

2020-21

CAL POLY POMONA

COLLEGE OF ENGINEERING MAGAZINE

A Year Like No Other

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DEAN'S MESSAGE



2020 will be remembered as “a year like no other.” Despite unanticipated challenges impacting all of us, the faculty, staff and students in the College of Engineering continue to strive for excellence and adapt to new circumstances:

- Our faculty are invested in providing a quality remote learning experience for their students—adapting in the spring, preparing over the summer, and delivering this fall.
- Our staff are committed to serving students by offering the support they need to make degree progress.
- Our students are demonstrating perseverance and resilience by working hard as they gain valuable skills that will prepare them to enter and advance in the engineering workforce.

This year’s cover story is a testament to how we press onward in our new COVID-19 reality. Despite many unprecedented challenges, the college continues to offer one of the best programs in the country. The latest rankings from U.S. News and World Report places the college No. 5 nationally among master’s degree-granting public undergraduate engineering programs. Further, we have increased our number of programs ranked in the top 10 from two to six!

In addition to the pandemic, we also face social turmoil. Here at Cal Poly Pomona, President Coley has reaffirmed our commitment to the work of diversity, inclusion, and equity, as well as the elimination of any systemic racism that may exist in our institution.

Other stories in this year’s magazine celebrate the accomplishments of our students, faculty, alumni, and friends. I hope you take a moment to read about them and learn about the amazing people in our college.

Please stay safe and healthy during these trying times, and we look forward to hearing from you.

Best wishes,

Alison Baski, Ph.D.

Interim Dean

College of Engineering

Welcome Back

Greetings From Six Feet Away



The rhythms for the fall semester are radically different in 2020. With limited exceptions made for on-campus activities, a few have the privilege of returning to campus. This small research group led by aerospace engineering professor Dr. Subodh Bhandari gives us a peek into day one of the new normal for the foreseeable future.

Bhandari's research projects are funded by the Cal State Agricultural Research Institute (ARI), National Science Foundation (NSF), University Space Research Association (USRA), and companies in the aerospace industry. The first project, funded by ARI, involves unmanned aerial vehicles (UAV) using remote sensing technology for the assessment of plant health and optimization of nitrogen and water for plant production. The second research project focuses on increased autonomy of UAVs.

These projects involve engineering students in aerospace, mechanical, electrical and computer, and science students in computer science and plant sciences. The students work on instrumentation, sensor integration, and data collection, processing, and analysis.

▶ **“It’s really nice to come back here and see the same lab and people again. It’s pretty nostalgic.”**

—SUNG HYEOK CHO,
AEROSPACE ENGINEERING GRADUATE STUDENT



◀ **“It feels very good to be back. I miss being face-to-face—nothing replaces it. We’re excited to be able to continue to do research again.”**

—DR. SUBODH BHANDARI, AEROSPACE
ENGINEERING PROFESSOR AND
FACULTY ADVISOR

A Year Like No Other

BY THE COLLEGE OF ENGINEERING





OVERNIGHT, CAL POLY POMONA'S POPULATION OF OVER 30,000 WAS ASKED TO GO HOME, STAY HOME AND NOT COME BACK UNTIL THEY WERE TOLD THEY COULD.

IN A WHIRLWIND of evacuation, the shape of COVID-19—its transmissibility and lethality—was unknown. The worst was assumed in order to deploy the safest response. The campus went into total shut-down amid the spring 2020 semester, and the largest social experiment in remote working, learning, and living began. And not by choice.

Months after the pandemic began, George Floyd was killed in an act of police injustice. If COVID-19 was dry brush, Floyd's death was gasoline and a box of matches. The nation and the world priced in the risk of spreading the virus and chose to protest.

Social turmoil and a pandemic now run in parallel. This is the story of how the students, faculty, staff, and alumni that make up the College of Engineering navigated, and continue to navigate, a time of great uncertainty.



Top left: Dr. Mariappan Jawaharlal, former mechanical engineering professor, teaching virtually with his six-monitor setup. Above: Alberto Smith, manufacturing engineering student, with his girlfriend, Hazel Aguila. Left: A V-TASI session for ME 2191 (Strength and Mechanics of Materials) hosted by Kevin Lee, engineering student and V-TASI facilitator.

NOT JUST SURVIVING—ADAPTING, AND THRIVING

In late January, a cautious Cal Poly Pomona assessed that COVID-19 was not a risk to the campus. By March, caution became rapid action, accelerating to a remote and virtual environment that by any standard, was breathless in its speed. By the end of the month, our new virtual and remote reality began, and justifiably, doubts on how it would go.

“I didn’t like the idea of conducting a three-hour lab online, and went with low expectations,” says Dr. Mariappan Jawaharlal (Jawa), former mechanical engineering professor. “It turned out to be better than my wildest imagination.”

When Jawa logged on to teach his lab course, all 35 of his students were there waiting for him to begin.

“I love classroom interactions and I still prefer face-to-face meetings over online, but our students are resilient and willing to go the extra mile,” says Jawa.

Our programs showed the same resilience. The college’s Maximizing Engineering Potential (MEP) program took its in-person, student-taught tutoring service virtual. MEP’s staff leapt across chasms of bureaucracy to have tutoring in time for the students who needed it most.

Overall, each tutoring session ranged anywhere between 10 to 30 unique users, and the program also offered supplemental instruction three times a week for specific bottleneck courses. Aply called Virtual Technology-Assisted Supplemental Instruction (V-TASI), the program provides free instruction for courses that students have historically struggled with. Funded by the Office of Student Success, V-TASI proved to be an invaluable service.

“Multiple students mentioned to me that they had been having issues with a specific topic, and that V-TASI helped them really understand it,” says Katherine Nava, aerospace engineering student and V-TASI facilitator. “Without it, trying to learn from YouTube or their textbook was too difficult.” As MEP looks ahead to the upcoming challenges in a largely virtual and remote fall 2020 semester, they press onward.

“As far as MEP goes, we’re going to go with it,” says Scott Chang, academic retention coordinator for MEP. “Can’t do much about the situation, but we’re doing the same things we were doing before but in a virtual environment.”

“When CPP sees a problem, it gets together to solve it.”

—PAULINE TASCI ('19, MANUFACTURING ENGINEERING)

THEY MADE FACESHIELDS— A LOT OF FACESHIELDS

Beyond the classroom, engineering students and faculty volunteered their time and resources to produce personal protective equipment (PPE) for frontline workers.

Among the regional efforts in Southern California is the SoCal Makers COVID-19 Response Team, a network of volunteers within the SoCal area meeting the demand for PPE. Pauline Tasci ('19, manufacturing engineering) and Alberto Smith, manufacturing engineering student, were two of many students and faculty volunteers from Cal Poly Pomona. After immediately joining the effort, their work in the production and distribution of PPE benefited California and beyond, including Africa.

“I’m always the type of person who tries to help when seeing a problem,” says Tasci. “I’m not a scientist who can make a vaccine, but I can help frontline workers get the materials they need.”

