

IMAGINE. INNOVATE. INSPIRE.

I³@USD

SHILEY-MARCOS SCHOOL OF ENGINEERING
UNIVERSITY OF SAN DIEGO, FALL 2019

Where will your
passion take you?

Imagine. Innovate. Inspire.

As the dean of USD's Shiley-Marcos School of Engineering, I am often asked why our students choose to study engineering. Many say they are good at math and science and that engineering seems like a useful way to use these skills. Others like to build things or are intrigued about how systems work. An increasing number of students pursue engineering because they want to help people.

As a contemporary Catholic university, we have the luxury and responsibility of asking deeper questions about purpose and about vocation. In its truest form, a vocation is a response to a calling to undertake a particular kind of work. Over the years, as I have talked with students and alumni, it has become clear that many of those who come to USD desire to make a positive impact on the world. As an Ashoka Changemaker University, our students choose to study engineering and computer science at USD because we can provide them with the technical and professional tools and social experiences that allow them to make a difference in their communities and beyond — to become Changemaking Engineers.

I feel a deep responsibility to deliver on that expectation.

All people, irrespective of what path or career they pursue, have a vocation. We are all called upon to give of ourselves in our own way, through our own strengths. When I hire staff and faculty members, I look first for passion. I strive to fill our classrooms and halls with people who want to make a positive difference and who do so because it is what they care about. These incredible people then influence our students and give them confidence to do great things.

Our students are given an amazing opportunity to develop holistically. This is a great privilege that only a select number of people experience, but it also comes with a great responsibility — to take that knowledge and training and go out and make a positive difference in the world.

On the cover of this magazine you will find the words: imagine, innovate and inspire. This is what USD engineers and computer scientists can do. They can imagine a better world, create innovations that make a positive impact and inspire others to believe in a great future for all.

In this issue, you will encounter influencers, changemakers and entrepreneurs among our alumni, students and faculty members. You will also get a glimpse of our devoted external partners who give of their time and talents to nurture the next generation of Changemaking Engineers. I invite you to join us in making a difference.



Chell Roberts, PhD
Founding Dean, Shiley-Marcos School of Engineering



Chell Roberts
Founding Dean,
Shiley-Marcos School of
Engineering



Darlene Marcos Shiley established the Shiley-Marcos School of Engineering in 2013 with a transformational gift that honors the philanthropist's dedication to education and pays tribute to her late husband, Donald P. Shiley, renowned engineer and inventor of the tilting disc artificial heart valve. Her gift gives USD engineering and computer science students the chance to be true Changemakers.

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Dressed for Success

What did you think you wanted to do professionally that propelled you into engineering?

I've always been interested in how things work. I didn't know it at the time, but I was always entrepreneurial. That lends itself to becoming a builder. In high school, I took some software classes. Then I got into electronics at USD. Both enabled me to build things. My father, who comes from the finance and technology world, encouraged me to look at technology and engineering programs.

What stands out most from your time at USD?

I had so many good experiences with professors. I really enjoyed Ernie Kim's class on antenna design. He knew the subject and made it a lot of fun. It was very project-oriented and allowed us to build and experiment. That class really stood out for me.

In my senior year, I started working at a small medical device company, so I was able to do a lot of things, much of which I learned from Dr. Kim. I would bring him questions and he was always willing to mentor me.

Tell me a little about your life after graduation.

After graduation, I kept working for the medical device company, based in San Diego, California. We were focused on helping physicians diagnose acid-reflux types of diseases in a minimally invasive way. It was a startup, so I was able to do everything from bringing an idea to life, circuit design, antenna design, packaging and selling to doctors, which was very powerful being able to go to the end customer.

I was lured back to Dallas, Texas. My father runs a hedge fund and was looking for an equities and options trader. They typically look for quantitative types of people. I wanted to try something different and became the head trader really quickly. Then I started looking at technology companies and was helping inform investment decisions. I realized that I preferred building businesses rather than simply advising them. But I also realized I needed to beef up my business and accounting skills, and completed the MBA program at Southern Methodist University.

I met my now-wife, Amber, there. She was a personal stylist and a jewelry designer, and I wanted to help her professionalize her talents. I had started my own company to incubate some of my ideas and leveraged that incubator to build products for Amber. Then we created a blog as a tool to promote her personal stylist business. She would pick up clothing and bring it to her client's house then get paid by those clothing retailers. Her clients started reading her blog and instead of booking with her, they would purchase the clothing themselves. So we decided to create something online that replicated what she was doing offline. That was the impetus of rewardStyle, which connected her as a fashion blogger with retailers. It was as simple as publishing images of clothing in a compelling way and then allowing consumers to purchase those clothes.

Describe rewardStyle.

