MECHANICAL ENGINEERING | COLLEGE OF ENGINEERING | WINTER/SPRING 2020

# NEWS TO ME

## LOOKING BACK AT 80 YEARS

Celebrating our legacy and looking to the future of our program

CAL POLY

# INSIDE



**ON THE COVER**

Ronald Steven Blair (Mechanical Engineering, '81) with Cynthia Garretson Shurtleff (Metallurgical Engineering, '80). Photo courtesy of University Archives.

**THIS PAGE**

Cal Poly's Human Powered Vehicle club set a new record at the 20th annual World Human-Powered speed challenge in Nevada. Read more on page 12.

**ABOUT NEWS TO ME**

This publication is produced twice a year by the Mechanical Engineering Department. To view the online version of this edition or past editions, visit me.calpoly.edu/newsletters.

# BANDING TOGETHER

It's 9 a.m. on a Saturday and Kai Quizon is in full uniform ready to tackle a long day of preparation and performances for a home football game at Spanos Stadium. As drum major, Quizon leads his band mates through rehearsal and performances totaling about 12 hours, but he wouldn't have it any other way.

"Mustang band has given me a community that is unwavering in support and love," Quizon said. "There is no place on campus where I feel as safe and included as in band. It's the only reason why I am so successful here at Cal Poly."

Quizon is a third-year mechanical engineering student, who has been involved in band since freshman year. He started on the trumpet and moved his way up to become drum major. In that role, Quizon leads over 180 band members to rehearse and prepare for game days. Each student spends about 200 hours a quarter performing aside from regular rehearsals during the week.

Quizon relies on upperclassmen for advice and support especially from others in his major. As he progressed through his classes, he discovered a commonality with other mechanical engineers in band. They tackled dynamics problems holistically as opposed to linearly. Quizon believes learning about music influenced this.

Instead of thinking about the individual parts of a problem like individual notes in a sequence, students view the problem as part of a whole and in this case, a song.

"Music is another language — we learn to write, read and speak (play) it. Knowing this skill makes you think about engineering in a whole new way," said Quizon.

Students operate lab equipment in this image taken in about 1984. Photo courtesy of University Archives.

# LOOKING BA
# AT 80 YEAR

The California Polytechnic School, as it was known at the time, was established in 1901. It was the height of the Progressive Era in public education, a time when education was being recognized as not just a privilege of the well-to-do, but also a right of the working class. An educated worker is a more innovative and productive worker, progressives believed, and education allows workers to rise up the socioeconomic ladder.

There is no doubt that the founders of Cal Poly were influenced by John Dewey, founder of the progressive movement and arguably the father of Learn by Doing. Dewey felt that the teaching methods of the day unmotivated students by forcing them to sit passively through lectures and memorize seemingly unimportant facts and figures. He argued that students are naturally active learners, and the best way to learn academic subjects is through applied projects. At Cal Poly, Learn by Doing meant largely what it means today: Students learning their trade and practicing their craft through real-world projects.

Cal Poly started as a vocational high school, with three-year (and later, four-year) programs in agriculture, mechanics and domestic science. The mechanics curriculum essentially prepared students to become tradesmen in such areas as carpentry, drafting and machining. It was a Learn by Doing curriculum from the start; the program offered courses in freehand and mechanical drawing, carpentry and electrical working, forging, and even engines (steam and gas) and boilers.

The hands-on curriculum was so important that there were three stand-alone shops on campus by 1909 — a carpentry shop, machine shop and forge shop. A power house, built around 1910 and used to supply electricity to the

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campus, was also used as an electrical and mechanical laboratory. The power house was later expanded (around 1920) to include a hydraulics/fluid mechanics laboratory. This building still stands and is the oldest building on campus.

In the early days, students built, operated and/or maintained much of the equipment on campus. Students even built the furniture for the classrooms in the carpenter shop as part of their studies. This was hands-on education!

## THE BEGINNINGS OF THE ENGINEERING CURRICULUM

Although Cal Poly started out as a trade school, the curriculum gradually evolved and became more broad and technical. The mechanics curriculum began to look more like that of the typical mechanical engineering program with courses like materials, hydraulics and heat engines and boilers rounding out the curriculum. There was also a strong program of electrical courses offered. The Mechanics Department was eventually renamed Engineering-Mechanics to reflect the broader course offerings. An automobile shop, built in 1922, was expanded to include an aeronautical laboratory in 1927, signaling the beginning of aeronautical courses at Cal Poly.

Cal Poly began as a two-year junior college in 1927, offering degrees in Engineering-Mechanics, among others. By 1933 the newly-named Division of Industrial Education had programs only in aeronautics and electricity. The curriculum continued to grow and evolve, and in 1940 Cal Poly achieved collegiate status. Students could enroll in four-year programs to obtain degrees in Aeronautical, Electrical, and Air Conditioning engineering.

It is important to remember that the engineering courses evolved from the vocational curriculum; in fact, students could receive a vocational certificate after two years of study, or a technical certificate after three years. The vocational roots were critical in the development of Cal Poly because it established the rich history of hands-on, practical education that governs the program's philosophy to this day.

