.

College Honors Latest Distinguished Alumnus

Clark Rucker (ET ‘83), senior manager of quality for Phantom Works, a division of The Boeing Company, was selected by Cal Poly Pomona as a 2017 Distinguished Alumnus for his professional achievements, service to the community and to the university. Rucker was instrumental to the success of notable aerospace engineering projects, such as the B2 Bomber, the Delta Launch Vehicle Program and the International Space Station, and he has worked for aerospace engineering giants such as General Dynamics and Northrop Grumman.

Rucker is also the vice president of Cal Poly Pomona’s African-American Alumni Association and the Boeing deputy executive to the Cal Poly Pomona University Alumni Relations group, resulting in sustained support for academic scholarships and various university programs. Rucker also volunteers his time as a student mentor and as a speaker.

“I want to be remembered as someone who did all within his power to bring the academic society and aerospace industry together in order to help students advance in their careers,” says Rucker.
The Department of Aerospace Engineering is shooting for the stars by attempting to be the first university to launch a rocket into space by 2018 thanks to a $1.67 million gift from the National College Resources Foundation (NCRF).

“This gift is a godsend because it matches my own special desire of providing an expanded aerospace rocketry program at Cal Poly Pomona, as well as a laboratory in which future rocket engineers can be trained to take a productive and fruitful place in the growing field of aerospace rocketry,” says Frank Chandler, aerospace engineering assistant professor and an expert in launch vehicle and spacecraft design, and aerospace propulsion.

Five other universities have also received grants to reach this goal, creating a “space race” among competitors. An international competition slated for next year will be the first step of the race, as the rocketry team—comprised of students and faculty advisors—will compete against other universities to achieve an altitude of 45,000 feet using a liquid-fueled rocket. As an added incentive, the team that performs best can potentially win up to $100,000. After the competition, the team will improve upon their design to have their rocket breach outer space by surpassing an altitude of 328,000 feet, and Cal Poly Pomona hopes to be the first university to do it.

“Thanks to NCRF and our Cal Poly Pomona aerospace engineering team, we are markedly closer to seeing our vision of reaching the stars become a reality.” — Frank Chandler, aerospace engineering professor

ABOUT NCRF
NCRF is a non-profit that aims to curtail the high school dropout rate and increase degree and/or certificate enrollment among underrepresented youth. The organization’s outreach program puts students directly in touch with colleges and certificate programs, provides scholarships and offers tutorial programs for college readiness. Dr. Theresa Price, NCRF founder, says, “Our model is connecting students to college careers and beyond.”
Price says her organization focuses on helping students become skilled in fields that have a shortage of workers, such as the aerospace industry. “It is imperative to create a skilled workforce for these important industries to thrive,” she continues, adding that about 20 percent of the students that NCRF helps go on to attend Cal Poly Pomona.

**FUTURE PLANS FOR BLAST-OFF**

According to Chandler, the grant money will be used in funding a number of activities related to the Liquid Rocketry Laboratory, such as student projects, leasing of laboratory and office space, staffing costs, a fully equipped airstream trailer for use as a mobile laboratory at competitions and for off-campus testing, and the procurement of laboratory equipment and supplies.

“The laboratory equipment will include special manufacturing machines needed to produce rocket engines, rocket feed system components and rocket structural bodies that the university does not currently possess but are needed to teach state-of-the-art engineering techniques to better prepare students to enter the rocketry industry,” says Chandler.

Edwin Betady, a third-year aerospace engineering student, says the NCRF gift is “immeasurable in how far it will go” for students studying rocketry at Cal Poly Pomona.

“It is rocketry that establishes a lot of our defense systems that keep our society safe,” says Betady, who is also a SMART program scholar at the Los Angeles Air Force Base, Space and Missile Center. “Another interesting area addresses finding alternative habitats in case earth can no longer support life. Advancing propulsion systems will allow for deeper space exploration, so we can learn more about inhabitable environments beyond earth.”

Further expanding upon the benefits of funding rocketry studies, Chandler says, “The rocketry competition and research will help society by providing highly-trained students who will quickly enhance the workforce and enable potential new advances in the rocketry field.”

Tilden-Coil Constructors Raises Funds for New Lab Equipment

Tilden-Coil hosted a company fundraising event at Cal Poly Pomona’s Innovation Brew Works, inviting College of Engineering alumni hired by the company. Brian Jaramillo (ET ‘87), president of Tilden-Coil, conceived the event to reconnect alumni to the college and to encourage their support for lab revitalization efforts. Every dollar donated by alumni was matched by the company. A large contribution also came personally from Jaramillo and his wife, Vesta (COM ‘90), allowing the college to replace decades-old survey and lab equipment.