We started building the platform in 2011, before Instagram and the concept of influencers was around. It is a now marketplace that allows influencers to monetize and connects

Get up close and personal with electrical engineering alumnus Baxter Box '06, CEO of rewardStyle — a monetized platform for fashion, beauty and lifestyle influencers — sharing his journey from startup to market leader and innovator in influencer marketing and social commerce.

them with brands. Previously, it was only a business-to-business marketplace. Now we have added a business-to-consumer platform called LiketoKnow.it. It is the largest online influencer shopping channel with about 45,000 influencers and 4,500 retailers that are commissioning in over 100 countries. It is the next generation of retail marketers using influencers to create content pieces.

Where do you see your company going from here?

We are on a mission to help the best influencers around the world turn their passion into a profession. Publishing is getting democratized. People are waking up every day and going out and creating content — just doing what they love. We have room to grow internationally and will continue to build new and innovative products to help consumers really shop with confidence. We are currently headquartered in Dallas, Texas, and have a presence in New York, Los Angeles, Shanghai, Sao Paulo, London and Berlin. — *Elisa Lurkis*



"rewardStyle grew really quickly — starting in fashion, moving to home furniture and design, branching into children's fashion and accessories, then on to wellness and travel," explains Box. "Influencers have to be authentic and our markets grew from our experiences."

What Is Water Worth?

Benjamin Franklin once said, “When the well is dry, we will know the worth of water.” That well is not likely to be in Israel, as students from the University of San Diego (USD) recently learned from an engineering course that brought them to the holy land.



“I teach courses on the mechanics of fluids and I study their motion in my research as a mechanical engineer,” says Frank Jacobitz, PhD. “I developed this course with a focus on water, including its meaning in faith and culture, the history of water infrastructure, and current challenges and solutions to safe water access in developed and developing countries.”



Seventeen engineering students from the University of San Diego’s Shiley-Marcos School of Engineering spent their spring break in Israel as part of a semester-long course, taught by the

chair of mechanical engineering, Frank Jacobitz, PhD. The course, titled “Water in California and Israel: Challenges and Solutions,” required students to participate in the spring break trip. Donations received from the Murray Galinson San Diego Israel Initiative (MGSDII), along with an anonymous

matching donor, funded most of the travel costs.

The reason that the proverbial well is not likely to run dry in Israel is because of Israel’s cultural focus on the importance of water conservation.

One needs only to look at children's nursery rhymes in Israel to notice a real difference. American children grow up with the nursery rhyme "Rain, rain, go away; come again some other day!" By contrast, Israeli children have a nursery rhyme that translates to "Rain, rain,



from the skies; all day long, drops of water; drip, drop, drip, drop; clap your hands!" ("Let There Be Water," by Seth M. Siegel).

Eighty percent of Israel's drinking water comes from one of Israel's five desalination plants, while 95 percent

of the water used in Israel's agriculture and industry comes from recycling wastewater. Motivated by years of drought and the shrinking of the Sea of Galilee in the early 2000s, low-flow toilets and shower heads were installed nationwide, along with water restrictions (and real-cost pricing), all of which helped. Due to its extensive use of desalination, Israel is currently the only country in the Middle East that is not facing a water crisis.

Contrast this with California, which has similar weather patterns, drought-prone conditions and proximity to ocean water, where there is currently only one desalination plant. The Carlsbad Desalination Plant, in San Diego County, took 15 years to be approved, built and placed in full operation. The plant, built by IDE Technologies (the same company that built some of Israel's desalination plants), provides 8-10 percent of the drinking water in San Diego County.

In addition to learning about Israel's desalination efforts, USD's students also visited some of Israel's historic water sites, such as the City of David water tunnels, created by King Hezekiah in the eighth century B.C.E. to protect the water source from the encroaching Assyrian army; Caesarea, an ancient port city built by Herod the Great in about 25 B.C.E.; and an ancient aqueduct, also built by Herod in the first century B.C. And they visited Hatzerim, one of Israel's oldest kibbutzim, which founded the drip-irrigation technology company, Netafim. They also spent time touring Jerusalem's Old City and visited the Yad Vashem museum (the World Holocaust Remembrance Center).

The course was part of an ongoing partnership between USD and the Azrieli College of Engineering in Jerusalem, brought together by the MGSDII as part of their mission to bring Israel studies to San Diego university campuses. USD's students spent time on the Azrieli campus, hearing from water experts and

partnering with Azrieli students on joint water projects. Yaal Lester, PhD, Azrieli's faculty expert on water research, co-leads this partnership.

Susan Lapidus, MGSDII director, is thrilled with how this partnership took shape so quickly. "The program is the pinnacle of success in terms of bringing the knowledge of modern Israel to San Diego students and faculty. All semester, the USD students learned about water innovations in Israel, then had the unparalleled opportunity to go there and meet and study with their Israeli peers." She adds, "I cannot overstate what a wonderful partner USD's Shiley-Marcos School of Engineering has been."