## THE BEGINNING OF MECHANICAL ENGINEERING

In 1941, the Mechanical Industries Department was formed, offering a four-year degree in mechanical engineering (as well as granting vocational and technical certificates). The department was led by Norman Sharpe, a faculty member from the Air-Conditioning Department (he later went on to chair the Air-Conditioning Department for a number of years). The first graduate of the new mechanical engineering program was William Himmelman (mechanical engineering, '42).

It was an uncertain time, as World War II caused enrollments to drop sharply. In fact, sagging enrollments forced the administration to close most of the engineering programs in 1944. The end of the war and the GI Bill brought back the demand for engineering programs, and the mechanical engineering program re-opened in 1946.

## THE RETURN OF FEMALE STUDENTS

In the late 1920s, citing funding deficiencies, females were no longer admitted to Cal Poly (it was mandated by state law in 1930). But in 1956, females were again allowed to attend, and the mechanical engineering program saw its first female students in 1956.

## THE EVOLUTION OF PROGRAMS

It is interesting to see how the genealogies of the various engineering programs are intertwined. In the early 1980s, the air-conditioning program suffered from low enrollments and the budget ax and was absorbed into the Mechanical Engineering Department. It is now known now as the HVAC&R concentration. Around that same time, aeronautical engineering was absorbed into mechanical engineering, but reemerged as the Aerospace Engineering Department later that decade. The 1990s saw another budget crisis and the elimination of programs like Engineering Technology and Home Economics. Programs change with the times — new ones form and others disappear. It is a necessary function of a university to respond to the changing needs of the society.

## OUR PROGRAM TODAY

Today, the mechanical engineering program is recognized as the best public, primarily undergraduate, mechanical engineering program in the country according to U.S. News & World Report. It serves about 1,000 students and graduates approximately 200 students annually.

What makes the program so successful? Faculty and staff still believe in practical, hands-on education and are proud to maintain our laboratory-intensive curriculum. We still have not one, but two machine shops for our students to use for their projects. After all, the best engineers should have some idea how to build what they design.

Finally, we learn from our past. In 1902, the original board of trustees debated the inclusion of an engineering program but wrote, "The expense of suitable engineering equipment is so great that we do not feel justified in offering courses therein for the first few years. We prefer to do a few things well rather than try to do many things and not have sufficient means to do anything well." The department realizes that maintaining a state-of-the-art, hands-on program is costly. But today, as then, faculty and staff recognize the importance and efficiency of sticking to core competencies.

Some things never change.

# CREATING OUR FUTURE

## OUR CAMPAIGN TO CELEBRATE OUR 80TH ANNIVERSARY

Our labs are an integral part of our curriculum and have shaped thousands of mechanical engineering students over the past 80 years – we will continue this tradition for years to come. But we need your support.

As a Cal Poly faculty member, I have seen our program grow in size and prestige, largely due to our signature Learn by Doing approach. As a top-ranked undergraduate mechanical engineering programs in the country, we want to ensure our students have access to well-equipped, modern laboratories. With your support, we can create a better tomorrow for the next generation of Cal Poly mechanical engineers. Our 80th Anniversary campaign focuses on improving those facilities to create a better hands-on learning experience for our students.

## OUR GOALS

- Renovate our 15+ labs
- Upgrade equipment and technology
- Improve accessibility

I will be donating $80 for each year I have been at Cal Poly. Dr. Jim LoCascio has donated his recent CSU Faculty Innovation & Leadership Award of $10,000 to the fund. I challenge you to join us in creating our future. We are extremely grateful for your support and we will see you at our 80th anniversary celebration in 2021.

**JIM WIDMANN**
Department Chair

# GIVE ONLINE

Visit me.calpoly.edu/80th

> Make a secure gift online
> Set up recurring gifts
> Corporate matching

## THE SWENSONS

### PARENTS + SUPPORTERS

Ron and Bonnie Swenson are the parents of two Cal Poly mechanical engineering graduates, a son and daughter-in-law. The Swensons recognize the impact that Cal Poly Learn by Doing has on many students and chose to generously donate $70,000 to the renovation of the Thermal Sciences Lab. They hope that their gift will inspire others to support the Mechanical Engineering 80th Anniversary campaign.

## NEAL McDOUGAL

### ALUMNUS + SUPPORTER

Neal McDougal graduated with a mechanical engineering degree in 1985 and is a systems engineer at Raytheon in Los Angeles. He has been a longtime supporter of our department and uses Raytheon's gift matching to double the impact of his gift. He hopes his gift will inspire others to support our 80th Anniversary campaign.

"The Mechanical Engineering Department is important to me. I want to give back to the university because it's where I gained my knowledge and education. I wanted a way to directly support labs so that both instructors and students have everything they need to learn."

During a recent machine shop night, students created a wooden arm rest. Events like these are an important part of Womxn in Mechanical Engineering.

# A PLACE TO BELONG

## The new Womxn in Mechanical Engineering club brings students together

Womxn in Mechanical Engineering was created last year by a group of students to support women within the major by creating an inclusive environment. The club meets for weekly lunches and study sessions and hosts events in the machine shops. During their most recent machine shop social, students learned about the engineering design process and made a variation of a wooden armrest.

“For me, machine shop night and the club are important because I think it can be easy to forget the benefits of community when we get overwhelmed by school. It’s beautiful to spend time with people that have had similar challenges to help us overcome our own,” said Emily Hubbard, mechanical engineering fifth-year and Womxn in Mechanical Engineering president.


