INSIDE 180

Take a closer look at how students are using the new Warren J. Baker Center for Science & Mathematics
FROM THE DEAN

Walking through the new Warren J. Baker Center for Science & Mathematics during finals week reminded me why we’re here at Cal Poly: the students. The building was packed with students studying for exams. Groups gathered in the living rooms for impromptu study sessions, and they were surrounded by beautiful, science-based art.

These students are inspiring: their energy, their enthusiasm, their excitement about learning. We want to give you a feel of that excitement, a taste of what Cal Poly is today.

To do that, you have to get closer. You have to go with the students inside the classrooms and the research labs, onto the first voyage of our new research vessel and into the local community. But it doesn’t stop there.

The College of Science & Mathematics isn’t only the students, faculty and staff on campus. It extends into every corner of the globe where our alumni are making a difference.

We know you bring your Cal Poly experience into your lives as resourceful professionals and industry leaders. We know you still Learn by Doing as much as you did when you were here, as much as our current students do.

We hope this magazine and our quarterly e-newsletters bring you closer to life on campus. Please keep in touch and bring us closer to the Cal Poly life in your corner of the world.

PHIL BAILEY, DEAN
College of Science & Mathematics

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Cal Poly Takes Home Coatings Awards

Students in polymers and coatings program swept the poster awards at the Western Coating Symposium in Las Vegas, taking first, second and third place. Symposium organizers Larry Teachout from Behr Process Company and Eunice Leung from BYK USA visited campus in November 2013 and honored the winners with cash prizes of $1,200, $600 and $300, respectively.

Franceska Santos took first place with her research into how the interaction of chemicals at the molecular level changes the performance of paint in areas such as durability, appearance and strength. Grant Olson’s work on developing a new material for use in solar cells earned him second place, and Kim Varney placed third for her investigation of self-healing coatings in which the atoms can be pulled apart and then stuck back together by applying heat.

Cal Poly Places in Top Seven Percent at Prestigious Math Competition

Cal Poly placed an impressive 36th out of 557 schools participating in the 2013 Putnam Math Competition. This was Cal Poly’s second top 50 finish in three years on the notoriously difficult annual exam taken by undergraduates.

The six-hour exam consists of 12 problems solved in two three-hour sittings, no calculators allowed. Out of a possible 120 points, the median score for the 2013 exam was one point.

“We are very excited about our students’ performances,” said Professor Morgan Sherman, who coached the team this year. “The exam focuses on creativity and problem-solving skills, areas where Cal Poly students excel, and we see that they can compete with some of the best schools in the country.”

Brian Jones was the top scorer for Cal Poly with 30 points and an overall ranking of 266th out of 4,113 competitors, which placed him in the top 6 percent. Matthew Rodrigues scored 28 points for a rank of 365th, and freshman Michael Boulos scored 10 points for a rank of 1,324th.

Pictured: Western Coatings Symposium poster winners received cash prizes from industry sponsors during the dedication of the Baker Center. (Left to right): Larry Teachout from Behr Process Company; students Kim Varney, Franceska Santos and Grant Olson; and Eunice Leung from BYK USA.

Pictured: Brian Jones was Cal Poly’s top finisher on the Putnam Math Exam with 30 points. The median score at the competition was one point. Photo credit: Jonathan Shapiro
BIOLOGY STUDENT BUSTS MYTHS ABOUT MONARCHS

Much of what you thought you knew about monarch butterflies may be wrong. Jessica Griffiths, a biology graduate student, has been studying monarchs’ overwintering habits for three years, and her discoveries could change the way monarch habitat is protected.

“Many monarchs probably use multiple overwintering sites during the season,” Griffiths said. “This means that we can’t just protect one or even two sites in an area, we need to protect them all. We should be managing at the landscape level, not the site level.”

Griffiths also discovered that monarchs don’t prefer any species of tree and that they use native conifer species, such as Monterey pine, more often than eucalyptus.

“This work is based on one of the most basic steps a scientist can take — to test a broadly held notion that has actually never been tested,” Villablanca said. “There is no better way to learn the scientific method than to apply it.”

Griffiths credits this Learn by Doing experience with helping her become a better scientist. “When doing field work, you’re constantly trying new things, running into obstacles and working around them. You have to be able to solve problems creatively.”