“Tilden-Coil is blessed to employ 30 College of Engineering alumni, and with that came a responsibility to support and give back,” says Jaramillo.

Want to follow Jaramillo’s example? Contact Carrie Geurts, senior director of development, at 909.869.4468 or clgeurts@cpp.edu.
NEW FACULTY FOR A GROWING STUDENT POPULATION

The College of Engineering’s student population has grown incrementally throughout the years, with an enrollment total of approximately 5,800 in the last academic year. This growth has driven the college to expand its faculty base to support a student population that will continue to rise. Already on track to meet the need, the College of Engineering has hired over 20 new tenure track faculty since fall 2015, providing new faculty across all departments. This new wave of faculty will help the college achieve many things, such as:

- Accommodate sizeable programs – Some of the college’s undergraduate programs are the largest in the nation. The civil engineering department, for example, has 1,400 students.

- Hiring additional faculty helps alleviate academic bottlenecks—high-demand courses required by a large number of students—removing impediments that impact students’ academic progress. Faculty can also focus on course redesign efforts.

- Provide more support resources – More faculty means more availability to advise students, and maintain the level of excellence expected from the undergraduate programs.

- Drive growth – Additional faculty can also increase expertise in specific disciplines, which provides opportunities for student participation in research.
Dr. Farhana Abedin
Electromechanical Engineering Technology
Ph.D., University of Kansas

Abedin brings expertise in polymer science, bio and nano materials, material characterization, structural mechanics and computer-aided molecular design. Her ongoing research interests include using Computational Molecular Design (CMD) to speed the development of novel polymeric biomaterials while reducing cost, and the development of antimicrobial water-compatible tissue adhesive and scaffolds for tissue engineering.

“I want to help students develop a core set of engineering skills based on sound scientific principles so they can approach various engineering problems independently,” says Abedin. “I hope to spur excitement within students so that the complexity of the engineering field is overcome by their pursuit for learning.”

Dr. Ana Laura Guerrero
Industrial & Manufacturing Engineering
Ph.D., University of California, Riverside

Guerrero brings a fresh perspective to bioengineering, mechanical and industrial engineering. She has unique expertise in breast cancer research, and computational modeling in biological systems. She is continuing her doctoral research in the transport of toxins in breast tissue and breast milk, and she is interested in researching the quality and reliability in the pharmaceutical, drug and food industry—specifically, how the complexity of the supply chain affects product quality and safety.

“I want students to know we are living in an economy that’s constantly evolving, and we should be able to adapt and learn new skills to be ready to tackle any challenge,” says Guerrero. “Students who are well-rounded will have a better opportunity to move forward in their career goals.”

Dr. Omar E. Mora
Civil Engineering
Ph.D., The Ohio State University

Mora’s education made him well-rounded in geospatial technologies, change detection analysis, feature extraction and surveying and mapping. He has experience with airborne, spaceborne, terrestrial, mobile and unmanned aerial vehicle technologies. His current research emphasis is on surface model generation, surface extraction, change detection, close-range photogrammetry, laser scanning technologies and the development of algorithms for practical use in 3D mapping, modeling, classification, detection and object based image analysis (OBIA).

“One of the major challenges in geospatial engineering education is the need to unify the diverse disciplines within the various fields that may or may not be directly related to traditional geospatial engineering,” says Mora. “Helping students establish universal skills and knowledge required for geospatial employment opportunities is critical in their development as professionals.”

Dr. Nolan Tsuchiya, P.E.
Mechanical Engineering
Ph.D., University of California, Los Angeles

Tsuchiya’s expertise is in mechatronics, system identification and dynamic systems and control. He is currently involved in a joint autonomous vehicle research project with several engineering faculty and students, and continues to publish results from his ongoing research in various engineering journals and conferences.

“My faculty role so far has been very exciting and challenging,” says Tsuchiya. “Having the academic freedom to explore different teaching methods has given me the ability to refine and adjust my courses each term. Serving as the faculty advisor for several clubs and teams enables me to get to know our student body more personally. Seeing their hard work and dedication outside the classroom is truly inspiring.”
Wang Family Excellence Award – California State University (CSU)
Dr. Mariappan “Jawa” Jawaharlal, Mechanical Engineering
Ph.D., University of Massachusetts, Amherst

As one of only four faculty chosen from over 25,000 faculty in the CSU, Jawa was selected for this prestigious award for his distinguished record in the areas of teaching, scholarship and service. Jawa has pioneered the use of scenario-based learning to teach his courses. He is the founder and director of Robotics Education through Active Learning (REAL), one of the largest K-12 robotics programs in the nation, and a co-founder of the Femineer® Program, a program recognized by the White House for seeking to increase educational outcomes and opportunities for Hispanic K-12 students. He has also been instrumental in redesigning bottleneck courses to increase students’ ability to progress toward graduation.