Womxn in Mechanical Engineering’s weekly lunch on the lawn offers time for students to reconnect.

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# MUSTANGS ABROAD

Mechanical engineering students Taylor Chavez and Dakota Baker studied abroad at the Munich University of Applied Sciences and shared their experiences.

*What was your favorite moment studying abroad?*

"My favorite part was simple and unplanned, but impactful. I hiked to the top of the Citadella in Budapest. I saw the sunset and the city light up like magic. It was one of those moments that I realized how special and unforgettable my study abroad experience meant to me."

— Taylor Chavez

*What are the classes like?*

"The teachers are very mindful of students' desire to travel and classes get out around 3 p.m. We went on a factory tour of BMW, went to the Deutsches Museum and more! I adventured around the city of Munich and nearby cities such as Andechs, Garmisch-Partenkirchen and Salzburg."

— Dakota Baker

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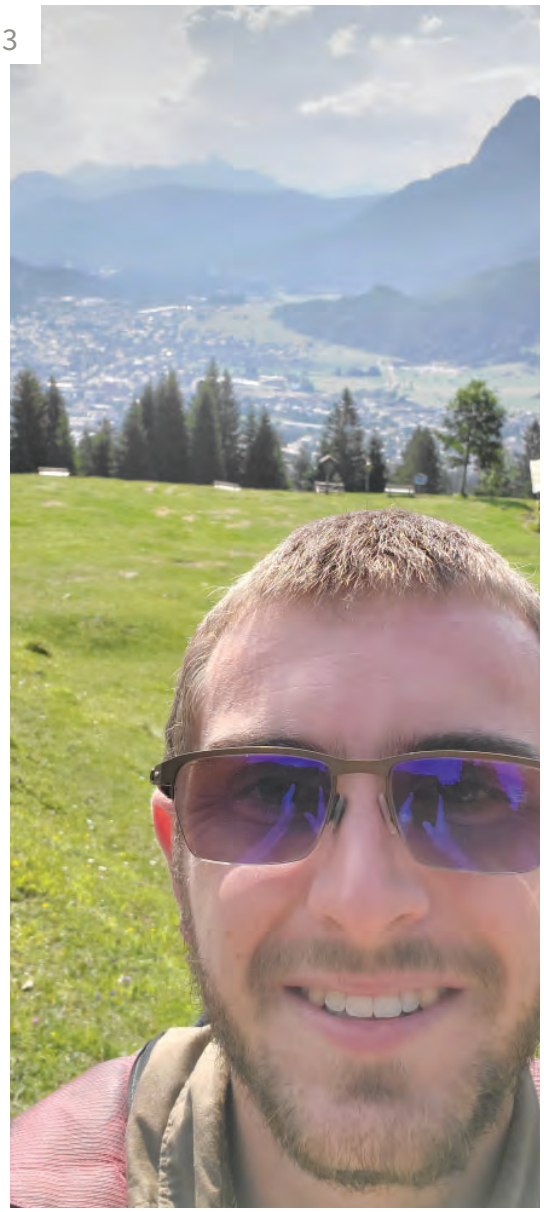

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1. Taylor Chavez at the Cliffs of Moher in Ireland.

2. Chavez and some friends look at Hohenschwangau (middle) and Neuschwanstein castles from an overlook in Germany.

3. Dakota Baker stands above the Bavarian ski town of Garmisch-Partenkirchen.

4. Baker shares ice cream with friends from India and Thailand.

**ONLINE**
Visit **me.calpoly.edu/study-abroad** to learn more about our programs.

# BUSINESS 101

## MECHANICAL ENGINEERING ALUMNI ARE BUSINESS STARTERS

### JACK FISHER '19
**CO-FOUNDER — TEKK CONSULTING + DIY OFF ROAD**

Balancing school and life can be a difficult act, but imagine also running a new business. It can seem nearly impossible. Not for Jack Fisher (mechanical engineering, '19), as an undergrad he worked full time co-managing Tekk Consulting, a multi-disciplinary consulting firm, with his business partner.

Although many projects are protected under non-disclosure agreements, Fisher said that, “We take our clients’ creative ideas and engineer them into reality.” Tekk Consulting specializes in 3-D printing, reverse engineering from 3-D scans, automotive design and development, and robotics engineering.

After succeeding as a consultant, Fisher wanted to start another company that could give others the tools to build their own projects. He launched DIY Off Road, an online digital asset marketplace, in January 2019. To date they have thousand of assets available for purchase. With a customer base stretching from as far off as Turkey, the partners have plans to start more DIY companies that cater to more audiences interesting in building cars and robots.

Fisher’s tips for starting your own business:

1. Partner with someone who is different from you.
2. Commit to your goals.
3. Find a mentor.
4. Focus on the customer.

For more information, visit their Instagram @diy_offroad and @tekkconsultinginc.


Jack Fisher designed this Deberti bumper drawer that turns a bumper into a hidden storage drawer with enough space to store a spare tire.

Rory Aronson (mechanical engineering, '13) developed FarmBot, an open-source CNC farming machine.