Conservationists have long based their management practices on the assumption that monarchs spend the entire winter at the same site. Designing her own hands-on research approach with the help of Professor Francis Villablanca, Griffiths challenged this assumption.

She and a team of Cal Poly students tagged and counted monarchs at three different sites in San Luis Obispo County at different times. Griffiths’ findings suggest that there is much more movement than previously thought, especially among neighboring sites.

WE CAN’T JUST PROTECT ONE OR EVEN TWO SITES IN AN AREA, WE NEED TO PROTECT THEM ALL.

PHYSICS PROFESSOR HONORED BY AMERICAN PHYSICAL SOCIETY

Election as a fellow of the American Physical Society is one of the highest honors a physicist’s professional peers can confer. Only three Cal Poly faculty members have received this accolade, and Randy Knight, elected in 2013, is the third.

Fellows are recognized for exceptional contributions to physics. Knight was elected for his contributions to physics education. His textbooks “Physics for Scientists and Engineers” and “College Physics” were the first physics textbooks to take advantage of research into education and cognitive psychology that shed light on how students learn physics.

In the 1980s, researchers found that traditional instruction often didn’t change students’ serious misconceptions about the physical world. “Research also indicated that there were more effective ways to teach many topics, ways that encourage students to be more actively engaged with the material,” said Knight. “That research-based approach is what I incorporated in my textbooks.”

Knight is currently working on a new digital textbook for science and engineering majors.

Pictured: Professor Emeritus Randy Knight displays the textbooks he authored.
PINK AND DUDE CHEFS BRING HEALTHY CUISINE TO LOCAL MIDDLE SCHOOLS

Something’s cooking in the Solutions Through Research in Diet and Exercise Center (STRIDE) — a whole world of things to be exact. Pink and Dude Chefs, the center’s after-school nutrition and culinary program, introduced a new curriculum last year. Students from Mesa Middle School in Arroyo Grande, Calif., learned recipes from a different country each week, including France, Italy, Greece, Morocco, Japan and Thailand.

In keeping with STRIDE’s focus on obesity prevention, the young chefs learned to prepare nutritious snacks and meals. They then took their newfound skills home to inspire their families to eat a healthier diet.

The sizzle is spreading as Pink and Dude Chefs prepare to roll out an online campus — a full curriculum, including support materials, that will soon be available to anyone with an Internet connection.

“Pink and dude chefs is more than an excellent tool for nutrition education and culinary skills training. It is a fundamental improvement in the way that we approach health promotion and obesity prevention among young people,” said Aydin Nazmi, STRIDE’s director.

TEACHERS-TO-BE CONNECT KIDS WITH BOOKS

Over 150 second-graders took home their own copy of a popular children’s book thanks to Cal Poly’s chapter of the Student California Teachers Association and a $1,000 National Education Association CLASS grant. The grant funded multiple programs, including a book donation and reading program in high needs elementary schools.

The Books in Schools program brought Cal Poly liberal studies and child development majors to local, high-needs elementary schools for a day of reading and craft activities. At the end of the day, all elementary students received a copy of the book they read.

“You could tell that for some of the children, this was perhaps the only book they had ever had to themselves,” said Hannah Loth, one of the liberal studies volunteers. “It was refreshing to see so many students showing their appreciation for reading and learning.”

MATH ACADEMY INSPIRES HIGH SCHOOL STUDENTS

Mathematics professors Elsa Medina and Amelie Schinck-Mickel know the challenges faced by first-generation college students — they were both the first in their family to attend college. They founded the Math Academy, a summer enrichment program, to give local, underrepresented high school students the opportunity to do some hands-on math and get a taste of college life.

The week-long program introduces students to a new way of doing math. The group uses a hands-on approach to algebra and geometry, drawing pictures and building models to help them discover solutions.

“The most exciting part for me was seeing how creative the students’ solutions were,” Schinck-Mikel said. “They were thinking of ways to solve problems that I hadn’t thought of.”

This July, the academy offered its third annual session at Cal Poly with its signature mix of engaging, common core-based math activities, and tours of campus facilities.
The new Warren J. Baker Center for Science & Mathematics is a busy place. Located at the heart of the Cal Poly campus, its six floors and 189,000 square feet provide classroom and lab space for 1,500 students at any one time and study space for another 400. But to really get a feel for how the Baker Center is transforming science education at Cal Poly, you need to take a peek inside.