Smith, whose girlfriend and mother work as nurses, put his 3D printer to work to manufacture plastic face covers. After the raw product is produced, an extensive amount of work was done to ensure its usability. Smith rounded out the sharp corners and Tasci gave them an extensive quality check—she made sure nothing poked out, no filaments were astray, and sterilized them with rubbing alcohol. After three hours of quality control, she delivered them to Eric Gever, the response team’s lead, to get them ready and delivered to where they needed to go.

“I’m amazed how quickly Cal Poly Pomona students stepped up to the plate,” says Tasci. “When CPP sees a problem, it gets together to solve it.”

STAFF RELENTLESSLY HELP STUDENTS

On a typical workday, the Engineering Advising Center (EAC) saw an average of 30 emails a day from students needing guidance on moving forward in their engineering program. Then overnight, 30 became hundreds.

“I think a good word for it was overwhelming,” says Monica Kays, engineering advising coordinator.

In a virtual and remote environment, what would have been a tidy 10-minute, in-person advising session became a cycle of email replies between advisor and student. An email chain could persist throughout the day, or even the entire week. Compounding the challenge was the new work environment. Home offices may vary.

The Kays’ household is full with her husband, a school teacher who now teaches at home via Zoom; her 10-year-old daughter; and the family dog, who elects to yap whenever an Amazon delivery arrives at their doorstep.

“Bless her [Kays’ daughter] heart, but it’s not easy when she’s asking, ‘Mom, are you on a Zoom call? I need help with fractions,’” says Kays.

The EAC pushed on during these unprecedented challenges by relying on each other to stay focused on getting students through the semester.

“I feel lucky to be on the team that I’m in. We lean on each other for pretty much anything,” says Alexandra Retana, engineering

advisor. “As a unit we’re continuing to be really successful with the students.”

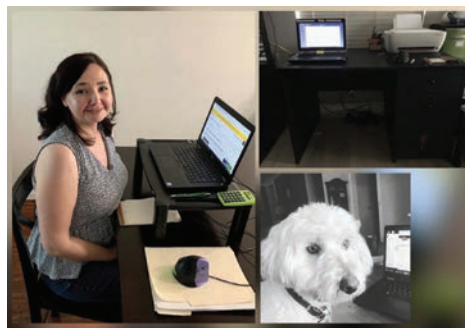
Lita Patel, administrative support coordinator for the Department of Mechanical Engineering, had similar challenges.

“It was endless contact from students,” says Patel. “Hundreds of emails with students panicking.”

The most common student request was a need for permission numbers that allowed students to enroll for required classes at capacity. With the transition to remote and virtual learning occurring around the fall 2020 class registration period and Patel being the sole tracker and distributor of permission numbers for the department, hectic was the status quo.

A 21-year veteran in getting students what they need, Patel developed a system to track the distribution of permission numbers. She worked around her one-monitor limitation by turning her iPad into a second screen.

“Thank you so much for your help Lita. You’ve always been a lifesaver,” said one of the hundreds of students in need of her help.



Left to right, clockwise: Lorena Facio, engineering advisor, working from home; administrative support coordinator Lita Patel's home setup; engineering advising coordinator Monica Kay's dog, Hopps, invading her workspace.

FALL 2020 AND BEYOND

“This was the single biggest moment in faculty development training ever.”

—DR. PAUL NISSENSON, MECHANICAL ENGINEERING ASSOCIATE PROFESSOR

Summer was a time of preparation.

“This was the single biggest moment in faculty development training ever,” says Dr. Paul Nissenson, mechanical engineering associate professor. Nearly 1,300 faculty across the university took on training courses to optimize their classes for a virtual format. In the college, engineering faculty led workshops on how to grade, test and teach virtually. Particular to the College of Engineering, a fundamental challenge was translating its in-person lab courses online.

“How do you give students a good enough experience to be confident in saying, ‘Yes, I understand how to use this machine,’” says Nissenson. The solution is videos that show how the machines in the lab work to understand it in theory. The practice comes when the students receive preexisting lab data to complete their assignment. In other words, while the process is only shown, students are still required to understand it to interpret the output.

Fall and beyond will be filled with problems to solve, and faculty are ready to get it right.

“Faculty are really eager to figure out what will work for their students,” says Nissenson. “Even faculty nearing retirement participated in summer programs to deliver as good of an education as they can. In the long-term, we will be better off with this experience.”



PERSISTENCE AND A DREAM

Aerospace Engineering Student Veteran Reaches Dream Job after 17 Years

Demetrious Jarvis ('20, aerospace engineering) was standing on a Navy aircraft carrier flight deck when a booming noise made him drop belly down to the floor.

"The noise scared me, but when I gathered myself there was this powerful fighter jet with full afterburner and the arresting gear locked on," says Jarvis. "The sound of the plane and the feeling I had, I was like, 'Wow, I think I love this.'"

That was 17 years ago when he found his purpose in life: to work with planes. With his persistence to have a better future for himself and a desire to contribute to society, Jarvis pushed himself to overcome challenges he faced throughout his life to reach his goal.



Demetrious Jarvis ('20, aerospace engineering) served more than four years in the United States Navy, where he discovered his love of aircrafts.

Jarvis is no stranger to working hard. He grew up in Norfolk, Virginia, and dropped out of school in the ninth grade to help support his family. He was the second oldest of 15 siblings.

When Jarvis turned 17, his aunt and grandma took him to a military school for an eight-month program to earn his GED diploma. Instead of eight months, he did it in two. His experience

at the program inspired him to enlist in military service.

"I was recruited heavily for the military out of that program, and it changed my life," says Jarvis.

Jarvis served in the Navy for more than four years and learned to maintain airplanes and fighter jets. He researched the aerospace industry to see how he could contribute and learned about Kelly Johnson, one of Skunk Works' co-founders, who produced innovative aircraft designs, including the first fighter jet to exceed 400 mph. Inspired by how one man and one organization changed the world, Jarvis wanted to be a part of that mission.

To find work outside the Navy, Jarvis moved from the East Coast to California to work on planes as a contractor. Despite working in the same company for four years, he was not qualified for certain promotions because he lacked a college degree. Jarvis quit his job and spent the next four years studying math and physics at Pasadena Community College and making up his high school courses.

"Transferring from junior college was scary because I didn't think I could get into a university, but then I received offer letters for all the colleges I applied to and it made me believe in myself more," says Jarvis.

Out of all the universities he visited, he felt positive energy at Cal Poly Pomona once he stepped on campus, feeling that he was meant to be a Bronco, and transferred in 2016 into aerospace engineering. As a student he connected with the Veterans Resource Center and with peers who understood his Navy background.

Jarvis started to see his work pay off when he was a part of projects that allowed him to apply what he learned in the classroom to hands-on experiences.

Some of the courses he took allowed him to work with high- and low-speed tunnels to test the durability of aircraft wings, which led him to work as a flutter and vibrations engineer. His precise designs and calculations ensured the safety of aircraft components, and he dedicated his time to understand how he could contribute to this field.

