Students immersed in hands-on research with faculty mentors gain real-world experience.
FROM THE DEAN

We’ve highlighted student research in this issue because it’s at the heart of what we do in Cal Poly’s College of Science & Mathematics. Learn by Doing isn’t just our motto; it’s a way of approaching the world, a way you — our alumni, donors and friends — embody every day.

In a world that’s changing as rapidly as ours, students need strong problem-solving and critical-thinking skills. That’s what science and mathematics have always taught, and there’s no better way to learn those skills than by pursuing real-world research with a faculty mentor.

Working on a research project, students apply the knowledge they’ve learned in class in a new environment. They get the chance to fail, learn from that failure and innovate solutions. Nothing builds confidence like overcoming challenges. Nothing increases communication skills and helps students see themselves as scientists and mathematicians like publishing peer-reviewed papers and presenting at professional conferences.

We need to give more students the opportunity to pursue research — and not just during the summer. That’s why we’re excited to announce a collaboration with the College of Agriculture, Food & Environmental Sciences on a new research and teaching building.

The building’s science and mathematics facilities will include 15,000 square feet of labs and collaboration space dedicated to research. This additional space will greatly increase the number of students who have access to the college’s excellent undergraduate research program.

Please take a look at the information on page 8 and consider a contribution to the building. Your donation will have a major impact on the next generation of scientists, mathematicians, medical professionals, educators and industry leaders.

You are vital partners in all we do here at Cal Poly, and we greatly appreciate your support.

PHIL BAILEY, DEAN College of Science & Mathematics

IN THIS ISSUE

COLLEGE NEWS
02
Students excel on campus and in the community.

FROM DESIGN TO DISCOVERY
05
Students immersed in hands-on research with faculty mentors gain real-world experience.

INCREASING OPPORTUNITIES
09
Underrepresented students at Cal Poly face and overcome a unique set of challenges.

ALUMNI NEWS
13
Liberal studies alumna Trisha Huynh shares her experiences in Malaysia.

CLOSE UP
15
Biology major Brandon Rowley’s story of love and research.

ALUMNI CONNECTIONS
17
Venture capital partner Mike Abbott chats with current students.

GIVING BACK
18
Your gift makes a difference.
BAKER CENTER RECEIVES LEED GOLD CERTIFICATION

The Warren J. Baker Center for Science & Mathematics has been awarded gold for being green. The 189,000-square-foot structure, which opened for classes in September 2013, earned LEED gold certification by the U.S. Green Building Council.

LEED — Leadership in Energy and Environmental Design — is the national benchmark for the design, construction and operation of high-performance green buildings. Certification means a building has met rigorous standards for sustainability, water and energy efficiency, resource selection and environmental quality. LEED has several levels: certified, silver, gold and platinum.

“We planned and designed the building for LEED certification and were reasonably confident that gold was attainable,” said Dean Phil Bailey. “What a joy to have it confirmed.”

Joel Neel, Cal Poly’s director of facilities planning and capital projects, agreed. “I've been here for 15 years, and it's the building I'm most proud of,” he said. “It's a pretty interesting accomplishment considering it is a science laboratory building with more than 170 fume hoods in it, which means it has a lot of heating, ventilation and air conditioning requirements. All that makes it more difficult to attain gold certification.”

Neel said Cal Poly strives to be a leader and innovator in sustainable design and management of campus buildings, infrastructure and land. The Baker Center designation brings the number of LEED-certified projects on the Cal Poly campus to four, including some of the university’s largest projects for a total of nearly 30 percent of the campus’ 6 million square feet of building space.

HONORED ALUMNUS EXCELS IN PHARMACEUTICAL INDUSTRY

Jeffrey Jasper (B.S., Chemistry, 1984) is the 2015 Honored Alumnus in the College of Science & Mathematics. Jasper is vice president of preclinical sciences at Revolution Medicines and has more than 20 years experience in the pharmaceutical industry. His areas of expertise include molecular pharmacology and preclinical drug development in the areas of neuromuscular, gastrointestinal and respiratory diseases.