**Tuesday, 2 P.M. / Room 338 / Chemistry Studio Classroom**

The music playing over the loudspeakers is barely audible over the group discussions in Grace Neff’s Chemistry 125: General Chemistry for Engineers studio class. In this integrated lecture and lab classroom, students sit in clusters of eight with two lab partners sharing a computer. The studios allow faculty to teach in innovative ways and give students the opportunity to actively discover science by doing experiments and immediately exploring the data with their professors.

Lab partners Jeff Reeves and Tyler Watkins, both mechanical engineering sophomores, are finishing up an experiment on the freezing point of an unknown substance. They will pool their data with the rest of their group to identify the substance.

“It feels hands-on,” Reeves says of the studio approach. “During the lectures, she [Neff] can just show you what...
Civil engineering freshman Julihanna Mandeville echoes her classmate’s sentiments. “I like this way better because you learn about it and do it on the same day. It’s easier to understand when they’re together rather than seeming like two separate things.”

She’s also a fan of all the space outside the classrooms. “It’s in the heart of campus, so if I have a break in between classes, I go upstairs. It’s really easy to get group studies together or to get help from teachers.”

Nikhitha Byragani, a mechanical engineering sophomore, and her lab partner are still in the midst of the experiment. Various test tubes sit in beakers of ice, and a temperature probe is connected to the computer, which graphs the temperature in real time.

Byragani enjoys the interactive nature of the studio. “It makes a classroom more of a group thing than a bunch of people sitting in rows trying to see the board. It makes the class experience more intimate.”

Computer engineering senior Vincent D’Alessio is more than happy with the new studio’s setup — the color on the walls, the comfortable chairs. “I like coming to class more,” he says. “It makes me more excited for chemistry.”

Seven students sit around three of the many tables outside Chemistry Professor Eric Kantorowski’s office as he reviews the answers to their last organic chemistry quiz. Their laptops, notebooks and books are spread across the table as they watch Kantorowski graph spectra and write.
chemical structures on the glass dry erase board.

With this new space making a group approach to office hours possible, the session has become interactive. Students throw out possible ways to synthesize a compound and answer each other’s questions.

“The space available throughout the Baker Center has helped students and faculty connect in new ways,” Kantorowski said. “The space is inviting; permits students and faculty to mingle; and has created many opportunities for academic, research, and career conversations that would not otherwise occur to such a high degree.”

WEDNESDAY, 4 P.M. / SECOND FLOOR LIVING ROOM

Shelby Carow, a sophomore communication studies major, is settled in with her laptop writing an essay for her Small Group Communication class. She has classes in the nearby English building and comes to the Baker Center for the hour between classes.

“IT’S A COMFORTABLE PLACE TO HANG OUT AND DO MY WORK. THIS IS A COMFORTABLE CHAIR, AND IT’S VERY QUIET IN HERE. IT’S SO CONVENIENT,” CAROW SAYS.

Mary Giordano, a fourth year nutrition major, sits on one of the large padded benches near the building entrance and leans against the wall. She’s making jewelry using Kumihimo, an ancient Japanese weaving technique.

“It’s really stylish. I like the architecture,” Giordano says. “I had a lab on the fourth floor. It was really nice, a lot of hoods and cool technology. I love this place.” //

“IF YOU CAN CAPTURE STUDENTS’ IMAGINATIONS, THEY’LL BE SELF-MOTIVATED AND SEEK OUT THEIR OWN LEARNING OPPORTUNITIES. THAT’S THE ENVIRONMENT WE’RE TRYING TO CREATE IN THE BAKER CENTER.

– DEAN PHIL BAILEY

Professor Eric Kantorowski holds office hours in the study space outside his office. Photo compliments of ZGF Architects LLP, © Tim Griffith.

Science-inspired artwork fills the walls in the Baker Center. Photo credit: Top Jay Erker Middle Jonathan Shapiro Bottom Kaori Funahashi.
Through the three decades of his presidency, Warren J. Baker’s leadership transformed Cal Poly into the nationally recognized comprehensive polytechnic university it is today.