Jarvis also knew he wanted to work with rockets, and joined the Undergraduate Missiles, Ballistics and Rocketry Association (UMBRA) to participate in competitions and explore the aerospace field. In 2019, he worked as the payload lead with a

25-person team that launched a 14-foot rocket 24,000 feet in the air. They won first place in the Friends of Amateur Rocketry (FAR) 1030 competition that year and set a school record. He eventually became the UMBRA president, and credits his professors in teaching him to be persistent.

"The Navy showed me that that I'm really good at working on airplanes and that I have a passion for fighter jets, but I didn't know that I was really good with rockets until I got to Cal Poly Pomona," Jarvis says. "Cal Poly Pomona allowed me to explore something as specific as vibrations on an aircraft, which helped me in exploring jobs."

While he was a member of UMBRA, Jarvis took part in every campus event that Lockheed Martin—the aerospace, defense, security, and technologies company that houses Skunk Works—participated in. Jarvis networked with managers from the company, who advised him to specialize in his engineering field.

“ I actually needed a master’s degree for the position that I was applying for, but because Cal Poly Pomona offered wind tunnel classes and hands-on opportunities, I qualified for the job. ”

—DEMETRIOUS JARVIS ('20, AEROSPACE ENGINEERING),
FLUTTER AND VIBRATIONS ENGINEER AT SKUNK WORKS

After Lockheed Martin rejected several of Jarvis' online applications, he upped his game and flew to Arizona for a conference and stood in line for an opportunity to meet a hiring manager in person. A Lockheed Martin representative who had also attended Cal Poly Pomona events recognized him and took his application. Jarvis had an interview the next morning, and he was offered a position to work as an engineer at Skunk Works in Southern California.

"I actually needed a master's degree for the position that I was applying for, but because Cal Poly Pomona offered wind tunnel classes and hands-on opportunities, I qualified for the job," Jarvis says. "What I did with wind tunnels on campus, I'll be doing at Skunk Works but on a bigger scale with real airplanes."

Jarvis never let a challenge prevent him from reaching his goal. He is determined to be a model for his younger siblings and show that they can reach their dreams through determination and education.

"The Navy definitely taught me endurance and to be mentally tough when you're going through challenges," Jarvis says. "Just being resilient and constantly hitting the wall until you crack it and then you can go through it."

Where is he now?

Jarvis graduated from Cal Poly Pomona with a degree in aerospace engineering in May 2020. After graduation, he started work at Skunk Works as a flutter and vibrations engineer, testing for vibrations and stress on airplanes, missiles, rockets, and other advanced development projects. He says, "I went from putting the chains and chalk on the plane to providing full-scale designs for customers. But it was a journey. And now, I reached a dream."

This is a modified version of a profile originally written by Nancy Yeang.

IT ALL ADDS UP

Games, math and coding inspire valedictorian Kimberly Gottula.

When Kimberly Gottula ('20, industrial engineering) was growing up in Placentia, her mother made sure that books and math-oriented board games were always at the ready. She wanted her daughter not only to learn to read early but also to develop an affinity for numbers and defy her older sister's opinion that math wasn't for girls.

Defy it she did. In May, Gottula graduated magna cum laude in industrial engineering from Cal Poly Pomona and she was the program's valedictorian.

From a young age, Gottula enjoyed puzzling over numbers. In the GATE program for gifted and talented pupils at Golden Elementary School, she was a year ahead in math. In her junior year at El Dorado High School, she signed up for dual-enrollment calculus, earning two semesters of credit at Cal State Fullerton.

During her senior year of high school in 2016, Gottula worked with the programming language Scratch through a Massachusetts Institute of Technology (MIT) website to develop her game, Dress Up Stick Man. MIT posted Gottula's game, which allowed users to dress a rudimentary figure by dragging and dropping hair, clothes, hats and footwear. Thousands of fans have played the game

and posted their "stick man" and "stick woman" results.

"We all know that this game is my true legacy," says Gottula. When it came time to select a college, Gottula said, "I had no idea what I wanted to do, but I knew I was good at STEM, and I figured Cal Poly Pomona could be a really good school."

Not every element of STEM — science, technology, engineering and math — has been her cup of tea. Neither high school biology nor chemistry appealed. At Cal Poly Pomona, she tried out computer science and aerospace engineering but immediately changed her mind.

She eventually landed on industrial engineering, and it seems the apple did not fall far from the tree.

Before his untimely death from leukemia when she was in the sixth grade, Gottula's father, Ron, worked as a mechanical engineer at Northrop Grumman. Her mother, Melanie, later married Joe Montoya, a building system specialist.

"The reason I like industrial engineering is because I get really frustrated by things that could work better or faster," Gottula says.

Gottula is now a manufacturing planner at Lockheed Martin.

One close associate who envisions success for Gottula is her former campus supervisor, Zoe Lance ('15, English), a communications specialist with the university's Office of Student Success.



Dress Up Stick Man, a simple dress-up game developed by Kimberly Gottula in 2016. Thousands have played it and is still played today. Try it yourself: <https://scratch.mit.edu/projects/100973283/>



“I had no idea what I wanted to do, but I knew I was good at STEM, and I figured Cal Poly Pomona could be a really good school.”

—KIMBERLY GOTTULA (’20, INDUSTRIAL ENGINEERING),
MANUFACTURING PLANNER, LOCKHEED MARTIN

Gottula worked for Lance three years ago when the campus was planning for the conversion from quarters to semesters.

“She played key roles in so many student-facing projects, both during and after conversion—websites, social media, event planning and so many other things,” Lance said.

“She embodies the learn by doing ethos we are all so proud of. When something stalled or got a little thorny, she didn’t give up. Lockheed is immensely lucky to have her; she has the technical engineering skills, but she’s also a great communicator and collaborator.”

With the COVID-19 pandemic restrictions putting a damper on campus festivities, Gottula had to get creative. Her mother dyed her hair black for an on-campus photo shoot, for which Gottula wore her cap, gown, sashes and honor cords.

During a virtual celebration with the department chair and classmates, Gottula made brief valedictory comments, expressing gratitude for the people she had met, for her job, and for her mother, with whom she competed at Money Bingo and 4-Way Countdown all those years ago.

PROCESSES, DATA AND ENDING FOOD INSECURITY

**MORE THAN A THIRD OF
CAL POLY POMONA STUDENTS
DO NOT GET ENOUGH FOOD.**

**DR. GREG PLACENCIA AND HIS
STUDENTS ARE USING DATA
TO HELP THEM GET FED.**

The trope of the college student subsisting on ramen might be funny, but carries with it a sad truth. A 2018 California State University (CSU) study found that four in 10 students do not have reliable access to healthy food. At Cal Poly Pomona, 36 percent of students experience food insecurity.