After earning his doctorate in pharmacology at UCSD’s School of Medicine and completing his postdoctoral training at Stanford, Jasper worked for several pharmaceutical companies, including Merck & Co., Roche, and Theravance. At Theravance — and in collaboration with GlaxoSmithKline — he helped develop the medicine Breo Ellipta, now marketed for the treatment of chronic obstructive pulmonary diseases, such as emphysema. Also at Theravance, he contributed to two respiratory disease medicines now in late-stage clinical development.

Jasper went on to co-found Altos Therapeutics, a specialty company dedicated to developing pharmaceuticals for gastrointestinal (GI) disorders for which few or no treatments are currently available.

Jasper has served for more than 18 years as a member of the editorial board for the American Journal of Physiology and has published 50 scientific articles in peer-reviewed journals.

Photo Credit: Brittany App

View related video online at cosam.calpoly.edu/intersections

Pictured: Jeffrey Jasper
BIOLOGY STUDENT AWARDED NSF RESEARCH FELLOWSHIP

Cal Poly biological sciences graduate student Paul Carvalho was awarded a National Science Foundation (NSF) graduate research fellowship. The grant will fund three years of his master’s and doctoral programs, allowing him to continue researching fisheries — work that he started as an undergraduate at Cal Poly.

The fellowship supports outstanding graduate students pursuing research-based degrees in science, technology, engineering and mathematics. This is the second consecutive year that a Cal Poly biological sciences student has been awarded the fellowship.

"This is the most coveted award for a graduate student in the sciences," said Professor Crow White, Carvalho’s research advisor. "It opens the door to getting into the most competitive doctoral programs."

"Before I got the grant, I wasn’t 100 percent sure that I was going to do my Ph.D.," said Carvalho. "The NSF fellowship really opens doors because I can connect with people who are interested in fisheries modeling. It will also allow me to focus on research without having to worry about outside funding sources."

Carvalho and White traveled to Fiji in the summer of 2014 to study how small-scale fisheries there use periodical harvesting that is based around cultural events such as marriages or deaths. Based on the data they collected, Carvalho is now creating ecological models to predict how fish populations will respond to this management technique.

"This research is exciting because it’s important not to overexploit our natural resources," said Carvalho. "Fishing is also extremely economically important — it employs millions of people around the world."

STATISTICS STUDENT NAMED TO SAS STUDENT AMBASSADOR PROGRAM

Isabel Litton (B.S., Statistics, 2015) was named an SAS Student Ambassador in her senior year — one of only seven in the nation and two in California. The competitive program is designed to recognize and support students around the world who are using SAS analytics software in innovative ways that benefit their respective disciplines.

Litton presented her research at the SAS Global Forum in Dallas, a gathering of more than 5,000 SAS software users working in business and information technology. Her presentation, "Tweetomatic: An Automated Approach to Batch Processing of Tweets," described how to automate data retrieval from Twitter.

“I was shocked and honored to be chosen out of all the applicants,” said Litton. “With more and more students realizing the value of analytics expertise for research and their careers, the competition to be named an SAS Student Ambassador has never been more fierce,” said Jerry Oglesby, senior director for the SAS Global Academic Program and Global Certification.

Litton is now pursuing a master’s degree at the University of San Francisco and plans to become a data scientist.

Pictured: Biological sciences student Paul Carvalho scuba dives off the coast of Fiji.

Pictured: Isabel Litton Photo credit: Tenney Rizzo
The first grant funds the Math and Science Teacher Leadership Collaborative, which consists of 60 third- through fifth-grade teachers in San Luis Obispo County. The teachers collaborate on learning activities based on the Next Generation Science Standards, which will be used in schools beginning in 2016.

"It’s so important for the people who will be teaching the next generation of scientists to have the resources they need to become experts," said Lola Berber-Jimenez, chair of the Liberal Studies Department.

Central Coast STEM Institutes, funded by a second grant, follow a similar model. More than 70 teachers from the Santa Maria-Bonita School District will receive instruction in mathematics content and best teaching practices. They will then partner with Cal Poly faculty members to construct lessons that address the Common Core Standards and include activities.