Last November, faculty, staff, students and friends of the university gathered to dedicate the building and recognize Baker’s contributions. Alumni and friends of the university were also honored for their generous donations that made the Baker Center a reality. //

Pictured: Top The Mustang Marching Band welcomed guests to the Baker Center dedication. Middle Left Liberal Studies student and Poly Reps president Ashley Evonc spoke about what the Baker Center means to students. Middle Right President Emeritus Warren J. Baker reflected on the vision behind the Baker Center and the building’s impact on student learning. Bottom A light show decorated the Baker Center for the celebration. Photo credit: Brittany App
Established in 2002, the Center for Coastal Marine Sciences (CCMS) is the home of marine coursework and research at Cal Poly. The center boasts an interdisciplinary group of faculty that focuses on ocean health and marine resources — with an important twist. They also apply that science by engaging with the local fishing community, policy makers, and governmental agencies that manage ocean ecosystems. This combination gives students across the university hands-on experience in and beyond their majors.

“Students who get involved in marine research at Cal Poly are embedded in projects that show them the importance of science and how science relates to problems that are happening in the ocean and society,” said Dean Wendt, the university’s dean of research and director of CCMS.

One such student is Andrew Lam, a senior computer engineering major who worked with scientists and engineers at the Monterey Bay Aquarium Research Institute. The team’s research is aimed at reducing biofouling, which is the growth of algae and barnacles on underwater sensors, pier pilings and the bottoms of boats.

Historically, toxic coatings have been used to prevent biofouling, but since the Environmental Protection Agency
Cal Poly Pier in Avila Beach, Calif., the hub of CCMS’s research. Only 11 miles from campus, the pier provides more than 40,000 square feet of off-shore space for classes and research.

One of the unique features of the facility is a flowing seawater system that allows researchers to conduct long-term studies of fish and invertebrates. Students and faculty discover how sea urchins may help cure skin cancer, study how climate change will affect marine invertebrates, and seek solutions to a variety of other challenges facing ocean ecosystems.

“I don’t think anything says Learn by Doing more than began limiting the use of toxic paints, scientists have been investigating alternative coatings. The research team Lam worked with is studying the use of LEDs as an environmentally friendly option.

The chance to create real-world solutions drew Lam to the project. “If you look at any pier in the ocean, you’ll see a lot of biofouling, which requires a lot of maintenance,” said Lam. “Knowing that my device could mitigate those effects really adds to my motivation. This project has the potential to solve worldwide problems.”

Lam conducted much of his testing at the one kilometer-long

“This project has the potential to solve worldwide problems.

Photo Credit: Brittany App
actually getting students into the medium they’re studying,” said Jason Felton, diving safety officer at CCMS.

For the first time this summer, the diving program offered classes leading to certification by the American Academy of Underwater Sciences. Many state and federal agencies require their divers to be certified, so the classes may help students land jobs after graduation.

The new diving certification is just one way the marine program is growing. This past year saw the addition of a new research boat (see story on next page) and a federally funded extension agent who will strengthen CCMS’s connection to the community. The Biological Sciences Department also welcomed Ben Ruttenberg and Crow White to the faculty. Both men bring a wealth of experience in applied research and collaboration with government agencies.

Ruttenberg came to Cal Poly following a career with the National Park Service and National Oceanic and Atmospheric Administration. “I’ve been sitting on the other side, talking and working with the people who make policy,” said Ruttenberg. “It broadened my view of how to make science work in a policy world.”

Students in Ruttenberg’s new marine conservation and policy course got a taste of that world. They interned with different agencies and organizations that needed more scientific information before making a policy decision. “It gave them some real-world experience in this field, working with people who are in the jobs they might end up having,” Ruttenberg said.

As a research scientist, White brings a unique mix of field study, lab analysis and modeling expertise to the marine program, as well as a focus on applying research to policy. “Almost all of my research has direct management implications,” White said. “It captures students’ interest more because they want to change the world and improve our existence.”

With the energy, enthusiasm and resources growing in the marine program, it’s hard to know what’s next, but the possibilities are almost endless. The ocean is a very big place. //
Don’t call her pretty — she’s beautiful. The Research Vessel TL Richards, a 26-foot, commercial-grade boat, became the newest addition to Cal Poly’s marine program last year.

The boat is named in honor of Professor Emeritus Tom L. Richards, who taught marine biology at Cal Poly for 36 years. With a range of more than 200 miles, the TL Richards opens up entire new ecosystems for students to study. Research teams can now go as far south as the Channel Islands and access remote areas in Big Sur, and they don’t have to wait for the rare calm day to do it — the Richards can handle significant chop in the ocean.