Dr. Greg Placencia, assistant professor of industrial and manufacturing engineering, has worked to reduce hunger at Cal Poly Pomona. The way he sees it, industrial and systems engineers and their penchant for data-driven research, improving processes, and measurable outcomes offer a new way to look at this pressing problem.

“Some of the greatest societal problems, from wrongful incarceration to hunger, are a reflection of faulty systems,” says Placencia. “As industrial engineers, we look for ways to fix broken systems and create better ones.”

Placencia has dedicated his career to addressing social issues from an engineering framework. His research endeavors are as bold as they are varied: human trafficking, home healthcare for children, and academic intervention for students. Two years ago, the Los Angeles native shifted his focus to food insecurity on campus.



The mobile food pantry was established in 2017 and provided free food for up to 400 students per month.

Broncos Helping Broncos

Research has not caught up with the realities of today's college students, and there is little known about the long-term effects of hunger in this age group. The young adults who participated in the CSU survey, however, shared that food insecurity caused more than hunger pangs. It affected their mood, concentration, and, ultimately, their academic performance.

To ensure that Broncos receive a consistent supply of food, the Cal Poly Pomona community established a monthly mobile food pantry in 2017. A year later, it opened Poly Pantry, a 161-square foot store in the Bronco Student



Center, where students can get food and other essentials for free.

As Cal Poly Pomona's plans to address food insecurity grew and evolved, Placencia and his students stood by ready to offer their expertise.

His first student research group explored different cost-effective methods to address hunger on campus. The team investigated the mobile pantry, reduced-cost meal plans and a mobile app that could send push notifications whenever surplus food from a campus event was available.

Earlier in 2020, the second cohort took a deep dive into Poly Pantry's operations. Before COVID-19 forced the suspension of in-person classes and the temporary closure of Poly



Dr. Greg Placencia, assistant professor for the industrial and manufacturing engineering department.

Pantry, industrial engineering seniors devoted hours to on-site observations. After noticing that workers had to write down inventory and sales by hand, the engineering undergraduates recommended purchasing commerce software. By automating the process, the Poly Pantry could lower labor expenses and easily identify and resupply products that students need most.

"As industrial engineers, we make things better and more efficient," says Maya Rabat ('20, industrial engineering), who worked on the Poly Pantry project. "I hope this report reaches all Cal Poly Pomona students. I want them to know that the school cares about them and is trying to help address their needs."

“As industrial engineers, we look for ways to fix broken systems and create better ones.”

—DR. GREG PLACENCIA, INDUSTRIAL AND MANUFACTURING ENGINEERING ASSISTANT PROFESSOR

A Grand Vision

Each student project brings Placencia one step closer to offering a sophisticated, data-powered program to Cal Poly Pomona. Drawing from the advanced practices of e-commerce giants such as Amazon, Placencia envisions a future where students are automatically matched to food, medical, and housing services based on certain behaviors, such as items they acquire at the Poly Pantry.

"If you look at the data properly, you can make meaningful connections out of seemingly unconnected habits," says Placencia. "Businesses often create these types of predictive models. It is why Target knows that when women buy an oversized bag of cotton balls, they are likely to be pregnant."

Building on the work of Rabat and her classmates, a third group is now collaborating with Placencia and will focus on data analytics.

Placencia says: "Before they begin the project, I tell them, 'Wouldn't it be nice if we could reach out to students before they even knew they needed help? Or, if we could correlate investments in nutrition to student success?' That's the kind of impact you can have."

Raising THE BAR

OUR DEVOTED DONORS HELP STUDENTS AIM HIGH—AND DO MORE.

In our quest to give students the tools, opportunities and other resources they need to succeed, the College of Engineering was fortunate enough to raise nearly \$4 million this past year thanks to the generosity of donors like these.



Ganpat Patel ('70, electrical engineering) with his wife, Manju.

Ganpat “Pat” Patel (’70, Electrical Engineering)

A perennial Cal Poly Pomona donor power couple, Ganpat “Pat” Patel and his wife, Manju, recently took the step of investing \$1 million toward the creation of The Ganpat and Manju Center for International Collaboration and Engineering Innovation. This center advances the goals of international faculty research; expansion of online course development; improving virtual learning and the funding of research projects in emerging areas like quantum and autonomous systems. In short, the center aims to enhance the research and educational mission of the college by innovating in emerging areas of engineering.

“This gift will enable us to interact with international universities to pursue common research and educational objectives for the betterment of humanity. Several of our faculty and students are already actively involved with this new center,” says Dr. Benham Bahr, mechanical engineering professor and the center’s director. “We are prepared to build on the college’s strong undergraduate research reputation with this generous contribution and expand partnerships with industry around cutting-edge topics.”

This new research and innovation center reflects Pat’s entrepreneurial spirit and belief that industry and academia are stronger when they work together. The Patels’ gift is just their latest investment in the college. Most notable of which is the Distinguished Lecture Series, a program established in 2013 to broaden the educational experience of students, faculty and staff. Since its inception, the lecture series has exposed thousands of students to the expertise and discourse of government and industry leaders, entrepreneurs, and scholars on ethics—with many of them being alumni. The Patels have also funded student project labs, and student teams that build vehicles and compete in international events held by the Society of Automotive Engineers.

In giving back to the school, Ganpat hopes to encourage future generations of students to keep learning and inspire them to find a career in which they “love what they do and do what they love.”

Jack O' Neil

The late John "Jack" O'Neil, an industrial and manufacturing engineering professor emeritus at the College of Engineering for 33 years and his wife Mary, have provided for industrial and manufacturing students through their estate plans with a significant bequest gift. This will eventually fund scholarships to help deserving students afford their education at Cal Poly Pomona. However, when Jack passed away earlier this year, Mary decided to honor Jack's legacy now by donating an additional \$50,000 to establish the Jack and Mary O'Neil Endowed Scholarship Fund. This latest five-figure gift was hardly the couple's first cash donation. In fact, the O'Neils frequently supported the university's scholarship funds during his tenure by first giving directly to the college, and later contributing through the Pace Setters, a group of retired faculty and staff.

A former industrial engineer, Jack began teaching at Cal Poly Pomona in 1970, and quickly made a name for himself with his passion and unwavering charity. Famously, for nearly three decades he and Mary ('71, mathematics; '73, master's in mathematics) opened their home to engineering students for a Thanksgiving meal. He was well respected by students for always demanding their best.

"We wanted to leave a legacy," Jack once declared, "and from the beginning, Cal Poly Pomona felt like home."



The late Jack O'Neil with his wife, Mary.

“We wanted to leave a legacy and from the beginning, Cal Poly Pomona felt like home.”

—JACK O' NEIL, INDUSTRIAL AND MANUFACTURING ENGINEERING PROFESSOR EMERITUS



Melissa Smith (right), DENSO's community affairs lead, visiting the college's Baja Society of Automotive Engineers (SAE) team. DENSO's donations have directly supported the college's automotive design teams, helping fund the construction of the vehicles and participation in international competition.