## RORY ARONSON '13

**CEO — FARMBOT**

After listening to a lecture about a multimillion dollar farming machine from a local farmer, Rory Aronson (mechanical engineering, '13) began to imagine what the application would be for a regular household. Aronson took the summer off after graduation to research and create the first prototype. He published his research paper online and connected with two other people across the world. Together they created FarmBot, an open-source CNC farming machine. Essentially, FarmBot is a 3-D printer for small-scale farming that can be modified to the user's needs. The most popular FarmBot is about the size of a queen mattress, perfect for a home garden.

Since its inception, FarmBot has sold and shipped more than 1,000 FarmBots worldwide — as far as China, India and South America.

"I really want people to embrace FarmBot as a technology to feed a lot of people fresher and healthier produce, and more importantly, give people ownership of growing food. I believe that making this product open-source gives people more access to these things," said Aronson.

Schools and universities account for 50 percent of FarmBot customers. They use the product to teach students about farming, manufacturing, software engineering and nutrition.

"We envision FarmBot being low-cost, easy and hands-off," he said. "Kind of like a washing machine. You put in the detergent and it beeps when it's done."

# RECORD-BREAKING RUN

## STUDENTS ECLIPSE 27-YEAR-OLD SPEED RECORD AT THE WORLD HUMAN-POWERED SPEED CHALLENGE


The human-powered vehicle team takes “Ambition,” the human-powered vehicle to prepare for their big race at Battle Mountian, NV.

On its last possible run, a human-powered vehicle (HPV) created by a team of Cal Poly engineering students broke the American collegiate speed record, setting a mark that hadn't been bested in nearly three decades.

The new record, 63.68 mph, was set during the 20th annual World Human-Powered Speed Challenge in Battle Mountain, Nevada, held Sept. 8-13. The previous record was 61.29 mph, set by a team from UC Berkeley in September 1992.

A HPV is any vehicle powered by muscular strength. The most common HPV is a bicycle. Cal Poly's HPV, named Ambition, competed against other enclosed recumbent bicycles that were designed, built and ridden by students. Professional teams also competed in separate categories.

Ambition was tailored to its driver, Josh Gieschen, a biochemistry major from Davis, California.

Battle Mountain is an optimum location for the event because of its thin air at 4,619 feet, which reduces aerodynamic drag. Riders travel down a 5-mile stretch outside the town on State Route 305, on what organizers boast is one of the straightest, flattest and smoothest roads in the world, reaching their maximum velocity before being timed over a 200-meter distance.

The object of the event is to make the most aerodynamically efficient vehicles possible. Meanwhile, the technologies used for the HPVs can apply directly to all forms of transportation.

Ambition is a front-wheel-drive bike covered with a bullet-shaped shell, made out of carbon fiber and Kevlar, to maximize aerodynamic performance. Members of the Cal Poly team split into subgroups specializing in different areas, such as the bike frame, shell and drive train. Mechanical engineering seniors Derek Fromm of Seattle and Michael Juri of Fremont, California, developed the drive system.

While Cal Poly has had a human-powered vehicle team since 1978, this was the first time it attempted to break the record. After working on the vehicle for a year, the team had to make multiple significant changes in the days leading up to the race, adding a windshield and fixing a chain that repeatedly fell off.

"We had issues, but we knew we had time to fix them," said Kyra Schmidt, the manufacturing lead.

The day before leaving for Nevada, though, they had a promising test run, Schmidt said, giving them confidence.

Still, there would be other factors — some out of their control. To qualify for a record, the wind can't exceed 3.7 mph. Some years, it's simply too windy for anyone to qualify, Fromm said.

During the week, Ambition actually surpassed the record on Thursday, reaching 66.43 mph. But the wind speed disqualified it as a record-breaking run.

As the final day approached, wind was forecast to exceed 3.7 mph in the evening. But the Cal Poly team had a window of opportunity earlier in the day.

"It was literally our last chance," Fromm said.

Gieschen got off to a good start.

The so-called "motor," who made 10 runs over the week — often racing twice a day — was tired and battling a cold. But his speed continued to increase until finally exceeding the 27-year record with "legal wind."

And when it was over, Gieschen dramatically crashed at around 50 mph, the vehicle rolling over roughly three times.

Fortunately, Fromm said, Ambition was well built, and safety measures worked.

"Not a single thing broke on the bike," he said.

Gieschen walked away with just a couple of small bruises.

"We are all super proud of everything Josh and the team accomplished," said Schmidt, a mechanical engineering senior from Irvine, California.

Next year, the team is looking at 70 mph, she said — and, once again, she's confident they can do it.

"We are excited to continue improving and come back even better next year — but first, we can all take a well-deserved break."

Visit **hpv.calpoly.edu** for more information about Human Powered Vehicle.

# WORKING TOGETHER

Cal Poly engineering students work to install an Advent calendar at the Cambria Christmas Market. Pictured from left to right, Sigrid Derickson, Oma Skyrus, Danny Clifton and Silvia Calinov.