“The Richards changes the sorts of questions our students can ask,” said Dean Wendt, interim director of Cal Poly’s Center for Coastal Marine Sciences. “It enables our students and faculty to explore the most remote part of the California coastline.”

Other research-friendly features include live wells for transporting fish and marine invertebrates and enough room to accommodate a team of six to eight divers. The boat also has the capacity for a 500-pound pole crane that can be used to load and deploy advanced instrumentation.

The TL Richards is decidedly high tech. State-of-the-art electronic navigation equipment allows for precise positioning and tracking. A FLIR infrared night-vision camera enables scientists to study nocturnal marine life.

In true Cal Poly style, the researchers on board during the maiden voyage were undergraduates in the Biology 328 Marine Ecology class.

“This is the best class I’ve taken at Cal Poly. It takes hands-on to a whole new level,” said Chris Tremonti, a biology major concentrating in pre-med.

Students got a double lesson as they explored the Morro Bay harbor area: in basic research and in boating safety. They learned not only how to test the conductivity, temperature and depth of the estuary’s water but also basic marine safety and protocols, such as properly securing the scientific instruments on board.

“This is what I hope to be doing in the future. It’s a wonderful opportunity to gain skills that I’ll use later,” said Lara Slatoff, a biology major with a marine concentration. “It’s an opportunity I don’t think I’d have gotten if I didn’t go to Cal Poly.”
HIGH TECH AT NEW TECH

Cal Poly alumni bring math to life at a new high school with a project-based curriculum.

Fun. That’s what you wish math class had been. If you have the good fortune to be a student of Dara Stepans (B.S., Mathematics, 2012; Single Subject Credential, Mathematics, 2013) or Ben Woodford (B.S., Mathematics, 2012; Single Subject Credential, Mathematics, 2014) at Central Coast New Tech High School (CCNTH), that wish would come true.

Stepans (DStep to her students) and Woodford teach algebra and geometry at CCNTH, a new high school in Nipomo, Calif., that uses a project-based curriculum. In its second year, the school had 203 students and an average class size of 17.

At first glance, CCNTH classrooms resemble any other classroom, with whiteboards on the walls and backpacks strewn around the floor. Until you realize that everything is mobile, from the wheeled tables and chairs to the laptops that every student has open in front of them.

“Feel free to plug in and work,” Stepans says after giving directions to her Algebra I class. Friday is a work day. There will be no traditional lecture. Instead, students dig into a typically interdisciplinary, real-world project: designing floor tiles for the new science building on the CCNTH campus.

“Instead of lecturing continuously and occasionally doing a fun little project at the end of the unit, New Tech turns that model upside-down,” Stepans said. “We hinge everything around a fun, authentic, engaging project and have the students start on solving or modeling or analyzing it.”

As students progress through the projects, they find out what they don’t know and begin exploring, using their teachers as resources. They finish each project with either a written or oral presentation explaining what they’ve learned and done.

The approach resonates with students in Stepans’s class. “I can’t explain how much it’s helped me. I love coming to school every day,” said Brittany Judy, a ninth grader. “Hands-on stuff helps me learn better. I have straight As. Without project-based learning, I would not have the grades I have right now.”

In the geometry class that Woodford teaches, mathematics is getting a little wild. Students learn how to find
the center of gravity the hard but entertaining way — by doing wheelchair wheelies.

Woodford has used a wheelchair since breaking his back in a skiing accident. He was shopping for a new chair when he realized, “This is a three-dimensional geometry problem. I’m not going to do it. I’m going to have my students do it.”

The center of gravity lesson is part of a larger unit in which students design a custom wheelchair, either for themselves or for Woodford. The groups that aren’t doing wheelies are taking each other’s body measurements, which they will use to construct three-dimensional diagrams of their chairs. Some will then create computer models of the chairs.

The class will complete the project by designing a consumer information website for Living Spinal, the company that sells the wheelchairs. The website will provide information on different ways to design and customize manual wheelchairs, including blueprint-like diagrams created by the students.

“The thing we really try to do here is make the projects authentic. They’re doing something that matters. They feel like it has real meaning,” Woodford said.

“The school is a lot about learn by doing,” said Matthew Read, a ninth grader in Woodford’s class. “We put a lot of things into real-life perspective. It was a hard transition, but it fits me better than the regular methods.”

