Thank you to our Sponsors!

G3
Packaging, Bottling and Logistics

Preston Pipelines
General Engineering Contractor

Little Sister Orchards
Garth & Michelle Pecchenino

Ag Industrial Manufacturing, Inc.
Specializing in Vineyard Mechanization Equipment and Custom Fabrication

Provost & Pritchard
Engineering Innovative Solutions
The BRAE magazine is written and created by Cal Poly students to keep alumni, students, faculty and friends informed and up to date on the clubs and activities happening in the BRAE department. Below is the team that has worked hard to create this magazine!

BRAE Communications Team

**SOLEDAD CASTRO**
Second year, Agricultural Communication
Graphic Designer, Photographer and Writer

**PAYTON PASCHOAL**
Second year, Agricultural Communication
Photographer and Writer

**JAMES BROADDUS**
Agricultural Communication, ‘19
Writer

STAY CONNECTED WITH BRAE
Keep in touch with the BRAE department by following us on social media!

UPCOMING EVENTS

**SEPT. 17** Start of Fall Quarter

**OCTOBER** Fall Preview 2020

**DEC. 12** CAFES Graduation 2020
We have graduates in just about every community in California, and together we can recruit the best and brightest students.

- Peter Livingston
I thank the great BioResource and Agricultural Engineering (BRAE) staff and faculty for all of their support of our students. We saw 64 seniors graduate in June 2019 and are looking forward to having 50 complete the programs in 2020.

This issue of our magazine was complete and at the printer when this global challenge emerged. In just a few short weeks much of what we know has changed - and will continue to do so. We are almost complete with a virtual quarter and yes, we are all looking forward to the possibility of having in-person labs in the fall. I am so proud of our faculty and students and the way they have embraced this quarter. My real thanks go out to the parents of our students. You did a great job teaching your children to be caring individuals who will be lifelong learners.

The Irrigation Training and Research Center turns 30 this year. The center employs a group of highly trained and dedicated individuals who provide training and research in the field of irrigation to California, the nation, and around the world. The center’s motto is, “moving water in new directions.” Congratulations to faculty member Franklin Gaudi, who is now a member of our tenure-track faculty and was promoted to assistant professor.

Department registration has grown at a manageable pace this past couple of years. As of May 1, we have 164 BioResource and Agricultural Engineering (BRAE) and 140 Agricultural Systems Management (ASM) students, for a total of 301 students. The BRAE numbers are down slightly, but the ASM numbers are up. Our incoming class in the fall will be about 56 BRAE and 24 ASM students.

Our goal over the next few years is to increase the number of applicants, which will continue increasing student quality. We have worked hard to increase the number of transfer students because they are a diverse and high-performing cohort. This year we have six new transfer students, up from two last year. We sponsor the FFA State Finals and have also been recruiting heavily with the California Agricultural Teachers Association (CATA).

We have been using the Daisy Hudson Scholarship to entice students from King and Tulare counties. We have sent out information packages to many schools but got very few direct responses. My hope is to rope some of you: parents, alumni, and industry friends into these presentations.
The BioResource and Agricultural Engineering Department has graduates in just about every community in California, and together we can recruit the best and brightest students.

We rely on your contributions to the department. State funds coming into Cal Poly do not cover all of the costs to provide the hands-on education our students expect. The department uses donations to fund bus trips, specialized class supplies, and to support student projects.

We are investigating turning the large storage space on the east side of the ramp into a “doing” facility. This redesign would create additional space for our capstone design classes and our competition teams while giving Labs 5, 6 and 7 more space for projects, fabrication and research.

The proposed $5 million, two-story building would provide faculty office space, meeting spaces for the students, and fabrication and project space. This would be the first new space for BRAE since 1970. We need a volunteer visionary dedicated to the department who will help recruit other donors.

To volunteer for this most important position, please contact Peter Livingston at:

paliving@calpoly.edu
520-909-7956

BRAE DEPARTMENT ALUMNI AND FRIENDS

The BRAE Department is grateful for any and all donations made to support the students’ endeavors. Projects and other opportunities are available to students thanks to our partnership with industry professionals and private donors.

To get involved, or to volunteer for fundraising efforts with the BRAE Department please contact:

BRAE Department Head
Peter Livingston
paliving@calpoly.edu
520-909-7956
Will Kraemer is a senior BioResource and Agricultural Engineering major at Cal Poly, with a love for hands-on experiences. He is also the reigning Stihl Timber Sports Collegiate Series Western Regional Champion and the fourth-place finisher at the National Championships.