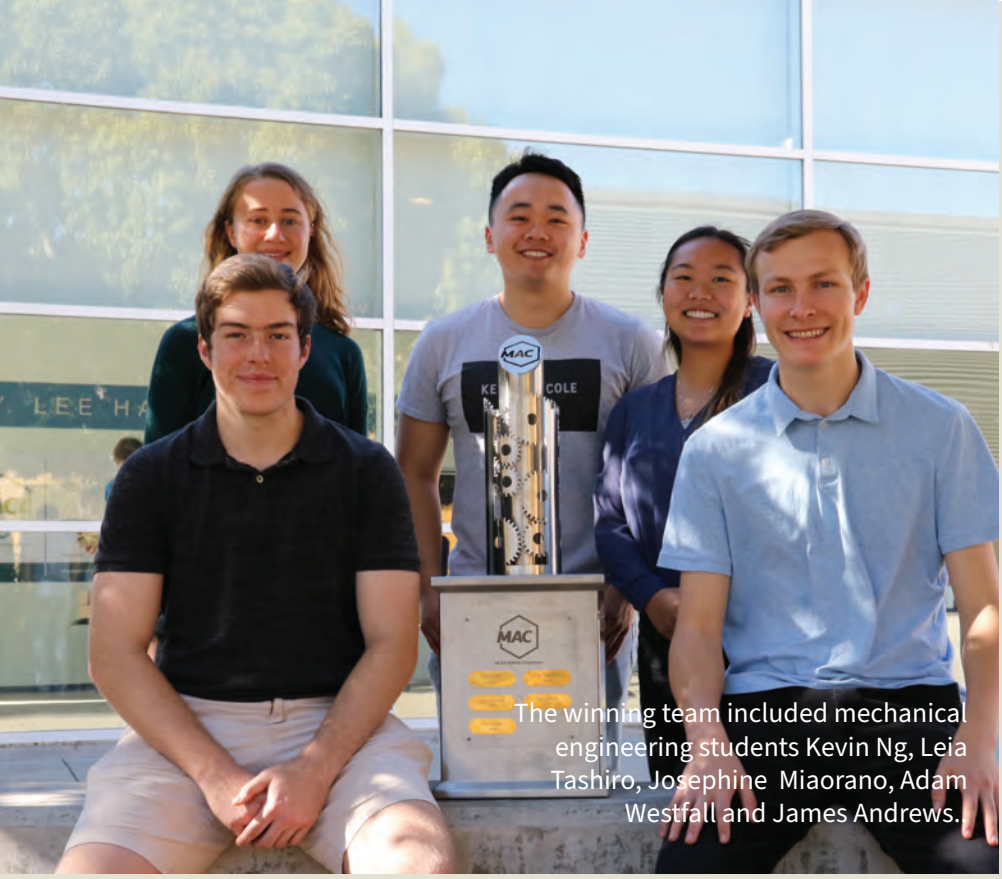
## Counting the Days

Mechanical engineering students designed a motorized advent calendar that was featured at the December 2019 Cambria Christmas Market. Based on Christmas markets in Europe that date back to the Middle Ages, the Cambria Christmas Market, housed primarily at the Cambria Pines Lodge, featured 2 million lights in dioramas and displays. The display — roughly 14 feet tall, 20 feet long and 4 feet deep — featured 25 days represented by boxes. Each box contained a playful diorama. There were a shooting star, a polar bear snow globe, Santa's workshop, an ice skater, a hula dancer and other animated scenes of the season. Seventeen boxes featured moving parts, and all played music related to the subject of the respective diorama.


Mechanical engineering seniors (right) visited the Maserati Innovation Center in Modena, Italy where they received an award for winning the international VI-grade Virtual For mula.

## Meeting Maserati

Cal Poly Racing team members and mechanical engineering students Noah Wheeler and Carl Stoye recently visited Maserati's new Innovation Lab over winter break and toured several Italian car museums after winning the VI-grade Virtual Formula competition for electric cars. The duo is the first American team to win. They won the competition by using VI-grade vehicle dynamics software to optimize a virtual formula car to compete in a series of race events.




The winning team included mechanical engineering students Kevin Ng, Leia Tashiro, Josephine Miaorano, Adam Westfall and James Andrews.