USD and Azrieli students were placed into project teams together, to address water contamination challenges from water sources in Israel. Together, they analyzed and treated water from the Sea of Galilee, Israel's coastal aquifers, aquifers in the Negev, water from the Jordan River and wastewater. Students then identified a similar water issue at a specific location in California.

After spending nearly a week together in Israel, the USD and Azrieli students met up again, in San Diego, California, for a week of joint classes and connection building.

Of course, USD hopes to bring another cohort of students to Israel during the 2019-2020 academic year.

Dr. Jacobitz, when asked about the importance of this course, stated, "This course started with two visions: The academic goal was to learn about water technology developed in Israel to sustainably address our challenges in California. A more personal aim is to build bridges between students from Israel and California. I hope that the first offering of our course made small steps towards both goals." — *Elisa Lurkis*

Link: www.sandiego.edu/israel19



The USD students observed Israel's current-day water challenges in the lowered levels of the Sea of Galilee and the Dead Sea. These challenges are addressed through water conservation programs, an expensive water infrastructure and innovation in water technology.

Giving Is Receiving

Executive advisory board member, Minoo Gupta, shares her thoughts on design thinking and how USD's "integrated design spine" within the engineering curriculum serves as a surefire means of preparing engineers to help solve big problems at a global (and personal) level.

What connected you to USD?

My original connection to USD was through our daughter, Anika, who is a USD alumna. She double majored in psychology and international studies and graduated in 2015. I would visit her often, spend time on campus and eat delicious food. I really love the USD campus.

How did that connection evolve?

I would visit the parent relations team on my visits to USD. At one point, Associate Vice President Sandie Ciallella came to the Bay Area and requested to meet. She told me about the engineering school being revamped, along with the hiring of a new dean to boost the program. She shared his aspirations for the future of the school. Being an engineer myself, I was interested in learning more about the future of their engineering school. Sandie connected me to Elisa Lurkis, director of development, and Chell Roberts, the new dean. Once we met in person, we had an instant connection.

If I'm remembering correctly, the bond was established over our shared views on the design thinking methodology plus simplicity, and how they connect to engineering as a whole. My belief is that engineers with design thinking tools can fundamentally reshape the future of problem-solving. I know how my own problem-solving benefitted me after I took the design-thinking course at Stanford. I realized that Chell's vision of the "integrated design spine" with an engineering curriculum was spot on. This is definitely a sure way to get engineers ready to help solve big problems at a global level.

I know broad-minded thinkers and they all like the idea of an integrated design spine within the engineering curriculum. However, today many of the design gurus are not engineers. There's a need for simplifying the design process within engineering. We now even have the school bringing design thinking to our social justice problems — a very powerful combination.

What is your philosophy around your philanthropy?

My husband, daughter and I really believe that education leads to self-sufficiency. We believe in giving time or resources, either to the underprivileged or to people who are experimenting with new ways of thinking. Supporting education in whatever way possible speaks to me. I personally lead and support a nonprofit named the Foundation for Excellence (www.ffe.org) that enables higher education for underprivileged students in India. Between FFE and USD, I like to believe that I



Minoo Gupta is the senior director of engineering and customer experience at Citrix. She leads the customer experience for all NetScaler brand products for the cloud and networking division. Gupta is an advisory board member of USD Shiley-Marcos School of Engineering, working to help shape the curriculum for future engineers. She has been actively involved since 2014.

am doing my small part toward helping advance humanity one person at a time.

How does your work at Citrix tie into your life?

I'm an engineer and have been working since 1986. I started my career as a programmer, and a few years into my career I switched to managing and leading engineering teams. Today, I manage teams across four different geographical regions. What inspires me is to focus on helping people grow their individual skills and reach their full potential through coaching and mentoring. When I observe engineers at the entry level and see them grow, I realize the importance of soft skills development either on the job or before starting their careers. I advocate for soft skills as part of the college education and am proud to see soft skills development at USD engineering as part of the critical education that

the students receive. Teaching these skills early is crucial to the success of an individual and the companies they work for.

Some of these ideas are being applied to my nonprofit as well. FFE not only provides scholarships, but also amends the program by providing soft skills training to the students in India who are pursuing medicine and engineering degrees. These skills help students gain confidence, and obtain high-salaried positions after graduating to become self-sufficient, thus breaking the cycle of poverty.

Tell me about your childhood.