Kraemer was born and raised in San Luis Obispo. Growing up Kraemer played many sports but his love was always for shop classes. Kraemer praised his high school teachers in both industrial technology and agriculture. As a member of Skills USA teams in high school, he won regional and state championships in welding and finished third in nationals as part of a welding fabrication team, and in his senior year his team built a barbecue smoker and won the national championship in Kansas City.

When Kraemer was a sophomore in high school he attended a logging competition at Cal Poly with his uncle, who works for Cal Poly Swanton Pacific Ranch, in Santa Cruz County, where one of the activities is to harvest timber. “There were pros competing with powerful chain saws. It was awesome.” Kraemer said, “When I came to Cal Poly I signed up for the logging team during WOW...I got super involved and started training hard right away.” The team cuts designated Monterey pines that are then replanted with new trees.

Every fall Cal Poly hosts the Cal Conclave Logging Competition that includes teams from schools like Northern Arizona University, Humboldt State and UC Berkeley. Each school can bring three teams composed of eight members that compete in a variety of skills. Each team must have at least two members.

As a freshman Kraemer competed in a multitude of events. His skills continued to improve, and during his sophomore year he went to the Association of Western Forestry Clubs competition in Flagstaff, Arizona. It is the largest forestry competition west of the Mississippi with over 150 competitors. Kraemer finished first and earned the title, “Bull of the Woods.”

During his junior year, Kraemer was elected president of the team. That same year, Cal Poly hosted the AWFC competition in the spring of 2018 — a three-day collegiate competition. On the second day of the competition, the Stihl Timber Sports Western Collegiate Qualifier was also held. Kraemer finished first in two events and second in two others, competing against the best loggers from each school represented. Kraemer qualified for the professional championships and the National Collegiate Championships in Milwaukee last July.

“Timber sports are unlike any other sport I’ve played. At our collegiate competitions everyone is very friendly, there’s no animosity between teams.” Kraemer finished fourth at Nationals in a field of eight regional qualifiers, taking first in the stock saw event.

Kraemer worked for Cal Poly alumnus and professional logger Walt Page. “I worked all week behind two fallers and once they’d fall the trees I’d limb them down and buck them, cut them all to size. Timber sports rewards a good combination of technique, strength and stamina so I work hard on all of them. I hope to compete professionally someday, as much for the love of it as anything else. There’s only one top professional, Matt Koger, who makes a living at it,” Kraemer stated.

“I’ve always been a very competitive person. I work harder when I don’t win. When you couple that with my interest in the equipment — sharp, dangerous stuff, hands-on — it really motivates me. Being on a team, I’ve learned a lot about leadership skills, about responsibility when people look up to you.” Kraemer smiled and said, “Remember when your parents told you never to run with scissors? I get to run through the woods with axes and chainsaws.” So far, Kraemer has experienced a lot of success and I expect the future will be no different.
We would like to take this opportunity to introduce you to one of BioResource and Agricultural Engineering (BRAE) Department’s most colorful alumni, Roger Gibb. Gibb is a great supporter of our program and we look forward to his visits.

In high school Gibb thought he would drive semi-trucks for his entire life, until one hot summer day, his boss pointed him toward Cal Poly, San Luis Obispo.

Gibb began as a mechanical engineering major before transferring into the mechanized agriculture program (the predecessor to the agricultural systems management degree).

Following his graduation in 1965, Gibb began a career and lifestyle around mechanization. He became interested in mechanization and motors when he was a young, but his love of cars dates back to his days in San Luis Obispo.

While at Cal Poly, he was active in the Cal Poly Turtles, a student-run hot rod club. The Turtles, under Gibb’s leadership, hosted monthly drag races for local car owners at the San Luis Air Strip. Club members ran the event and distributed prize money to the racers.
“We always wanted to buy a car as a club, but the insurance was too complicated [as a student group], so instead we hosted a big steak barbecue each quarter for all the club members,” Gibb said.

After graduation from the university, Gibb stayed involved with the mechanical parts, becoming a salesman for parts companies. In one of his first roles with International Harvester, Gibb sold the very first hydrostatic motor in the nation to the Vernon Packing Company.

After his first year on the job, Gibb remembers being asked why he never took a day off and answering:

“Why do I want to take a vacation?” He responded, “I am getting paid to travel the valley, I like the people I call on, I eat well, and I’m having a great time!”

Eventually he transitioned from International Harvester to a car air-conditioning installation company as a regional sales manager.

Gibb remembers interviewing potential salesmen for a full day to see if they were up to the task of working with the customers.