"Applying mathematics in other contexts, such as simple engineering projects, helps students relate math to the real world," said Kate Riley, the mathematics professor who leads the program.

"I’m gaining a huge amount of content knowledge that will help me better convey scientific concepts to my students," said Charlie Berry, a fourth grade teacher at Kermit King Elementary School in Paso Robles and member of the Teacher Leadership Collaborative. "The students in my class have been able to do a variety of hands-on STEM activities and put their ideas to work by developing new inventions."
Student-faculty research is exploding in the College of Science & Mathematics. This summer, almost 200 students and their faculty mentors investigated a wide range of innovative subjects, from new anti-malaria drugs to liquid crystals, from data recovery algorithms to the mating success of the Cuban freshwater fish Girardinus metallicus. They built computer clusters and telescopes, and traveled to the U.S. Virgin Islands and Geneva, Switzerland.

Most importantly, they learned the skills they will need to be professional scientists and mathematicians; teachers who will inspire the next generation to pursue science, technology, engineering and mathematics; and future leaders in medicine or industry.

“Science education today is all about teaching students how to actually be scientists,” said Emily Taylor, a biology professor who runs multiple research projects with students. “There’s no better way to embrace Cal Poly’s Learn by Doing motto than for students to get their hands — or gloves — dirty doing research alongside our faculty.”

Mason Dubois got his first taste of fieldwork this summer, investigating the thermal biology of western fence lizards in the southern Sierras with Taylor. “This was a unique
experience for me,” Dubois said. “As a student, I was part of this study from day one: designing the experiment, creating our hypothesis, and then going to the field to collect data to test our hypothesis.”

These student-faculty research projects can have real-world impact. Chemistry professor Andres Martinez, three faculty collaborators, and 11 students developed a pencil that health care providers could use to easily and inexpensively test for diseases such as HIV. Users would simply color inside the wax lines on a piece of chromatography paper and add a drop of blood or urine. If the paper changes color, the disease is present. The technique, which has been submitted for a patent, is well-suited for use in developing countries that often lack both funding and facilities.

“Because we wanted to make the reagent pencils available to people in resource-limited settings, I received a lesson in practicality,” said Tyler Sisley, who worked in Martinez’s lab over the summer. “I had to look at safety data and costs...
to determine whether or not I should pursue certain experiments based on their affordability, environmental contamination and safety. These skills will definitely benefit me later on in industry or research.”

“Students start working independently very early on,” Martinez said. “They make their own mistakes and learn from them. They also really appreciate having a product at the end of the day. They can see it. They can touch it. It’s easy to see how it can be used in the real world.”

As part of the research process, students also present their work at professional conferences and co-author peer-reviewed papers. By communicating their results to the scientific community, they not only gain a deeper understanding of what they’ve accomplished but also gain confidence and build a network of professional connections.

Vibrant research continues throughout the year, but the available facilities are more limited when classes are in session. With additional space, more research opportunities would be available to students.

The College of Science & Mathematics has the opportunity to partner with the College of Agriculture, Food & Environmental Science on a new research and teaching building that would include 15,000 square feet of dedicated research space. Though a generous lead donor has stepped forward, the college still needs to raise $3–5 million to make the building a reality.

“One of the things that makes Cal Poly special is that our faculty members focus on providing research opportunities for students,” said Dean Phil Bailey. “This building is critical to the growth of our student-faculty research program.”

Construction is slated to begin in 2018, and students and faculty will begin moving in during 2020.

“We have an excellent student-faculty research program,” Bailey said. “This building will help establish Cal Poly as a leader in undergraduate research.”

"THESE SKILLS WILL DEFINITELY BENEFIT ME LATER ON IN INDUSTRY OR RESEARCH."

Pictured: This summer, student researchers in the Chemistry & Biochemistry Department gathered with their faculty mentors and Dean Bailey (far right) to present their research results at a department symposium. Photo credit: Tenney Rizzo
WE NEED YOUR HELP TO COMPLETE A NEW UNDERGRADUATE RESEARCH AND TEACHING BUILDING.