DENSO Corporation

DENSO, a leading mobility supplier, has magnanimously given to the College of Engineering many times, including \$30,000 in 2018, \$40,000 in 2019 and an exceptional \$100,000 in 2020. It made the grants through its philanthropic division, the DENSO North America Foundation.

Over the years, their support has been instrumental in building our on-campus mobility design studio, as well as enabling the college's participation in two major events: the Society of Automotive Engineers (SAE) Collegiate Design Series and the EcoCAR Mobility Challenge, which inspires the development of advanced propulsion systems and automated vehicle technology.

"Our gifts are aimed at giving students the equipment they need to innovate for the benefit of today and tomorrow's mobile society," says Melissa Smith, DENSO's community affairs lead.

Because of their intense focus on CASE (connectivity, automation, sharing and electrification) initiatives, DENSO has also attracted promising engineering graduates like Noa Sanchez ('20, industrial engineering). "It's a revolutionary time to be part of this industry," he enthuses, "and witness the remarkable advancements in propulsion systems."



WANT TO MAKE A PLANNED GIFT?

CONSIDERING YOUR ESTATE GOALS?
GO TO PAGE 27 TO LEARN ABOUT PLANNED GIFTS.

POMONA'S **OUTSTANDING FACULTY**

AWARDS



Dr. Seema Shah-Fairbank

Associate Professor
Civil Engineering

Outstanding Faculty Advisor Award—American Society of Civil Engineers (ASCE)

Dr. Seema Shah-Fairbank's efforts as faculty advisor for the ASCE student chapter at Cal Poly Pomona has led to professional development workshops and signature outreach events that have given 800 middle school students exposure to the field of civil engineering. Student members credit her for the chapter receiving the ASCE Certificate of Commendation, a recognition awarded to the top 5 percent of 300+ ASCE student chapters around the world.



Dr. Paul Nissenson

Associate Professor
Mechanical Engineering

Outstanding Teaching Award—American Society for Engineering Education (ASEE), Pacific Southwest Section

Dr. Paul Nissenson has dedicated his career to leveraging new technologies to reach beyond the classroom and improve student success. Using a flipped classroom pedagogy, he led an interdisciplinary team and transformed one mechanical engineering bottleneck course by reducing failure rates by two-thirds in that course—from 34 percent down to 11 percent. He was also a lead in developing ME Online, a video tutorial library, which is an open educational resource containing over 600 videos created by engineering faculty. Approximately 140 were created by Nissenson and ME Online's videos have over 5 million views.



Dr. Wen Cheng

Professor
Civil Engineering

Excellence in Teaching Award—Provost's Award

Dr. Wen Cheng was the principle investigator on two grants from UC CONNECT (University of California Center on Economic Competitiveness in Transportation). This program aims to prepare students for industrial practice and increase their passion to pursue higher degrees. He received more than \$2.5 million external funding and published about 75 peer-reviewed papers with students since December 2009. He is the recipient of both the national and regional Outstanding Teaching Award from the civil engineering honor society Chi Epsilon.

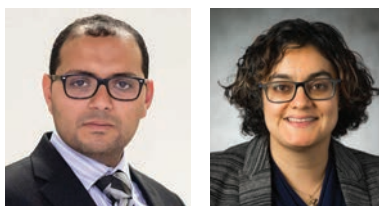
JOURNAL EDITORSHIPS AND RESEARCH

Faculty Selected as Fulbright U.S. Scholar



Dr. Norali Pernalete, electrical and computer engineering professor, received the Fulbright U.S. Scholar Program award for the 2020-21 academic year. One of over 800 U.S. citizens selected for the program, Pernalete is teaching and conducting research at Universidad Carlos III de Madrid in Spain. She is studying the use of robotic haptic devices for assessment and therapy purposes for eye-hand coordination and upper-limb disabilities.

Two Faculty Members Named Air Force Research Lab Fellows



Dr. Mohamed Aly (left), electrical and computer engineering assistant professor, and **Dr. Zahra Sotoudeh** (right), aerospace engineering associate professor, were selected as fellows for the 2020 Air Force Research Lab Summer Faculty fellowship (AFRL SFFP) program. The program offers fellows opportunities to conduct impactful research across the AFRL's many labs. Aly's research is on building a computing platform that can resist the cyberattack potential of quantum computers. Sotoudeh's research aims to develop a more accurate and computationally-efficient understanding of the behavior of modern aircraft encountering gust.

CSUPERB Grant Powers Nanofiber Research



Dr. Farhana Abedin (left), electro-mechanical engineering technology assistant professor, received the CSUPERB new investigator's grant to research the development of multifunctional nanofiber for disinfection and filtration of water. This unique nanofiber can kill bacteria upon contact and is free of common disinfecting reagents, eliminating the risk of reagent contamination in water. Collaborating on this research is chemical and materials engineering associate professor **Dr. Laila Jallo** (right) and biological sciences professor **Dr. Junjun Liu** (not pictured).

Faculty Member Begins Collaboration with Caltech



Dr. Farbod Khoshnoud, electromechanical engineering technology assistant professor, is a visiting associate at Caltech's Center for Autonomous Systems and Technologies (CAST). At this newly developed center, Khoshnoud will further his research in quantum robotics and autonomy with Cal Poly Pomona research students and develop partnerships with CAST for research funding opportunities.

Cal Poly Pomona Faculty Editors for Journals

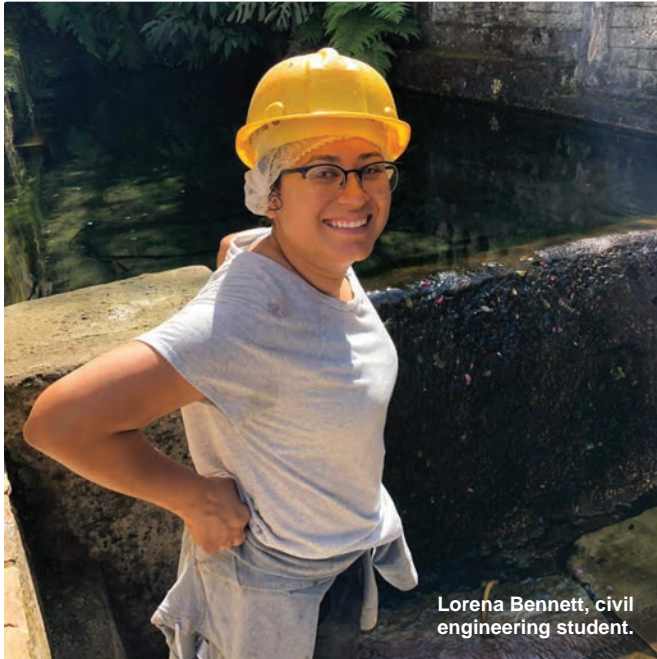


Several College of Engineering faculty comprised a team of five editors for the international Journal of Nanomaterials. They compiled a collection of 11 peer reviewed papers for a special issue on hydrothermal synthesis of nanomaterials. **Dr. Yong Gan** (left), mechanical engineering professor, was the lead guest editor. **Dr. Jenny Yu** (second from left), electrical and computer engineering associate professor, and **Dr. Mingheng Li** (second from right), chemical and materials engineering professor, served as editors. Further, Li served as guest editor with a Cal State Long Beach assistant professor on a special issue for the international journal, Mathematics. The special issue compiled 15 peer reviewed papers to bring together recent progress in mathematics applied in complex engineering problems, like modeling and simulation, optimization and machine learning.