Outstanding Faculty Advisor Award – Cal Poly Pomona
Dr. Todd Coburn, Aerospace Engineering
Ph.D., Claremont Graduate University

Coburn was one of eight faculty in Cal Poly Pomona to earn the 2017 Outstanding Faculty Advisor award. Coburn advises students in both aerospace and mechanical engineering. He is co-advisor for the Undergraduate Missiles Ballistics and Rocketry Association (UMBRA) rocket club, and also provides advice and assistance to other campus clubs in official and unofficial capacities. Students often cite him as amiable, full of zeal, and according to one student, “He constantly seeks to better himself and asks for student feedback frequently.”

Outstanding Faculty Advisor Award – Northrop Grumman
Dr. Paul Nissenson, Mechanical Engineering
Ph.D., University of California, Irvine

Nissenson has implemented a flipped classroom approach for two high-demand courses, in which students learn new material by watching video tutorials before each class, and class time is used to actively apply the concepts in a team environment. This teaching method is achieving promising results, earning him near-perfect teaching evaluations from his students. He was also the first in Cal Poly Pomona to teach a massive open online course (MOOC), which attracted over 10,000 students to the free course. In addition, Nissenson has personally created over 100 video tutorials for bottleneck courses—high-demand and often challenging courses—to increase the resources available to help students succeed.

Excellence in Teaching Award – Northrop Grumman
Dr. Paul Nissenson, Mechanical Engineering
Ph.D., University of California, Irvine

Fellow Honor, Distinguished Service Award – NACE International
Western Area Engineer of the Year – NACE International, Western Area
Dr. Vilupanur Ravi, Chemical & Materials Engineering
Ph.D., The Ohio State University

Ravi earned a trio of awards—two from NACE International, the globally recognized authority for corrosion control solutions with a membership of 36,000 in over 130 countries, and one from NACE International, Western Area, a regional arm of the organization. Ravi earned the Fellow Honor and the Western Area Engineer of the Year Award for his pioneering studies in the field of corrosion, which includes research on increasing the longevity and biocompatibility of advanced titanium alloys for medical implants. He was also selected for the Distinguished Service Award for his resolute service by leading committees, organizing symposia, and founding and mentoring a student section.
Provost Award for Excellence in Teaching – Cal Poly Pomona
Dr. Kamran Abedini, Industrial & Manufacturing Engineering
Ph.D., University of Southern California

Abedini devised “Puzzle Principles,” a pedagogical approach that uses cognitive and active-learning methods melded with his own experiences. He describes his classroom as a “think tank” in which students learn how to strategize, plan, design and apply. The approach matches the recommendations of the National Academy of Engineers and has received other international acknowledgements. He has also authored two engineering textbooks, and earned numerous awards on local and national stages for his teaching and advising of students. Students commonly refer to Abedini as a life mentor and credit him as the primary reason for their positive learning experiences.

ExCEEd (Excellence in Civil Engineering Education) Fellow – American Society of Civil Engineers (ASCE)
1) Dr. Ghada Gad, Civil Engineering
Ph.D., Iowa State University
2) Dr. Monica Palomo, Civil Engineering
Ph.D., Kansas State University
3) Dr. Rosa Vasconez, Civil Engineering
Ph.D., University of Michigan

Selected from an international pool of over 150,000 ASCE members for their “commitment to excellence in education and a willingness to serve as a future role model for effective teaching,” according to ASCE, Gad, Palomo, and Vasconez earned the distinction of being an ExCEEd Fellow. Since 2010, Palomo was further invited by ASCE to participate in annual ExCEEd workshops as an assistant mentor, and she has gladly accepted this annual invitation to assume the role for the last seven years.

Gad was selected as a 2016 ExCEEd Fellow. Gad’s pedagogy focuses on adopting active learning techniques in her classes to increase student attainment and motivation beyond the classroom. Gad encourages group work for her students—in Gad’s contract class, students work together to practice different dispute resolution methods used in construction by defending cases and negotiating settlements.