Thanks to a generous donor, much of the funding is secured, but the college still needs to raise $3–5 million to build the best facility possible. We’re working on an accelerated fundraising timeline because the architects will begin drawing plans in just one year. Gifts of all sizes will make a difference in the lives of current and future students.

SUPPORT THE FUTURE OF STUDENT-FACULTY RESEARCH

NAMING OPPORTUNITIES ARE AVAILABLE AT THE FOLLOWING LEVELS:

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YOUR GENEROSITY COULD PROVIDE:

15,000 SQUARE FEET OF LABS AND COLLABORATION SPACE

5X THE DEDICATED RESEARCH SPACE IN THE WARREN J. BAKER CENTER FOR SCIENCE AND MATHEMATICS

HUNDREDS OF STUDENTS GAINING HANDS-ON EXPERIENCE

TO MAKE A GIFT OR LEARN MORE, CONTACT:
Ruzena Brar, Director of Advancement
rbrar@calpoly.edu or 805-756-6534
Phil Bailey, Dean
pbailey@calpoly.edu or 805-756-2226
Increasing Opportunities

UNDERREPRESENTED STUDENTS AT CAL POLY FACE AND OVERCOME A UNIQUE SET OF CHALLENGES.

Long lines at Starbucks are not the problem for many first generation and underrepresented students. Eating, paying tuition, navigating an unfamiliar college landscape, and finding a sense of belonging are much higher on the list. University-wide, only 67 percent of underrepresented students will graduate in six years, as compared to 81 percent of white students.

The university has made it a priority to close the graduation gap and increase enrollment and retention of underrepresented students. For those who tap into the services the university offers and find a place on campus, their Learn by Doing experiences at Cal Poly and their degrees open up worlds their parents could only dream of. Meet two young women in the College of Science & Mathematics who have done just that.

ANA MARIA NUNEZ CASTREJON
You might mistake Ana Maria Nunez Castrejon’s quiet demeanor for reticence. It would be a big mistake. The biological sciences senior is better described as tenacious.

Only the second in her family to attend college, Castrejon swam somewhat blindly into the stream of college admissions. “I knew that college was something I needed to do, but I wasn’t entirely sure what it was. I just knew you get good
I was thinking, ‘My dad makes a lot less than that, and I’m sitting here.’ Following her freshman year, Castrejon considered transferring to CSU Bakersfield, but her older sister, who inspired her to pursue biology, also gave her a reason to stay at Cal Poly. “My sister didn’t have the opportunity to go anywhere else,” Castrejon said. “I didn’t want to throw away all the opportunities that she didn’t have.”

Fortunately, during her second year, Castrejon found the Louis Stokes Alliance for Minority Participation (LSAMP), a National Science Foundation-funded program that aims to increase the graduation rates of students from underrepresented groups in STEM disciplines. Through LSAMP, she found programs that supported her academically and people who understood what life felt like for her on the Cal Poly campus.

Castrejon grew up in Bakersfield, Calif., where her sister attended CSU Bakersfield while living with their parents. Choosing Cal Poly meant Castrejon was the first to move away from home, not a small decision for a Latina woman from an immigrant family and not one that worked well at the beginning.

“I felt like I didn’t belong here,” Castrejon said. “In one class, a student said in her speech that if you made a certain amount of money, you wouldn’t be able to support your family, and I was thinking, ‘My dad makes a lot less than that, and I’m sitting here.’”

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“ grades and do volunteer work and then they let you in. I didn’t know about financial aid, loans or anything like that,” she said.

“ *I FELT LIKE I DIDN’T BELONG HERE.*”

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During the summer of her sophomore year, Castrejon applied for and was awarded a spot in the Costa Rica CSU LSAMP research program. She received a travel reimbursement and a stipend to study rainforest plants and parasites on deep ocean fish. It was only the second time she’d been outside of California.

“I couldn’t believe I got it at first. I thought it was a mistake,” Castrejon said. “My parents were really afraid. I had to keep reassuring them that it was through the university.”