“Our salesmen had to talk to everyone,” Gibb said, “not just the guy in the office, but the mechanic in the shop, the accountant, and the guy in the back accepting packages. It was important they [the salesmen] understood all the different parts of the job before they started.”

Gibb had a long career working for various after-market automotive air conditioning companies.

After his retirement Gibb and his wife began traveling to auto shows with their various Packards. Gibb collects them in all of the body styles, from a two-seater with a jump seat to a four-door 10-seater limousine.

The cormorant emblems on his cars are amazing. The two of them also used to love to participate in Bentley car rallies.

After her passing Gibb honored his wife by purchasing a turbo charged Bentley with a W-12 engine. Said Gibb: “That is the smoothest ride I have ever had.”
CELEBRATING 30 YEARS WITH THE IRRIGATION TRAINING & RESEARCH CENTER
In honor of its 30th anniversary, the Cal Poly Irrigation Training and Research Center (ITRC) has launched a campaign that includes a new vision for irrigation education. Despite the increasing complexity of water issues throughout the world, high-quality education in irrigation-related topics is difficult to find. Whereas at one time there were strong university irrigation and drainage engineering programs throughout the western U.S., almost all have shrunk or disappeared. Pragmatic irrigation classes taught by professors who can combine strong industry and field experience with theory are rare.

What’s the Plan?
The ITRC is producing a comprehensive blended education program in agricultural and landscape irrigation that combines online learning and in-person laboratory training. In a three-phase plan, Cal Poly academic classes (graduate and undergraduate) will be converted to a blended online/laboratory teaching model. Those classes will be provided by Open Enrollment to students outside Cal Poly. Open Enrollment offers Cal Poly classes to students from other universities to take online for credit, and to members of the public to take to further their education. Elements of the courses will be combined to create certification programs that ITRC will offer for non-degree educational options in industry.

Outside funding is being solicited to provide the capital needed to develop a solid blended irrigation education program. Once established, ongoing costs for online course maintenance and on-campus laboratories will be covered through:

- Tuition paid by Cal Poly students in undergraduate and graduate programs.
- Fees paid by participants taking part in the eventual ITRC certification programs.

Our mission is to offer high-quality water education to the following audiences:

- Enrolled students at Cal Poly, in order to ensure the continued creation of future leaders.
- Industry professionals seeking to further their knowledge and training through an ITRC certification program.
- Students at other universities and members of the public looking for high-quality irrigation education through the university’s Open Enrollment system.

Why Cal Poly?
Unlike most other universities, Cal Poly has continually expanded its suite of irrigation classes. Cal Poly is uniquely qualified to provide the most up-to-date, high-quality irrigation education in the Western U.S. The ITRC has been a leader in water and energy technology and research since 1989.
The BioResource and Agriculture Engineering (BRAE) Department is grateful to have Associate Professor Gregory Schwartz as part of the faculty team.

A former Mustang himself, Schwartz shares the students’ pride in Cal Poly and consensus with the Learn by Doing motto.

After completing his undergraduate studies at Cal Poly, Schwartz attended Clemson University with a focus in sustainable vertical farming. His research included zero discharge aquaculture, finding that yields were increased by four times.

His focus centered on the idea of less waste and increased efficiency without a negative environmental impact. He then worked in industry, conducting research at a fish farm.

After 10 years Schwartz returned to Cal Poly to contribute to the BRAE Department. Although he spends most of his time teaching, Schwartz has ongoing research projects in which he enlists the help of his students.

His current projects include algae waste treatment for dairy wastewater as well as hydroponic and aeroponic crop production.

“\nThis project will always keep sustainability at heart.\n- Greg Schwartz”
Students at work

Cal Poly BioResource and Agricultural Engineering students Reed Koehnen, Evan Kimble, Ally Peart, Ian McKallip, Samir Trehan and Antonio Bejarano were approached early fall 2018 with the task of designing a new and innovative way to harvest olives. Astrid Jansen, owner and operator of Foxdale Farms, is the proud farmer and owner of an olive orchard outside of Templeton, California. She was seeking a machine designed to replace the manual harvesting of the olives she grows in her traditional 3-acre orchard.

Every year during harvest time, she drives large machines through the trees into her orchard. These machines extend an arm that attaches to the base of the tree and shakes it until all the ripe olives to fall to the ground waiting to be collected. The olives are gathered from the ground and are taken to the next step in their journey, which requires a lot of labor and time. She wanted efficiency and overall improvement in the way she harvested. So she sought out Cal Poly’s bright students in the hope that they could create a more efficient way to harvest olives. She wanted a machine that would increase product yields and reduce manual labor.