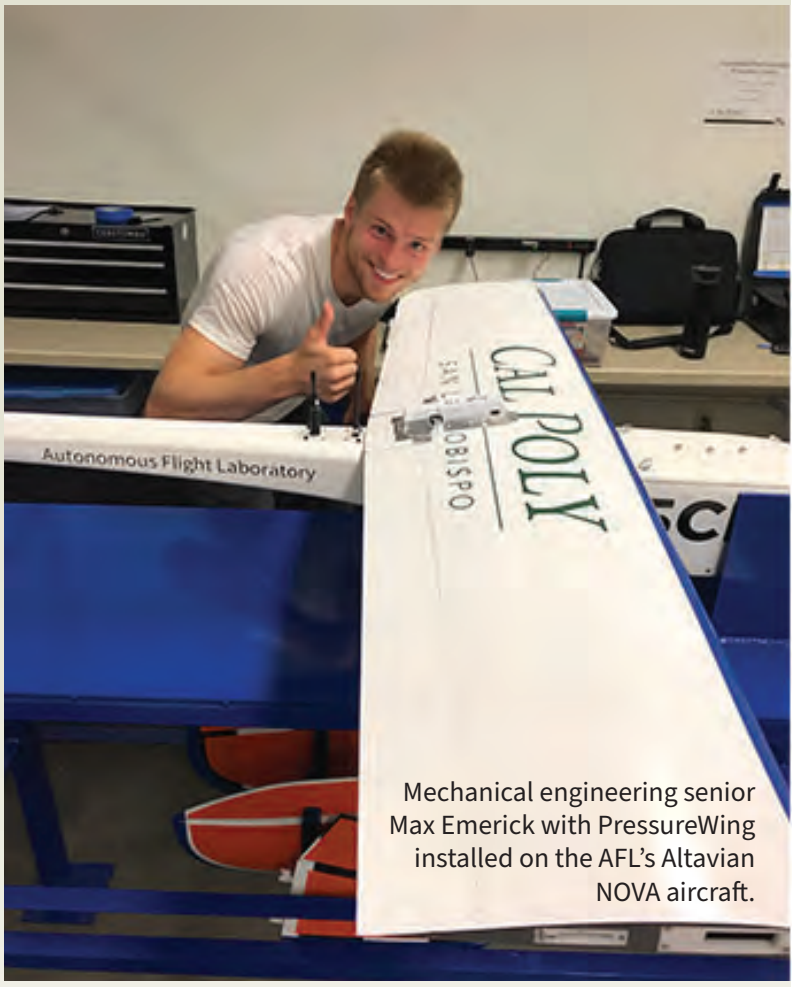
## MAC Competition

On Nov. 1, 2019, the Heating, Ventilating, Air-Conditioning and Refrigerating program hosted the second annual MAC competition — an industry-sponsored collaboration between the student chapters of the Mechanical Contractors Association and the American Society of Heating, Refrigerating and Air Conditioning. The three-day competition started on Friday evening when teams were announced at a mixer sponsored by the Northern California MCA Chapter. On Saturday the teams had less than nine hours to come up with a solution to the proposed HVAC problem and all written documents were due by 5 p.m. On Sunday morning, the teams gave presentations on their design solution. Forty students participated in the competition from various majors and the winning team was awarded a cash prize.

## Successful First Flight of Next-Generation Flight Test Data System

Cal Poly's Autonomous Flight Lab and the Boundary Layer Data System project successfully conducted the first flight of a smaller and lighter flight test instrument family called the Flight Test Data System (FTDS). FTDS is the first major revision of the existing boundary layer data system in a decade. The instrument uses more efficient power components, non-volatile data storage and will include both flow and non-flow sensors for strain, temperature, acoustic and acceleration. The new flight test system can be used in a broad range of test requirements including unmanned aircraft applications. The flight test marked the first milestone of a planned long-term collaboration between the lab and Bounday Layer Data System project aimed at development of a next-generation low-cost flight test capability.

Mechanical Engineering Professor Russ Westphal has worked with students on the system, which employs small, self-contained, autonomous instruments to help aircraft companies measure the aerodynamics of their planes.

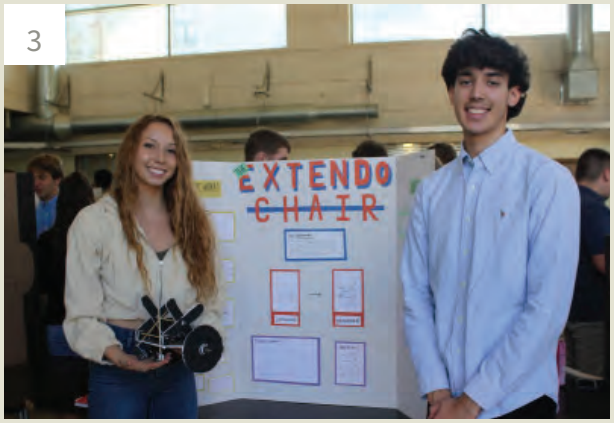



Mechanical engineering senior Max Emerick with PressureWing installed on the AFL's Altavian NOVA aircraft.

# FRESHMAN SHOWCASE

In the introductory mechanical engineering class, students were asked to design a product to help people with physical challenges improve their accessibility to an activity.








**1. Project Spikeball**
A wrist-mounted, adjustable racket that allows users to strike the ball without using fingers and hands.

**2. Send-O Mode**
The head wear sends feedback mechanisms to hearing impaired users, allowing them to sense objects approaching from their sides or behind when skiing or biking.

**3. The Extendo Chair**
The seat of the wheelchair extends up to help users reach higher elevations.

**4. Poly Purpose Prosthetic**
The prosthetic attaches to the user's arm and uses interchangeable attachments.

# FACULTY AWARDS

## Melinda Keller

### SWE ENGAGED ADVOCATE AWARD

Melinda Keller, mechanical engineering professor, received the Engaged Advocate Award by the WE Local program of the Society of Women Engineers in December. The award recognized her contribution and advancement of women in engineering. Keller, who has taught in the Mechanical Engineering Department for more than 20 years, works tirelessly to support diversity and inclusion efforts in the College of Engineering and at the department level.

She also serves as an advisor for the Cal Poly Amusement Park Engineers and Designers club, Indian Student Association, Design for America, Rotoract and the Men's Intramural Beach Volleyball Team. Keller was previously awarded Most Supportive Professor by SWE in 2019 as well as PolyRep's Mentor Award.