Following the experience in Costa Rica, Castrejon presented her research at the Society Advancing Chicano/Hispanics & Native Americans in Science conference in Los Angeles, which solidified her confidence in her scientific abilities. She never looked back, seeking out an on-campus research position where Castrejon has worked for the last year-and-a-half.

“Ana has actively sought out Learn by Doing experiences that broaden her horizons while allowing her to delve more deeply into specific topics she’s passionate about,” said Biology Professor Sandi Clement, Castrejon’s research advisor. “This summer, Ana performed a set of technically challenging cell and molecular biology experiments more typically performed by advanced graduate students than by undergrads.”

“I’ve grown. I have a lot more confidence in myself. I didn’t know much about college, and now I’m thinking about the possibility of grad school,” Castrejon said. “I’ve earned my spot, and I’m just as capable as anyone.”

**MARGARET AUDI**

A native of Kenya, Margaret Audi lived in Botswana and the U.K. before her family settled in Riverside when she was 10 years old. Audi felt at home wherever she landed — until she arrived at Cal Poly.

“In our dorm, only two out of 80 students were black. I felt like there was a microscope, and everyone would know what I did,” said Audi, a senior kinesiology major.

When Audi smiles, the whole room lights up, and she exudes a confidence that belies the difficulties she’s felt as a minority student on campus and in the larger San Luis Obispo community.

“Every time I go downtown, I always get asked, ‘Where are you from? Is this your first time in SLO?’ They never assume I’m a student,” Audi said. “So I don’t like going downtown that often.”

Audi spent one quarter of her junior year at CSU Long Beach while she considered leaving Cal Poly. The strength of the kinesiology major and Cal Poly’s Learn by Doing approach drew her back. “The Learn by Doing model is why I came here, and I really appreciate it,” she said.
The love of learning that brought Audi back to Cal Poly also led her to get deeply involved in the campus and San Luis Obispo communities despite the social difficulties. She added an ethnic studies minor; researched the health of underrepresented students with Kinesiology Professor Heather Starnes; and took an internship with the City of San Luis Obispo, working on the city’s action plan.

“Being involved and aware of your surroundings is really important because it helps you to shape and form public opinion. Knowledge is power,” Audi said. “It’s important not to be self-absorbed and to be more self-aware.”

Following her own advice, Audi took the rare step of trying to improve the campus culture for underrepresented students who come after her, specifically in the area of group projects. During group work, Audi often found that her fellow students disregarded her opinions. Not one to let an unfair situation persist, she decided to do what she could to change the situation.

She conducted a workshop with LSAMP students and asked them about their experiences working in groups. She solicited suggestions from the students on how professors could change group dynamics in the classroom. Audi will distill the information she collected into an information sheet to be distributed to faculty members through the Center for Teaching & Learning.

“Cal Poly has really shaped me into the person I am today. The good and bad experiences have made me a stronger person,” Audi said. And then, in her typically thoughtful way, she showed us all the way forward: “Because people have not been empathetic toward me, it forces me to be empathetic toward others. My experience of not being understood has helped me try to understand others.”

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“When I think of Margaret as a role model for the future of Cal Poly and the broader workforce, it is her commitment to integrating her knowledge about social justice with her STEM major that is truly exemplary,” said Jane Lehr, chair of the Women’s & Gender Studies Department and director of LSAMP. “Margaret truly exemplifies the idea that Learn by Doing can simultaneously provide a strong professional foundation and address equity and access — we do not need to choose between these options.”

Audi credits her mother, a nurse, as the source of her passion for helping others and the MultiCultural Center and Intervarsity Christian Fellowship as her stalwart support centers on campus. She hopes to get her doctorate in kinesiology, and through LSAMP, is applying to the Bridges to Doctorate Program, which provides financial aid for a master’s program as a first step.