Dr. Kevin Anderson (right), mechanical engineering professor, is associate editor for the American Society of Mechanical Engineers' (ASME) Journal of Solar Energy Engineering: Including Wind Energy and Building Energy Conservation. He will be maintaining the quality and standards of the journal until 2023.

INQUISITIVE MINDS, REWARDING RESEARCH

Wastewater treatment, renewable energy, the future of UAVs, and innovative metals—all in a day’s work for four College of Engineering student teams who competed in the annual 2020 CSU Research Competition.



EXPLORING INNOVATIVE WASTEWATER TREATMENT

Student Team: Lorena Bennett
Faculty Advisor: Dr. Monica Palomo

Presenting her research on solids analysis as an indicator of the wastewater treatment system performance, civil engineering student Lorena Bennett earned second place in the engineering and computer science session for undergraduates.

“Lorena was highly inquisitive and very motivated,” says Dr. Monica Palomo, civil engineering professor and one of the faculty advisors. “That was a crucial part of her success.”

Bennett had the opportunity to travel to Brazil, where she collaborated with researchers working with an innovative up-flow anaerobic sludge blanket (UASB) system. The system not only treats wastewater but provides valuable byproducts in the process. These benefits, combined with the fact they need little or no energy to run themselves, would make such UASBs ideal for improving the sanitary conditions of poor communities.

“Along with gaining a better understanding of the performance characteristics of UASB systems, I also had the amazing opportunity to interact with different cultures,” says Bennett.

EXTENDING UAV FLIGHT ENDURANCE

Student Team: Geoffrey Oetting, Ryan Valdezotto, Korbin Weatherman, Aramazd Melikian, Marc Repollo, Joel Lee, Dawit Assefa, Justin Wells, Bimaya Jayaratne, Jaehyun Kim, Timothy Kidd, Jaime Castro

Faculty Advisors: Dr. Jenny Yu, Steven Dobbs

Electric-powered unmanned aerial vehicles (UAVs) are seeing widespread use in a variety of applications, but they have severe limitations in flight endurance time. This team’s BANSHE (short for Battery As an iNtegrated Structure High Endurance) Flying Battery UAV project hopes to change that.

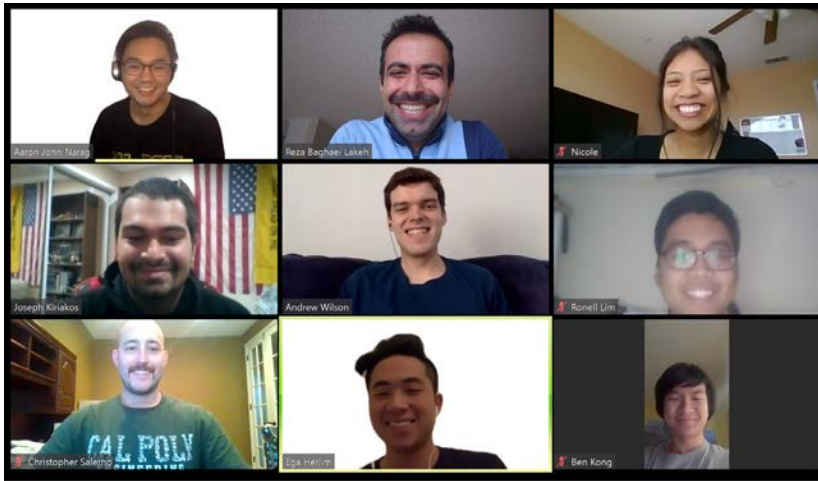
A multi-disciplinary effort comprising aerospace, electrical, computer, mechanical, chemical and chemistry undergraduate students, the BANSHE project aims to increase UAV flight time by substituting aircraft structural components with power storage devices and solar cells that also have structural properties. This will reduce the craft’s weight and also extract energy during flight.



Theoretically, a BANSHE UAV could be in flight for extended periods at a time without needing to land for a recharge.

“This industry-based team approach is foundational for helping prepare industry-ready students,” says Steven Dobbs, aerospace engineering professor and one of the faculty advisors.

MAKING SOLAR ENERGY MORE COST-EFFECTIVE



The student team practicing their presentation virtually on Zoom due to COVID-19.

Student Team: Andrew Wilson, Aaron Narag, Nicole Garcia, Ronell Lim, Benjamin Kong, Ega Herlim, Joseph Kiriakos, Christopher Salerno
Faculty Advisor: Dr. Reza Baghaei Lakeh

In its quest to promote sustainability, the U.S. Department of Energy wants to reduce the cost of running concentrating solar power (CSP) plants to \$0.03 per kWh by 2030. This team's research could very well help facilitate that.

This student team presented their research into a charging/discharging system for reverse osmosis concentrate (ROC) salts as a CSP thermal energy storage medium. This system would make it cheaper to run renewable energy power plants, like solar plants, which operate in the early morning and evening when electricity demands are greatest.

"The students developed new technical and presentation skills even after campus closure due to COVID-19," says Dr. Reza Baghaei Lakeh, mechanical engineering associate professor.

PURSuing INNOVATIONS IN METAL MATRIX COMPOSITES

Student Team: Harrison Brooks-Porter, Chase Hargrove, David Calderon, Lisbeth Pelayo
Faculty Advisor: Dr. Vilupanur Ravi

Metal matrix composites (MMCs) with ceramic reinforcements offer tailorable wear and corrosion properties essential for many industrial applications, notably pumps and automotive brake rotors. But manufacturing MMCs with different properties can be difficult, adding significantly to the cost of the final products. This student team sought to identify better and more innovative ways to produce them while still ensuring critical performance.

"This project gave these students invaluable experience in going beyond textbook learning, tackling tough open-ended questions and presenting their findings with scientific rigor," says faculty advisor Dr. Vilupanur Ravi, professor and chair for the Department of Chemical and Materials Engineering.

Combining an aluminum alloy with ceramics using an innovative melt infiltration technique, the students studied the behavior of MMCs in corrosive solution. Along the way, they found that this technique is indeed a cost-effective alternative for fabricating lightweight MMCs that are both durable and corrosion-resistant.

"This experience taught us to understand both the scientific and economic sides of chemical and materials engineering," says student team member Chase Hargrove.



Left to right: Chemical and materials engineering student team members David Calderon, Harrison Porter, Chase Hargrove and Lisbeth Pelayo.