Vasconez is a 2015 ASCE ExCEEd Fellow, a licensed professional engineer and a Leadership in Energy and Environmental Design-accredited professional. She has extensive industry experience in structural, bridge and protective engineering, and her engineering practice informs her teaching methods. Her pedagogical practices include the use of physical models in the classroom to facilitate in-class, active-learning activities that lead to improved learning.
WHAT ON EARTH?

Student team ranks top five in two annual GeoWall competitions.

With their Mechanically Stabilized Earth (MSE) retaining wall design, a Cal Poly Pomona civil engineering student team recently placed in the top five in two separate GeoWall competitions presented by the prestigious Geo-Institute of the American Society of Civil Engineers.

Dating back to prehistoric times, MSEs are made primarily of artificially reinforced soil, and are commonly used today in public places for structures like retaining walls, seawalls and dikes.

While the parameters vary from year to year, the object of the GeoWall competition is always the same: support and retain soils and increasing design loads with the least amount of reinforcement.

This year, teams were tasked with using Kraft paper as the reinforcing material, upping the ante and increasing the challenge considerably.

While they practiced diligently in the lab, the actual competition was nonetheless intense, subjecting students to strictly timed steps and unyielding safety standards. “The students were really motivated, worked well together, and were able to overcome all the challenges as a result,” says Dr. Mehrad Kamalzare, civil engineering assistant professor and the team’s faculty advisor.

Competing against graduate and undergraduate students, they initially took fifth place in the national competition held in Orlando, Florida. Then, after getting a chance to fine-tune their design, they went on to win third place at a regional competition held in Irvine, California, besting schools that had beaten them in nationals.

“This was a great experience,” says Charles Sargent, civil engineering student and GeoWall team captain. “The lectures and labs at Cal Poly Pomona really helped prepare us for the competition, and participating in activities like this outside the classroom is invaluable experience.”

Civil engineering student team members from the GeoWall team (left to right): Jose Zuniga, Andrew Tran and Eric Christenson with the structure used in competition.
The American Institute of Aeronautics and Astronautics (AIAA) is the world’s largest technical society dedicated to the global aerospace profession, and the society’s intense competitions draw contestants from around the world. Cal Poly Pomona aerospace engineering students garnered multiple awards in the 2015-16 competitions, placing top three in the nation in a variety of categories.

**INNOVATION ON FIRE**
Undergraduates pitted themselves against graduate-level students in the Graduate Team Aircraft Design Competition, and came out on top. Students were tasked to design a large tanker aircraft for wildfire suppression. First prize went to the team Ember Aviation for their LAT-1 aircraft, while students under the banner of the AeroTactic Company took third prize for their FF-1 Rainbird plane.

**MOBILIZE THE TROOPS**
In the Undergraduate Individual Aircraft Design Competition, student Daniel Lucak—the 2016 aerospace engineering valedictorian—won first prize for his military flying straddle carrier design—a freight-carrying vehicle used to carry material containers and troops. Lucak created the design using computational fluid dynamics and custom-made engineering spreadsheets.

**TO MARS AND BACK**
Students earned second place in the Undergraduate Team Space Transportation Design Competition for their system capable of transporting rock and soil samples from Mars back to Earth.

Cal Poly Pomona’s AIAA award tally is emblematic of the solid preparation engineering students receive. Aerospace students are required to participate in industry competition as part of a capstone design class, including competitions hosted by JPL and NASA, pushing them to work in real-world scenarios. Teams present their designs to peer review panels of engineers and scientists from companies like Northrop Grumman, JPL, Lockheed Martin and Boeing. “Students really benefit from the close ties our college maintains with these world-class organizations,” says Dr. Don Edberg, aerospace engineering professor and the faculty advisor of the winning teams.

Grant Carichner, a retired engineer from Lockheed Martin’s Skunk Works, was recruited as a lecturer by the department as a result of its relationship with Lockheed. The capstone class is taught by Edberg and Carichner.

“These achievements are a tribute to the aerospace engineering faculty, who effectively prepare our aerospace students for their capstone design class. We stand on the shoulders of giants,” says Edberg.

Want to increase learning opportunities like these for College of Engineering students? Contact Carrie Geurts, senior director of development, at 909.869.4468 or clgeurts@cpp.edu.
Deborah R. Castleman (EE ’81) served at the Pentagon as Deputy Assistant Secretary of Defense for Command, Control and Communications in the first Clinton administration. Prior to that, she was a space and defense policy analyst at RAND Corporation and a satellite systems engineer at Hughes Aircraft Company. Among other achievements, she eventually became one of the first two women to hold the position of spacecraft manager at the company. For her career achievements, Castleman was inducted into the College of Engineering Hall of Fame in 2017.