Woodford sees Cal Poly’s Learn by Doing approach as an ideal preparation for project-based teaching. “Cal Poly taught me to use research and standards to guide my teaching, while keeping learning student-centered and relevant,” Woodford said.

Stepanek agreed. “Having completed math and physics degrees at Poly, I feel I was well-trained to teach in a Learn by Doing style,” she said.

“Ben and Dara do a great job of exuding a passion for student learning in their content area as well as just a love of learning itself,” said CCNTH principal Dan Neff (B.S., Plant Protection Science, 2000; M.S. Agriculture, 2002; M.A., Education, 2008). “Their ability to connect students to relevant and real-life learning opportunities contributes to the overall uniqueness of our school.”

Woodford, Stepanek and Neff are just three of the 11 Cal Poly alumni currently working at CCNTH. //
Physics Professor Kat Gillen and her students are working toward trapping atoms in light patterns with the eventual hope of contributing to the development of quantum computing. The 2013-14 research group got together to talk about their frustrations and triumphs and why they think applied research is a great way to Learn by Doing.

WHAT DO YOU ENJOY MOST ABOUT DOING RESEARCH?

Jason Schray (fifth-year electrical engineering and physics double major; worked in the lab for 3 1/2 years): The most fun part is when you do all the work and you see results. You can spend hours in here banging your head against a wall. You’re looking at your data, and it doesn’t make sense. You call Kat over and she sees it’s a speck of dust on the camera. You clean it off, and then you get the defraction pattern that you want to see, and it’s like ah — what we learn about is real. It actually happened.

Sanjya Khatri (senior physics major; worked in the lab 2013-14): It’s fun seeing how it all comes together. Everyone is doing different projects. One of the good things we did was when we all went to the [Southwest Quantum Information & Technology] conference, we got to see in the grand scheme of things how it all fits together. You see how what you’re doing is important to accomplish the goal of eventually trapping atoms again.

SO YOU WANT TO TRAP AN ATOM

Student-faculty research at Cal Poly takes students beyond the planned experiments of their coursework and gives them a taste of life in a real-world research lab.
**Ian Powell** (junior physics major; worked in the lab beginning spring 2013): I agree with Jason. You’ll be working on something and it’s not working, it’s not working, and then, finally it’s working. And then you’re elated because it was so difficult, and you figured out what was going on. Problem solving — that’s what physicists do.

**Taylor Shannon** (senior physics major; worked in the lab 2013-14): I mostly did programming, and the most fun part is when it finally works.

**Schray:** It’s weird because when you go talk to your friends who aren’t doing research and you’re like, “Guess what I just did today? I shot a laser through some hole, and I was able to close the hole!” Someone who hasn’t done that isn’t very impressed. It’s so much more satisfying to tell someone who’s done research because they realize how tough it was.

So it sounds like you learned something you couldn’t learn in class.

**Schray:** Oh yeah, oh huge.

**Khatri:** I think it’s exactly what Jason was saying. When you’re doing all these experiments and you shine a laser through a hole and it doesn’t work right off the bat; if you’ve just come from optics class, you’ve learned that something should work nothing’s happening in the lab. But now, even if I get stuck, other people are doing things that are moving the whole project forward. It’s nice.

**Shannon:** I think what Sanjay said earlier about knowing how our projects fit together is really nice, and it’s more fun having more people doing

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**STUDENTS VOTED THEIR LAB-MATES “MOST LIKELY TO”...**

**Taylor Shannon:** Most likely to use a quantum computer

**Sanjay Khatri:** Most likely to receive a Nobel Prize in experimental physics

**Jason Schray:** Most likely to be a millionaire

**Ian Powell:** Most likely to win the Fields Medal (Math’s Nobel Prize)

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**Khatri:** Yeah exactly.

**Gillen:** You learn to trouble-shoot.

**Powell:** There’s no lab manual here.

**Gillen:** What’s it like working in a team?

**Powell:** I worked alone this last summer, and it’s just comforting to have other people come in. I’d be in here all day, it’s really hot, no one’s even in the building. I would get really frustrated because I’d get stuck, and it would feel like more things. And it’s all working toward the same goal.

**Powell:** Yeah, absolutely.

**Schray:** Also when you’re frustrated, you can totally vent to someone else. When you’re all alone, you find yourself talking to the wall.