IN BRIEF



Generations of students in the electrical and computer engineering department will have scholarship opportunities.

▲ A GENERATIONAL ENDOWMENT

The late Christopher Wilborn ('73, electrical and electronics engineering) leaves behind a **\$1.5 million endowed fund for the Department of Electrical and Computer Engineering**. The largest scholarship endowment for the College of Engineering ever, approximately \$100,000 in scholarships will be available for electrical and computer engineering students annually. "This endowment will provide unparalleled support for students in the department for generations to come," says Dr. Halima El Naga, electrical and computer engineering department chair.

▼ WOMEN IN ENGINEERING ADVISORY BOARD ESTABLISHED



Teresa Rodriguez ('18, civil engineering), right, was an active student participant with the CPP WE program and joins the advisory board as its most recent graduate.

into the field of engineering," says board chair Lynne Lachenmyer ('80, chemical engineering). "The board aims to bring strategic direction and additional resources to further the outreach, mentoring and support programs necessary to attract, retain and support women in engineering."

The Cal Poly Pomona Women in Engineering (CPP WE) Program establishes its first advisory board. Consisting of alumnae and alumni and industry representatives, the advisory board acts as an advocate for the program and seeks mutually beneficial partnerships.

Established in 2012, the program has served over 10,000 students by providing opportunities to connect to alumnae and faculty, and volunteer in K-12 outreach events on- and off-campus. "We're excited to build upon the strong CPP WE programs available to attract women

▼ RESEARCH STAR EARNS PRESTIGIOUS FELLOWSHIP



Jenny Martinez ('20, mechanical engineering) received the National Science Foundation Graduate Research Fellowship. The oldest

fellowship of its kind, only around 2,000 are awarded each year and nearly a third of its recipients go on to top-ranking

research institutions. Her previous research accomplishments include a research fellowship in the Rutgers RISE program, Caltech's WAVE program, and her work being published in the April 2019 edition of Nature. "My desire is to reach out to our community and be an example for future generations," says Martinez.

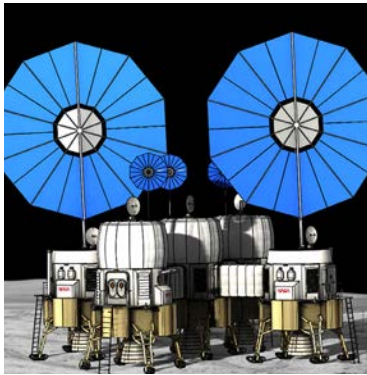
▼ A WORD FROM PAT



"Let us uplift society together through education."

Ganpat "Pat" Patel ('70, electrical engineering), the college's 2020 honorary doctorate. A perennial giver to the college, Pat is the former president and founder of Cherokee International Inc., and the founder and patron-in-chief of Ganpat University in Gujarat, India.

BUILDING A MOONBASE



A rendering of the proposed lunar base.

An aerospace engineering student team won first place at the American Institute of Aeronautics and Astronautics (AIAA) 2019-20 Space Systems Design Competition.

Challenged by NASA to propose a plan for a base on the Moon, their work was judged best among more than a dozen from around the world. “Students in the team dedicated many days and nights working tirelessly

on their design and paid attention to the details,” says Dr. Navid Nakhjiri, aerospace engineering associate professor and advisor for the team.

THE DEAN’S LEADERSHIP BOARD EXPANDS

Seven new members joined the college’s Dean’s Leadership Board (DLB), an advisory board of high-level executives that bring their expertise and knowledge to secure resources for the college and to help define its strategies and goals.

Six of the seven are college alumni and they join an advisory body of 25 members.

“It is an honor to serve as a member of the Dean’s Leadership Board. I look forward to giving back to the Cal Poly Pomona engineering community by sharing my expertise in advanced technologies in development and production in the aerospace and defense industry,” says Kent Miller (’81, engineering technology), one of the new DLB members.

Go to page 26 to view all members of the Dean’s Leadership Board.

ALUMNI BRIEFS



Kent Miller (’81, engineering technology) became an engineering fellow at Raytheon Technologies in 2019. Miller provides education and program protection design support for Raytheon’s advanced weapon and sensor programs. Further, he is an instructor for Raytheon engineers in cybersecurity, reverse

engineering, and anti-tamper in hardware, firmware and software. Miller has over 30 years of experience as a technical expert in the defense and national security arenas, including aircraft design and development for structural integrity and stealth capability, weapon system program and platform protection, and the export of advanced technologies.

“The Cal Poly Pomona polytechnic learning model and learn by doing approach provided an educational foundation that has served me very well throughout my career,” says Miller.



Luis Dominguez (’09, mechanical engineering) served as deputy electrical integration and test lead for NASA’s Jet Propulsion Laboratory Perseverance rover, which launched in 2020 and is set to arrive on Mars in February 2021. “I’m honored and privileged to say it’s been an incredible experience to put together and test the entire

spacecraft along with being part of the launch team,” says Dominguez. “Cal Poly Pomona’s learn by doing philosophy had an enormous impact on how I’ve approached furthering my engineering acumen. I employed the philosophy when transitioning to electronics and software testing.”

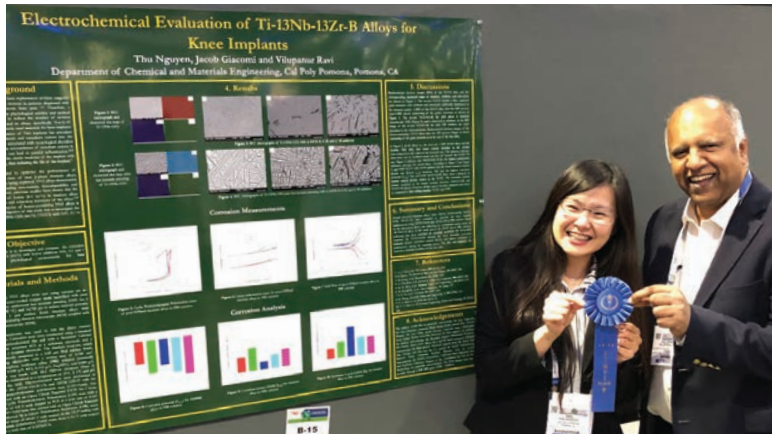


A SEISMIC WIN

A civil engineering student team placed first in seismic performance at the international Earthquake Engineering Research Institute (EERI) Seismic Design Competition. The team built a balsa wood multi-story building that was tested for stability and structural integrity when subjected to simulated seismic loading on a shake table. Cal Poly Pomona was among 46 teams from eight countries and 17 U.S. states and territories. In 2018, the team’s student lead at the time said that “more work will need to be committed to the other categories in order to remain competitive.”

They made the commitment, and it paid off. “I am proud of all our teams, regardless of the outcome. But it is special when they are recognized at the international level,” says Dr. Felipe Perez, civil engineering professor and advisor for the team.

IN BRIEF



Chemical engineering student presenter Thu Nguyen with Dr. Vilupanur Ravi, advisor for the research project and chair of the chemical and materials engineering department.