“Cal Poly has really shaped me into the person I am today. The good and bad experiences have made me a stronger person,” Audi said. And then, in her typically thoughtful way, she showed us all the way forward: “Because people have not been empathetic toward me, it forces me to be empathetic toward others. My experience of not being understood has helped me try to understand others.”
EXTREMELY UNCOMFORTABLE AND UTTERLY AMAZING

Liberal studies alumna Trisha Huynh (B.S., 2015) spent a year in Malaysia as part of the Fulbright English Teaching Assistant program in 2015. She shares her experiences below.

FEBRUARY: ARRIVAL IN SETIU, TERENGGANU STATE, MALAYSIA

I wholeheartedly believe that getting outside of one’s comfort zone leads to personal growth, which is one reason I applied to the Fulbright program. I didn’t realize how far out of that zone I would be in Setiu, the rural village where I teach English to seventh through 11th grade students at an Islamic school.

Cows, chickens, monkeys and monitor lizards run freely through the village. An incredible diversity of lush plants grow everywhere. I constantly battle the mold and insects that are prevalent in the stately home that is far too nice for just me and my housemate, a fellow English teaching assistant.

The community is extremely kind — staff members strive to speak broken English, our landlady invites us over for weekly dinners, and the neighborhood kids rattle our door to play and sing silly songs together.

Everything here is insanely weird, extremely uncomfortable and utterly amazing — all at the same time.

MAY: GIRL POWER ENGLISH CAMP

I never thought that I would turn into one of those people, the type who sees cultural differences and focuses only on the negative. Yet I now see the rusty nicks; the old, ragged tears; and the gaping holes that exist in Malaysia.

Most bothersome is the prevalent inequality between genders. My female students dream of becoming doctors, engineers and athletes, but I fear these are only dreams — the odds are, they will grow up to be housewives.

To address this issue, I spent months organizing a Girl Power English Camp. At the event, my girls would participate in activities that would encourage them to become confident leaders and pursue their academic goals.

On the morning of my camp, one girl stated, “Miss, I can’t come today.” I soon discovered that only five of 60 students who had signed up could attend. Extra classes, marching practice and family emergencies had taken precedent. In classic
Malaysian fashion, disaster had struck at the last minute.

I proceeded to ask — and eventually beg — every girl at school to attend, but didn’t know whether anyone would come. When camp started, only two students had arrived.

I clenched my fists in frustration. Finally, 15 minutes late, groups of girls began to arrive, giggling and excited.

Soon, I was listening to 47 girls with bright, excited eyes and wide smiles chanting, “I am beautiful. I am brave. I am strong.” Their sweet voices made all my efforts worthwhile. Although this camp put only a small dent in gender inequality, it was a step in the right direction.

JUNE-JULY: RAMADAN

During the month of Ramadan, Muslims fast from sunrise to sunset to gain greater compassion for those without basic life necessities.

On the first day, I joined my students in their celebratory ritual. At 5 a.m., I ate breakfast and felt fine until 11 a.m., when I was mildly parched. By 1 p.m., my rumbling stomach controlled my every thought. After trudging home from school at 3 in the afternoon, I fell into a long nap and didn’t bother waking until iftar, or breaking fast. Surrounded by good friends and good conversation, I finally ate. Never before had I been so grateful for a meal.

As the holiday continued, the shared experience created a sense of Muslim pride and brought the community together.

On the last day of Ramadan, I participated in the final iftar at my school. The excited staff and students gathered in the hall early, chattering about the past month’s hardships and blessings. Everyone piled their plates high with sweet dates, fluffy rice and freshly fried fish. At 7:22 p.m. on the dot, the call to prayer echoed through the village. Everyone closed their eyes and bent their heads to pray to Allah. Then the festivities began, and we all joyously dug into our food. It was absolutely luscious.

Sitting back to enjoy the moment, I looked over at my smiling students and felt immense respect for them for having made it through the difficult month. I was so fortunate to be welcomed by this community, partake in this experience, and soak in all that Malaysia has to offer.

OCTOBER: PREPARING TO LEAVE

If I had known what this year would entail, I probably wouldn’t have taken the grant. It’s been unbearably hot and humid. I’ve found far too many ants in my food. I’ve cried from both deep-seated frustration and utter jubilance in the same day.