**Khatri:** The wall is your imaginary friend.

**Gillen:** You guys, I had no idea you were going through this. //
A PERFECT SCORE

Ashley Chandler was the College of Science & Mathematics’ top graduating senior in 2013-14 — a 4.0 GPA is tough to beat.

Originally from Mandeville, La., near New Orleans, Chandler had a goal when she arrived at Cal Poly. “I wanted to be an actuary since day one,” she said. Actuaries calculate risk and premiums for insurance benefits.

By the end of her junior year, Chandler had passed two of the tests necessary to become an actuary. The field appealed to her because it combines the analytical skills of mathematics with her interest in working with people, a talent she honed as vice chair of the University Union Advisory Board for ASI student government.

“I think ASI is in large part responsible for all the soft skills I’ve gained,” Chandler said. “My position combined learning how to collaborate with people, learning people’s work styles, and learning how to manage a team.”

Following graduation, Chandler joined Mercer, a human resources consulting firm in San Francisco, as an employee health and benefits actuary. She credits Cal Poly with helping her land the job. Through Cal Poly connections, she was invited to apply for and won an internship with Mercer the summer following her junior year. The company appreciated Chandler’s ability to communicate complex ideas, a skill she had developed doing student-faculty research in the Mathematics Department the previous summer.

Chandler worked with Professor Linda Patton and fellow mathematics major Shelby Burnett on proofs regarding the symmetry of a certain numerical range. She then had the opportunity to present her work at MathFest, a conference organized by the Mathematical Association of America. “It was the first time that I’ve ever needed to communicate a math proof. It was a really valuable experience that provided me with the technical communication skills needed to succeed as an actuarial consultant,” Chandler said.

“Ashley’s rare combination of mathematical talent and work ethic made her the ideal student,” said Patton. “But I was most impressed that Ashley is as much fun to work with as she is intelligent and reliable.”

Chandler is a big fan of her alma mater. “I’m happy to brag on Cal Poly. I think coming to Cal Poly is one of the best decisions I’ve ever made.” //
ENGAGE WITH THE COLLEGE OF SCIENCE & MATHEMATICS

Private support enhances student success and gives science and mathematics students increased Learn by Doing opportunities. You can support Cal Poly students — the state and nation’s future leaders in education, innovation and industry — in the way that’s right for you.

**GUEST SPEAKING**
Our faculty and students want to hear from you — your experiences are valuable learning opportunities.

**SCHOLARSHIPS**
Most students at Cal Poly receive some form of financial aid. By creating a scholarship, you can help foster the next generation of leaders and innovators while establishing a legacy students will remember.

**COLLEGE AND DEPARTMENT SUPPORT**
Gifts made directly to the college or your department extend and improve student learning in a number of ways, including developing facilities and enhancing instructional technology.

**STUDENT-FACULTY RESEARCH**
Students work with faculty members on their real-world, ongoing research projects. You can sponsor students who are applying the knowledge they gain in the classroom right away.

**RESEARCH CENTERS**
The college’s five centers provide the heart of research and collaboration. You can keep Cal Poly on the leading edge of science and technology by giving students the experiences they need to become leaders in education, industry and the health professions.

**INTERNSHIPS**
Cal Poly students are eager to gain on-the-job experience through internships, providing employers with an opportunity to infuse new ideas and energy into their organizations.

**CAL POLY ALUMNI ASSOCIATION**
Cal Poly alumni are proud of their school. Get involved through the Alumni Association by supporting special events such as business networking opportunities or local chapter events. Update your information at alumni.calpoly.edu/info.

Support College of Science & Mathematics students by giving online today at: cosam.calpoly.edu/ways-to-give

FOR MORE INFORMATION ON HOW TO SUPPORT THE COLLEGE, CONTACT:

**RUZENA BRAR**
Director of Advancement
rkbrar@calpoly.edu / 805-756-6534

*Pictured* The bronze statue of Albert Einstein outside the Baker Center was donated by Sandi and Paul Bonderson (B.S., Electronic Engineering, 1975) and has become a favorite spot for campus photo ops.
It’s always a great time to give a Cal Poly Proud gift! Order your exclusive Cal Poly gear today. A portion of the proceeds from every item purchased goes to support Learn by Doing.

Learn more and shop now at CalPolyProud.com