## Jim LoCascio

### CSU FACULTY INNOVATION & LEADERSHIP AWARD

Jim LoCascio's impact on students was just part of the reason he was recently honored with the California State University Faculty Innovation and Leadership Award (FILA). The award, presented to one faculty member of each of the 23 CSU campuses, acknowledges CSU faculty who have demonstrated leadership at the program, department, school, college or university level to improve student success and outcomes in courses with traditionally low success rates or persistent equity gaps. The award comes with $5,000 in cash for the winner and $10,000 for departments. LoCascio donated his cash award to the Mechanical Engineering 80th Anniversary Campaign.

"As I meet with engineering alumni, so many of them tell me that their classes with Professor LoCascio had a profound impact on their lives," said College of Engineering Dean Amy S. Fleischer. "He has a lasting legacy through his students."

Part of LoCascio's teachings have been creative: In 2016, he arranged for freshmen mechanical engineering students to see a play, "All My Sons," which introduces questions that involve engineering ethics as well as an individual's obligation to society.

"Dr. LoCascio is one of those rare professors that throughout his career has had a profound influence on many of his students," wrote Andrew Davol, a former LoCascio student who became a peer on the mechanical engineering faculty team. "I know that my career choice may have been very different without his influence."

LoCascio has helped other CSU programs, and he does outreach to help younger students get excited about STEM education. His dedication to helping his other family — those in the engineering field — traces back to his upbringing and his father, who began working at age 7.

# NEW FACULTY

## JENNIFER MOTT PEUKER
### Assistant Professor

Ph.D. University of Illinois at Urbana-Champaign, 2012
M.S. University of Illinois at Urbana-Champaign, 2007
B.S. California Polytechnic State University, San Luis Obispo, California 2005

*What do you hope students learn from your classes?*

One of my goals is to challenge students in and out of the classroom — their assumptions, what they know about the world — and engage them in critical thinking and engineering problem solving. I do this by having students defend their answers in class discussions and using a flipped classroom model to have more engagement during class time. I want students to understand the importance of applying their engineering coursework to their lives.

I encourage students to make sense of never-before-seen problems in thermal sciences and persevere to solve them. I hope that the passion I have for the topics I teach is evident in the classroom and is also contagious to the students.

## HANS MAYER
### Assistant Professor

Ph.D. University of California, Santa Barbara, California, 2016
M.S. Carnegie Mellon University, Pittsburgh, Pennsylvania, 2005
B.S. California Polytechnic State University, San Luis Obispo, California 2003

*What do you hope students learn from your classes?*

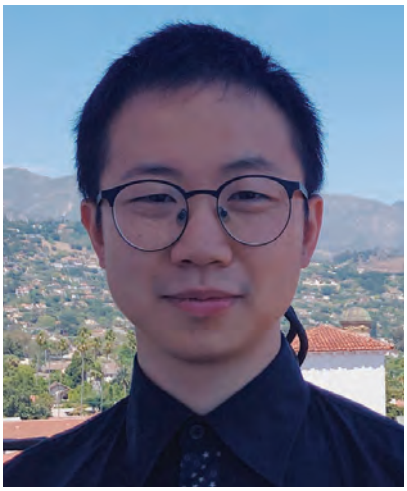
Beyond successful completion of the course learning objectives, I hope that in my classes students gain a greater appreciation for the subject matter. I want them to understand how the particular subject fits within the larger world of mechanical engineering, hoping that they get a better sense of the "big picture." As part of this I want them to walk away knowing a bit more about the history of the subject. I want each student to rise to their full potential through a challenging class, to be resilient and resourceful, and to understand that attention to detail and common sense matters. I want each student to take pride in their work.

## ERIC ESPINOZA-WADE
### Assistant Professor

Ph.D. Massachusetts Institute of Technology, 2007
M.S. Massachusetts Institute of Technology, 2004
B.S. Massachusetts Institute of Technology, 2000

*What do you hope students learn from your classes?*

I hope students gain an understanding of how first principles of physics and mathematics can be used to explain phenomena that we observe in daily life. In particular, I believe it is important to have an intuitive understanding of the world, and this requires an understanding of the mechanisms through which objects interact. Relatively simple physics and mathematics mechanisms can be abstracted to describe complex and unpredictable behaviors; students will hopefully be able to utilize the skill sets they gain in class in their personal and professional lives.



## SIYUAN (SIMON) XING
### Assistant Professor

Ph.D. Southern Illinois University Carbondale, Illinois, 2019
M.S. Southern Illinois University Edwardsville, Illinois, 2016
B.S. Sichuan University, Sichuan, China, 2013

*What do you hope students learn from your classes?*

I hope to introduce my students to a scheme of scientific thinking through theories and build them a sense of engineering through experiments to light their passion for acquiring new knowledge and using it to solve real-world problems, and to develop their independent opinions on the development of technologies.

## RICARDO CRUZ LOZANO
### Lecturer

Ph.D. Texas Tech University, Texas, 2017
M.S. Center for Research and Advanced Studies of the National Polytechnic Institute, State of Mexico, Mexico, 2012
B.S. Tecnológico de Monterrey, State of Mexico, Mexico, 2007

*What do you hope students learn from your classes?*

I hope students are able to develop their abilities as design thinkers, and that our learning experiences together in the classroom contributes to their growth in reaching their full potential as great problem solvers, which I believe is one of the most important traits of an engineer.