Q: You commanded a high-level position at the Pentagon during the first Clinton administration. How did your engineering education prepare you for that role?
A: I’m convinced that one of the reasons I was considered for this highly-technical policy position was because of my engineering education. It gave me an edge both in getting the job and doing the job. When evaluating various military programs, I could dive in, ask in-depth questions and better ascertain which programs deserved enhanced, continued or lessened support. I was told later that I was known in the Pentagon as “someone who asks hard questions.”

My engineering education gave me two things: 1. Confidence in myself that I could understand and tackle any complex problem, and 2. Instant credibility in others’ eyes that I had the requisite ability and knowledge for such a position.

Q: Can you describe any projects you have worked on that required international travel in your career?
A: When interviewing for a position, it’s easy to ask if it involves international travel. Some positions do, others do not. You can certainly make your preferences known. I loved the thought of international travel! Immediately after graduation from Cal Poly Pomona, I began my position as a satellite systems engineer. I worked for Hughes Aircraft in the Satellite Ground Equipment Division, where I traveled to various earth stations in the U.S. and also spent three months in Indonesia—my first international trip ever; it was very exciting! Later, I transferred to the space side of the business, and this involved a few trips to Great Britain for customer meetings. Later, in my position at the Pentagon, I visited military sites all over the world.

Q: Why have you been such an advocate to see more women in positions of power?
As I look back over my childhood, I see how important role models were for me. For example, in fourth grade, I thought I wanted to be a nurse. Then I read a book about Elizabeth Blackwell, the first woman doctor, and immediately decided that I wanted to be a doctor! Prior to that, the only jobs I thought that a woman could have were three: secretary, teacher or nurse. Seriously, I remember thinking that those were the only choices! I am gratified that girls today can see all kinds of exciting career paths open to them. They also see that women, too, can and do hold positions of power—both in the movies and real life!

Q: You have recently participated as a speaker at Cal Poly Pomona for the Femineer Summit and TEDxCPP. Why the recent interest to come speak at the university?
Since I’ve achieved career success and financial security for myself, one of my goals now is to help motivate younger people to achieve their own success. So when I was asked to speak at my alma mater for these two events, I jumped at the chance to do just that. Also, I like public speaking! I’m interested in a variety of topics, and it’s important, I feel, to be able to put my (often inchoate!) thoughts into clear, simple language. Preparing to give a speech is one way to help me do that. Another way is to create online videos, where I simply talk to the camera. I’ve recently made such a video in the spirit of “think big, start small.”
DEPARTMENT CHAIRS

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Mechanical Engineering

Cover photo: Silhouettes based on mechanical engineering students Mohammad Massoud Massumabernia and Justine Nguyen.

COLLEGE OF ENGINEERING CAL POLY POMONA

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Dr. Joseph J. Rencis  Dean

Dr. M. Ronald Yeung  Interim Associate Dean for Academic Programs & Student Services

Christopher Park  Managing Editor

Alicia Hansell  Associate Editor

Liliana Velazquez  Art Direction & Design

Christopher Park,  Tom Zasadzinski  Photography

Inland Group  Printing & Distribution

CONTRIBUTORS

A publication by the College of Engineering

Dr. Joseph J. Rencis  Dean
Dr. M. Ronald Yeung  Interim Associate Dean for Academic Programs & Student Services
Christopher Park  Managing Editor
Alicia Hansell  Associate Editor
Greg Aragon, Writer
Julie Bos, Writer
Laura Mickelson, Writer
Michael Walton, Writer

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As part of its commitment to green printing, this magazine is printed on Forest Stewardship Council (FSC) certified paper. The FSC promotes environmentally appropriate, socially beneficial and economically viable management of the world’s forests.
In 2005, Pat established Ganpat University in his home state of Gujarat, India. Today, the private university serves more than 20,000 students. In 2015, Pat gave the College of Engineering a $1 million endowment for key programs and labs, and continues to be a benefactor for the college.

Pat’s words and actions are one and the same, and the college will always need people like him.

“LET US UPLIFT SOCIETY THROUGH EDUCATION” – GANPAT “PAT” PATEL (EE ’70)

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Gifts in all forms are important to the College of Engineering. With your support, we can help students achieve their dreams. Your gift can be directed to any area of the college that is of interest to you.

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