I came to Malaysia thinking that I would be able to assimilate to the culture. In August, I realized that I came as an outsider, and as much as I tried, I would always remain one.

Nevertheless, I would not exchange this year for the world. I scuba-dove throughout Malaysia, learned to appreciate my community’s deep Islamic devotion and faith, and shared joyful conversations with friendly strangers.

The highlight of my experience was, by far, my students. I made Anis howl with laughter and talked openly with Amar about Judaism. I learned about Ukasyah, Haifz, Salam and Afiq’s dreams for the future. I consoled Citi over her parents’ recent divorce. I taught Liyana, Izzah and Ain to be brave, confident girls.

These students are what I will remember of Malaysia. Tearing myself away from the roots I have grown here will be bittersweet. //
That meeting led Rowley to Jasmine who, in her youth, had toured the country, appeared on Letterman and Leno, and even spent time with animal expert Jack Hanna. Yes, Jasmine was a tiger, and when Rowley met her, she was dead.

CHAPTER 1: NECROPSY

Jasmine spent most of her life with Zoo to You, a charitable organization based in Paso Robles, Calif., that rescues wild animals and provides conservation education. When Jasmine died at 19 — a ripe old age for tigers — Zoo to You wanted to know what caused her rapid decline. They placed the fateful call to Perrine, the one that Rowley walked in on, asking whether Perrine could perform a necropsy, an autopsy for animals.

Rowley, already interested in big cats, lost no time in convincing Perrine he was the student for the job, and in March 2014, he met Jasmine for the first time. She had no skin and was ready for dissection.

Rowley got to know Jasmine intimately during the necropsy — every muscle, organ and tendon. He and his fellow students weren’t only searching for the cause of death, which turned out to be kidney problems and maybe lung cancer. They had a larger vision: Jasmine would become a skeleton that Zoo to You could use as an educational piece.

“Jasmine was an icon for conservation all over the world. She touched the lives of millions of people,” Rowley said. “In death, she can continue to educate people about anatomy and the illegal trade in tiger bones.”

But to get to the bones, you have to remove the tissue surrounding it.

CHAPTER 2: MACERATION

After cutting off as much muscle as possible, Rowley and his team faced a critical question: carrion beetle, boiling water or bacteria. That is, what’s the best method to remove the remaining flesh?
Rowley, dedicated to both Jasmine and his education, used all three methods, none of them for the faint of heart. "I think the hardest part about the boiling is that you have to be with it the whole time," Rowley said. It does, however, smell better than the flesh-eating bacteria that grows when the bones are soaked in cold water for an extended period of time.

In fall 2014, with the flesh removed, the student team whitened the bones with laundry detergent and set out to make Jasmine whole again, a process otherwise known as rearticulation.

CHAPTER 3: REARTICULATION

But how to best connect the bones of a tiger skeleton? Do you wire your true love together, letting the whole world see that unsightly copper?

Rowley wanted something more elegant for Jasmine, so he chose a method developed by local expert Ron Ruppert, chair of the Division of Biological Sciences at Cuesta College. Rupert’s technique involves drilling a quarter inch hole in the bones, running a steel rod through, then filling the cavity with hot glue. The result would be a gleaming white skeleton with no sign of the mechanism holding it together.

But Rowley had never drilled a hole in much of anything. His hot glue gun skills were rudimentary at best. And he had exactly one chance to get it right for each bone.

“I never thought that the first time I’d be drilling things would be through tiger bones,” Rowley said.

Enter Biological Sciences Department technicians Mike Stiles, Dave Clendenen, and Rob and Doug Brewster, adept at assembling pretty much anything. “We really couldn’t have done it without these guys,” Rowley said.

As Jasmine’s skeleton began to take form, Rowley realized how much she was already teaching him. “I’d never done anything like this,” he said. “I learned to have foresight, know when to ask for help, and to take it one step at a time. I also really learned the anatomy from the outside in, bone by bone.”