After months of researching, drawing designs, and building prototypes, these students created a machine that goes above and beyond Jansen’s needs. This harvester is designed to reach into the trees and shake the olives loose from the branches. An arm extends into the canopy of the tree, and at the end of the arm there is a cross section of horizontal bars that shake the leaves and branches, letting all the little green olives drop. A platform is extended ready to catch the olives that are then taken upward by a conveyor belt that drops the produce into bins. The team has been hard at work since October of 2018, and after months of diligent labor, they have finally accomplished their mission.

“We need to quantify water and energy consumption to come up with a cost analysis in order to see if it’s worth it to grow plants indoors,” Schwartz said.

Schwartz also assists in advising student clubs, including Grow Crew, Quarter Scale, Bass Fishing Team, and Polyponics, all with “sustainability at heart.”

Schwartz envisions he will continue teaching at Cal Poly and hopes to see his students develop a deeper interest and need for indoor farming techniques.
A group of BioResource and Agricultural Engineering (BRAE) seniors has been hard at work dedicating their senior project to better drought stricken developing areas. The students are working hard redesigning the Borelite Drill. This drill uses a repetitive motion of water well drilling that penetrates the ground until clean water is accessible.

The students are tasked with the mission to replicate the designs of the Borelite Drill so that it is lighter and more compact than before. By doing so, the drill will be easier to transport to areas in need. Allowing accessible clean water available to under-developed areas.

The students dedicated over three quarters to the project. After many hours of work, the project is finally complete.

“We believe that our drilling technology can not only improve but save the lives of millions of people world-wide and empower them to be self-sustaining and healthy,” said Matthew Talbert, chief executive officer of Borelite Manufacturing Co.

Cal Poly students have been asked to take part in the Borelite mission and create a design for the company’s drills that will advance their efforts to provide clean water to rural villages.

The purpose of this drill is to be more easily transportable so that it can be easily shipped worldwide, specifically to villages in Central Asia, South America, and Africa that are in desperate need of clean water.

Photos courtesy of Borelite. For more information on Borelite visit their website: http://www.aquafor.us/borelite/.
The stands are packed. Drinks are on ice. The smell of tri-tip is lingering in the air. Students in yellow shirts surround the track. The engines roar. All of San Luis Obispo knows it’s Tractor Pull season. The Tractor Pull Club is one of six clubs under the BioResource and Agricultural Engineering (BRAE) department. Through this club, men and women across a wide variety of majors work diligently throughout the year to put on Cal Poly’s annual Tractor Pull. In addition to the club, there is a Tractor Pull Team that builds, manages and travels with Cal Poly tractors to tractor pulls across California and surrounding states. Both team and club members take pride in their work and service to the department.

Throughout the year, students modify tractors to compete to see who can pull a certain weight the furthest distance. Categories depend on their weight and number of engines. The tractors pull a “sled” which is a piece of machinery that increases in weight as the pull goes on.

In 1972, the first Tractor Pull on the West Coast was held at Poly Royal. It wasn’t until 1999 when a few bright-eyed seniors built Mustang Fever, the first Cal Poly tractor. In its first year, Mustang Fever successfully pulled at six competitions across the state. Generations of students at Cal Poly had the privilege to work on Mustang Fever until it was retired in 2017.

Cal Poly now has two new tractors: Mustang Legacy and Poly Thunder. One of the team founders, BRAE Professor Emeritus Mark Zohns, calls Mustang Legacy “the youngster with the old engine” since it sports the same World War II airplane engine as the first Cal Poly tractor, Mustang Fever. In 2018, Cal Poly traveled with Mustang Legacy and Poly Thunder to 26 pulls during the season and held top placings at every competition.

Weeks before Open House, the club must build the stadium from the ground up in one of the empty Cal Poly pastures. Everything used - from the bleachers to the ticket booth - is hand built by past Cal Poly students and maintained by present members. The purpose of this event is to raise money for scholarships given to Tractor Pull Club members and BRAE Department students.

From the beginning to present day, all profits from the event have gone toward the scholarships. Each year over $20,000 is awarded. The Tractor Pull Club provides students outside the department unique opportunities to get involved and maybe even earn a scholarship. This year, approximately 20 students from different majors, including statistics and dairy science, are involved in the club. Tractor Pull Club is welcoming to all students and encourages them to step out of their comfort zones, get their hands dirty, and pursue their passion for tractor pulling.

Stay in Touch on Instagram @calpolytractorpull
Students with a focus on the bioresource part of the BioResource and Agricultural Engineering (BRAE) Department did not have a specialized professional club — until now.