I'm an avid believer that education is the best tool we have to help us reach our dreams and goals no matter how big they are. That it's a key that can help us open up doors with new opportunities and new experiences, and that it's the most valuable resource we have in order to continuously evolve throughout our life. One of my greatest joys is the opportunity to contribute to the education of young people through my profession as a teacher.

## BEHNAM GHALAMCHI
### Lecturer

Ph.D. Lappeenranta University of Technology, Finland, 2014
M.S. Zanjan University, Iran, 2010

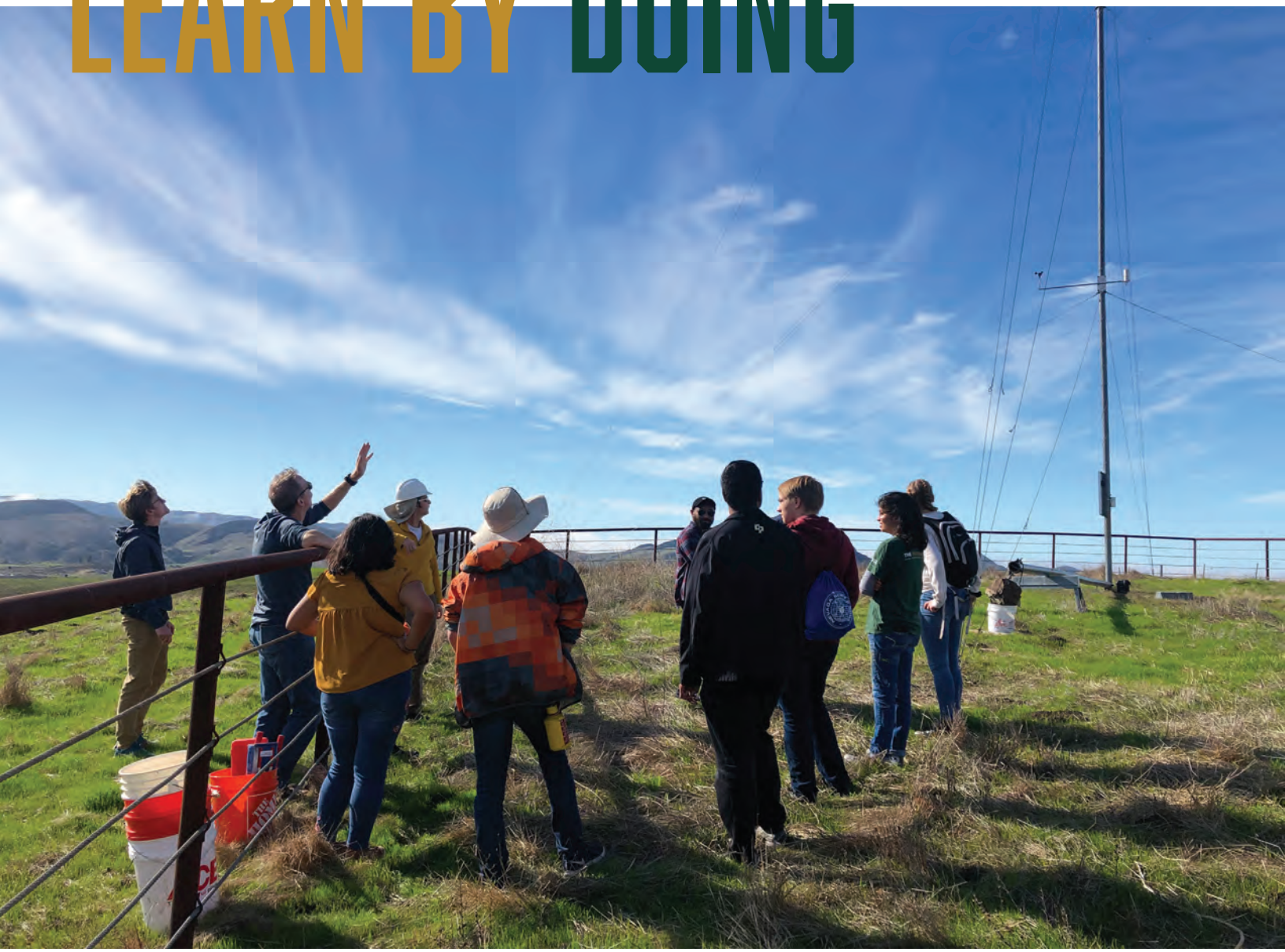
*What do you hope students learn from your classes?*

This past quarter, I taught mechanical control systems. Controls is a very widespread course in mechanical engineering. In my opinion, control is very different than the other classical mechanical engineering courses and this makes students a bit nervous. I usually start on the first day of the class explaining that the course is not defined in mechanical engineering students' comfort zone, but it is very fun to learn a new skill that will be very useful at some point in their future career. I was very happy to see students at the end of the fall quarter talk about the control systems with a clear voice. It was a sign for me that they are learning.

CAL POLY
Mechanical Engineering
COLLEGE OF ENGINEERING

California Polytechnic State University
1 Grand Ave.
San Luis Obispo, CA 93407

# LEARN BY DOING



## CAL POLY WIND POWER RESEARCH CENTER

Students join Professors Patrick Lemieux and John Ridgely for a maintenance day at the Cal Poly Wind Power Research Center. The center was started to conduct applied research and education in support of the wind power industry. The center is located just seven miles from the main Cal Poly campus.