A FIRST IN INTERNATIONAL CONFERENCE

A chemical and materials engineering student team won first place in the Biological Materials Science Best Poster Competition at the international TMS 2020 Annual Meeting. Attendees from over 70 nations attended the event, and chemical engineering student Thu Nguyen presented the winning poster titled “Electrochemical Evaluation of Ti-13Nb-13Zr-B Alloys for Knee Implants.” The presentation was co-authored by chemical engineering student Jacob Giacomi and advised by Dr. Vilupanur Ravi, the chair of the Department of Chemical and Materials Engineering. “This win demonstrates the high quality and outstanding work of our students. Another positive outcome was that Thu Nguyen was offered a position in the research group of one of the judges,” says Ravi.

V A THREE-PEAT IN SIGHT? BACK-TO-BACK WINS FOR THIS DESIGN-BUILD TEAM



A civil engineering student team earned first place for the second year in a row in the ASC Design-Build competition, the largest construction student competition in the nation. The foundations of this success began four years ago when the Department of Civil Engineering started an initiative to bring design-build topics into civil engineering curriculum. “This achievement is truly amazing. Now let’s go for the legendary three-peat!” says Dr. Jinsung Cho, associate professor and faculty advisor for the student teams that won back to back.



To achieve the sense of a floating landscape, the construction team designed the animation mechanisms with the goal of subtle, languid movement, said mechanical engineering student Chris Maciosek, a construction chair for the Rose Float.

V THE ONLY STUDENT-BUILT ROSE FLOAT GLIDES INTO PASADENA

More than 700,000 spectators lined the streets of Pasadena to watch the 2020 Rose Parade and millions more watched from home. “Aquatic Aspirations” Rose Parade float, a joint effort by students at Cal Poly Pomona and San Luis Obispo, made its colorful entrance into the parade and earned the Director Trophy for most outstanding artistic design and use of floral and non-floral materials. The float was the 72nd consecutive entry for the Cal Poly universities, and the only student-built float in the Rose Parade.

v 2020 PROJECT SYMPOSIUM AND SHOWCASE

➤ A VIRTUAL SUCCESS: PROJECT SYMPOSIUM & SHOWCASE 2020

This annual college-wide research and senior design symposium invites hundreds of student teams to present their findings. Presentations typically fill our buildings, but the pandemic forced us to do otherwise. Adapted for a virtual format, the event went ahead thanks to the collective work of our students, faculty and staff.

191



Total Sessions

Students presented in both livestream and pre-recorded formats.

92

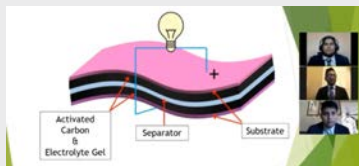
Video Presentations

Students recorded video presentations of their work for public consumption.



1,500 Views

27.8 Hours Watched



460+

Attendees



Industry, faculty, staff and students watched virtually as student teams presented their research and project efforts.

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- **Gift Considerations**
 - › Give stocks instead of cash and avoid capital gain taxes.
 - › In 2020, you can contribute up to 100 percent of adjusted gross income to charity.



"I believe the dividends are high as beneficiaries become productive members of society and hopefully become role models themselves for others to follow." – **Sue Hess**

Steve ('76, mechanical engineering) and his wife **Sue Hess** have pledged a significant estate gift for the College of Engineering with a focus on funding scholarships.



CalPolyPomona

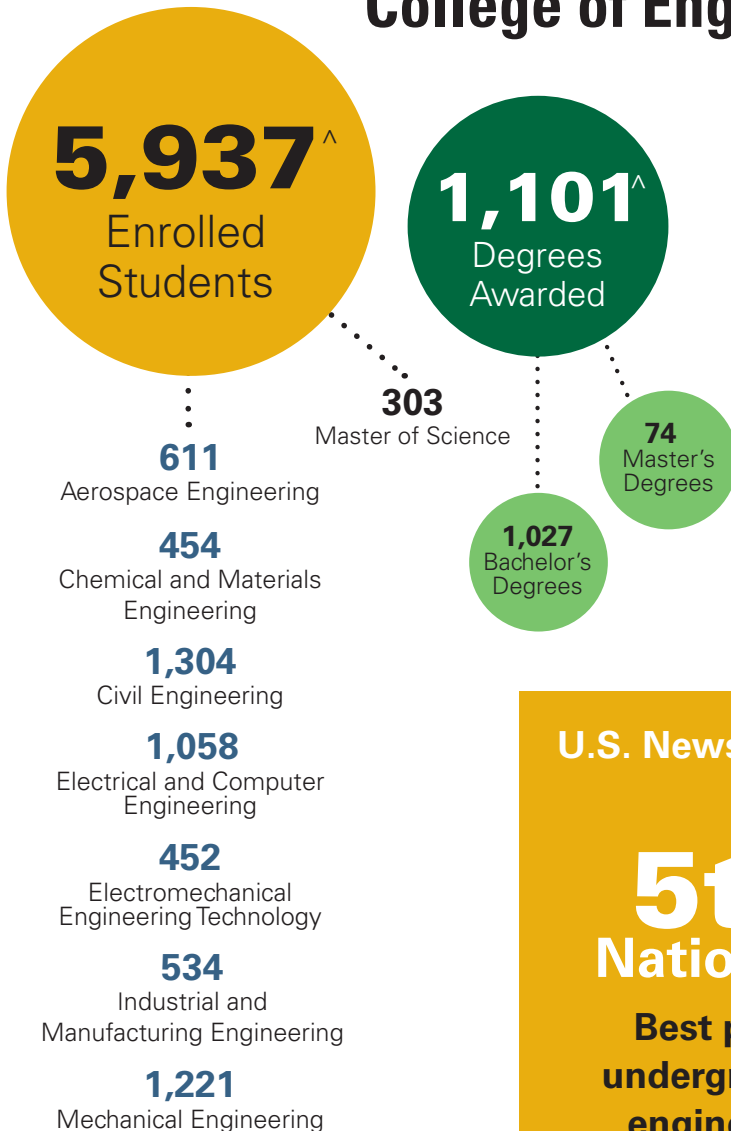
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College of Engineering Facts



Diversity & Social Mobility

42% Underrepresented Minority Students

52% First Generation Students

41% Low Income Students

Highest SAT and GPA averages in the university

1269
Average Admit SAT

3.79
Average Admit GPA

U.S. News and World Report 2021 National Rankings*

5th Nationally
Best public undergraduate engineering program

2nd Nationally
Best industrial/manufacturing engineering program

3rd Nationally
Best aerospace engineering program

4th Nationally
Best computer engineering program

6th Nationally
Best civil engineering program

8th Nationally
Best electrical engineering program

8th Nationally
Best mechanical engineering program

*Enrollment data from fall 2019; degrees awarded data from the 2019-20 academic year

*Among programs where a doctorate is not offered