Grow Crew was chartered in winter quarter 2019. As the newest club under the BRAE Department, Grow Crew began as a project-centered club and is now beginning to brand itself as a club focused on sustainability, industry connections, and growing leaders.

At biweekly meetings, members of Grow Crew work on projects provided by industry to test a variety of vertical farming techniques, including hydroponics, aquaponics, and most recently, aeroponics.

Because they all share an interest in sustainable restoration engineering, members are thrilled to have the opportunity to work with modern farming technologies.

Kevin Manoj George, a sophomore BRAE student and vice president of Grow Crew, stated, “In the past few years, and in upcoming classes, more and more students have been interested in the BioResource part of BRAE. Grow Crew provides a place to explore further into sustainable vertical farming.”

In addition to testing, Grow Crew produces a number of crops that it plans to sell by partnering with other sustainable farming operations at Cal Poly.

Presently, Grow Crew is building a climate control room in which members plan to study spinach for One Point One, a startup company that sells produce from completely automated farms.

By mimicking real-world projects with contracts and deadlines, Grow Crew offers its members the best preparation for a career in the field of automated farming. In addition to enthusiastic industry support, the Grow Crew officer team thanks department head Peter Livingston and advisor Greg Schwartz for making this idea a reality.

Grow Crew encourages all students with a passion for sustainable agriculture, a good work ethic, and an understanding of the issues solved by vertical farming to join.

A wide variety of majors are working on several projects.

“Their solutions come from all areas,” said club President Megan Campbell.

This diversity of perspectives allows for greater improvement for the club and industry. Campbell states, “This is where agriculture is headed.”
WOMEN IN BRAE
An introduction to some of the women excelling in BRAE

MEGAN CAMPBELL
Megan Campbell is a third-year bioresource and agricultural engineering major from Folsom, California. Campbell is striving toward a career working as a restoration engineer; creating or preserving wetlands and other riparian habitats for wastewater treatment. While at Cal Poly, she was a founding member of the club Grow Crew, an accomplishment she is very proud of. “It allows for people who want to focus on the bioresource side of the department to come together and work on related projects,” Campbell said. We are excited to see where her journey will take her.

ERIKA GOMEZ
Erika Gomez is a fifth-year bioresource and agricultural engineering major from Los Angeles. She is working hard to advance in a civil engineering career. She plans on successfully completing the Fundamentals of Engineering exam and earning her license in civil engineering. She notes that her favorite course so far has been Aquaculture Engineering. She is proud to acknowledge that with an immense amount of hard work and dedication, she has been able to maintain a GPA above 3.0 throughout her years at Cal Poly.

MIKAELEA JENSEN
Mikaela Jensen is a third-year agriculture systems management major, and she plans to graduate in June 2020. She has been very active in the BioResource and Agricultural Engineering Department throughout her three years and played a large role in the Agricultural Engineering Society (AES), which she joined her first week at Cal Poly. Jensen is proud to say that she will be using her degree to work in the beef industry and apply her knowledge to cattle operations.

ZOE RAE GICK
Also from the big city of Los Angeles, Zoe Glick is extremely proud of striving toward a career in agricultural engineering. “I would have never thought a city girl like me would ever be fabricating in machine shops, testing pumps and magnetic flow meters at the Water Resource Facility, or short-circuiting bead boards in the labs!” Glick’s two favorite courses have been a hydraulics class and an irrigation project because they allowed her to gain an irreplaceable experience that will push her toward a career in water resources. After Cal Poly Glick hopes to continue her passion and work as an engineering consultant that specializes in water.
2019-20
AGRICULTURAL ENGINEERING SOCIETY OFFICER TEAM

Ryan Emory
- PRESIDENT

Mikaela Jensen
- VICE PRESIDENT

Ethan Jones
- VICE PRESIDENT

Molli Method
- SMB CAFES REPRESENTATIVE

Bradley Livingston
- CAREER FAIR CHAIR

Michaela Sewell
- SWE REPRESENTATIVE

Megan Caird
- COMMUNICATIONS CHAIR

Megan Campbell
- SECRETARY

STAY IN TOUCH WITH THE AGRICULTURAL ENGINEERING SOCIETY ON SOCIAL MEDIA
The AES officer team hosts an annual banquet where they award scholarships to students and faculty based on their academic achievements and hard work throughout the year. The 2019 AES banquet awarded more than $110,000.
2019 AES BANQUET
AWARDING MORE THAN $110,000 IN SCHOLARSHIPS