Rowley and his team completed the rearticulation in spring 2015. Though she will eventually return to Zoo to You, Jasmine currently resides in Fisher Science, and she is beautiful.

“People can go in and touch the bones and feel how amazing the joints are and how they articulate perfectly,” Rowley said.

Now that’s true love. //
SO WHAT’S IT LIKE TO BE A VENTURE CAPITALIST?

Honored Alumnus Mike Abbott sat down with students to talk about what Cal Poly biochemistry has to do with being a vice president at Twitter and a partner at venture capital firm Kleiner Perkins Caufield & Byers. Following is an excerpt from that conversation.

WHAT WAS THE MOST CHALLENGING PART OF YOUR JOB AT TWITTER?

I was brought in to rebuild the team and the infrastructure. The part I wasn’t sure about was that shiny new things always had higher priority than “Is the site available? Is it performing?” One of the cultural changes — and the founders were very supportive — was, how do we get “Is the service up and running” on par with the other?

WHAT WAS IT LIKE FIXING THE OBAMACARE WEB-SITE? HOW DID YOU GET PULLED INTO THAT?

My partner John is close to the president. My role in this was to figure out, could we fix it or did it all have to be rewritten? After two days, I determined we could fix it because the contractors were open to us making a lot of changes.

WHICH DO YOU ENJOY MORE, LEADING TEAMS OR BEING A VENTURE CAPITALIST?

This particular role has high intellectual return and low emotional return, and I think leading teams is the opposite. I try to fill that emotional component through, for example, helping an entrepreneur hire a designer or introducing them to Pepsi as a customer.

HOW MUCH IMPACT DID YOUR BIOCHEMISTRY DEGREE HAVE? WOULD YOU GO BACK AND DO A DIFFERENT DEGREE?

I wouldn’t change a thing. One of the primary things I learned during my time here was how to learn. That in itself was incredibly important. I’ve had the most random career path you can imagine, and I really enjoy being uncomfortable. I think that notion of intellectual curiosity is one of the things I got here. [Cal Poly] didn’t pay me $20 to say that.

ONE OF THE PRIMARY THINGS I LEARNED DURING MY TIME HERE WAS HOW TO LEARN.

WHAT WERE YOU LIKE WHEN YOU WERE A STUDENT AT CAL POLY?

I was not exceptional when I was at Cal Poly. (Chemistry professor emerita) Tina Bailey’s class was really an inflection point for me that impacted the rest of my life. Up until I took Metabolism, I was just cruising along. I made all these little decisions here and there, but the butterfly effect for me was genuinely that class. It set in motion in me that desire to learn. I can’t stress that enough.

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Gifts of all sizes impact the lives of students every day. Here are some examples of how your gift can support Learn by Doing:

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<thead>
<tr>
<th>Amount</th>
<th>Description</th>
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<tbody>
<tr>
<td>$13</td>
<td>Provides 1 gallon of glue for STEM night in local schools</td>
</tr>
<tr>
<td>$50</td>
<td>Brings 2 new molecular model kits into the general chemistry studio</td>
</tr>
<tr>
<td>$150</td>
<td>Registers 1 kinesiology student to present her research at the Southwest Chapter of the American College of Sports Medicine conference</td>
</tr>
<tr>
<td>$500</td>
<td>Sponsors travel, lodging and registration for 2 statistics students to participate in Datafest</td>
</tr>
<tr>
<td>$1,000</td>
<td>Keeps 2 high-field NMR spectrometers stocked with liquid nitrogen and helium for 3 months of undergraduate research</td>
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<tr>
<td>$5,000</td>
<td>Gives 1 teacher candidate 1 year of teaching experience in an elementary school classroom</td>
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<tr>
<td>$3,200</td>
<td>Adds 1 smart panel for student-faculty collaboration in the math studio classroom</td>
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<tr>
<td>$8,500</td>
<td>Gives physics students a Pockels cell and driver for an optical measurement system</td>
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<tr>
<td>$25,000</td>
<td>Provides a new polymerase chain reaction machine for biological sciences students to do DNA work</td>
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