I grew up in a small town in India, in Lucknow. My dad worked for Indian Railways as a design engineer, designing locomotive engines and passenger trains. He was definitely my inspiration. When it came time for me to be either a doctor or an engineer, I chose electrical engineering. When I finished my studies, multinational companies in India were looking to find programmers in a big way. I joined Tata Unisys in India, learning to program in every programming language that existed. Essentially, these companies were designed to provide job-ready programmers to multinationals. In many cases, the programmers were sent to work in-house with the engineers in the U.S. My first project posting was at Unisys in Atlanta, Georgia for six months. During these six months, I met my life partner, who became my husband, and we both wanted to live in the U.S. His dream was to work in Silicon Valley, so I followed along.

I came from a very humble upbringing with just enough to live a healthy and loving life. But I saw many people whose families couldn't provide for themselves or have the means to provide an education for their kids. In India, you are face to face with poverty all the time. As we went back to India to meet friends and family, we saw many opportunities and ways we could be helpful to others, to help support underprivileged people. Being able to become a small part of the longer-term solution for these families provides meaning to our lives, too. — *Elisa Lurkis*

The Lucky One

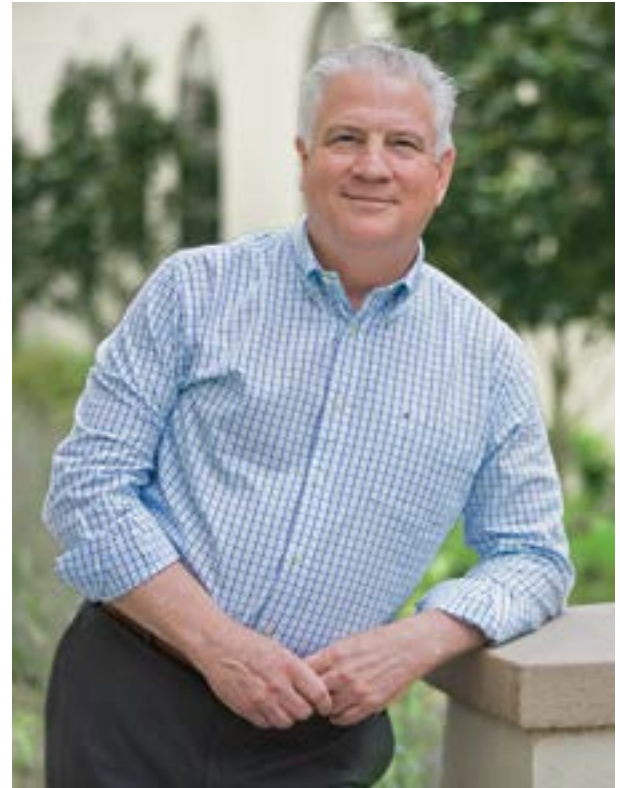
Members of the University of San Diego's Board of Trustees unanimously elected "advisory board member extraordinaire" Tom Lupfer to begin his tenure as the newest member of the board starting Fall 2019.

Serving as the governing body to approve strategic initiatives, create policy and approve budgets for the university, the distinguished members have been working to create a board of trustees that is representative of the entire university.

"It is important to include people on the board who understand engineering when making decisions for the university as a whole," explains Chell Roberts, dean of the Shiley-Marcos School of Engineering. "Tom has been deeply engaged in the school — a devout professional who understands our vision and aspirations, and will be able to further those through engagement on the university board."

In partnership with the Shiley-Marcos School of Engineering, Lupfer serves as an executive advisory board member, a professor of practice, an industry partner, a co-founder of the Industry Scholars Program, a generous donor and an honorary Mortar Board member. All the while, he serves as president of Clarity Design — an employer of 16 USD graduates and countless interns, all hired in alignment with the goal of helping to diversify the engineering profession. Simply stated, Tom Lupfer is the kind of partner most institutions dream of.

"As a trustee, my obligation is to the university, first and foremost. I am honored to be able to apply my engineering and business skills to be of service to USD," Lupfer continues, "I'm particularly excited about seeing how the university is run from a financial and decision-making perspective, and learning more about the other schools to encourage as much cross-campus collaboration as possible."



Having received his MA in engineering and economics from Oxford University on a Marshall scholarship — and with a brother who was a Rhodes scholar — Tom Lupfer has been working with the dean, the provost and the president to develop a coherent approach for cultivating and coaching students for such prestigious scholarships. "A USD undergraduate has never been awarded a Rhodes or Marshall scholarship and I am pleased to be involved with the efforts to change that."

Days after his confirmation was made public, Lupfer admitted with an infectious smile, "In my first meeting with Chell, he outlined his vision and I was instantly hooked, coming from an industry perspective. Being involved with USD has been very rewarding for me — the right thing at the right time. I feel I'm the lucky one to be associated with such a fine institution and to be able to work with such great people." — *Michelle Sztupkay*

Link: www.sandiego.edu/tlupfer

Answering the Call for an Engineering Revolution

When the University of San Diego's Shiley-Marcos School of Engineering came to fruition in 2013, it signaled the start of a new chapter in the discipline's history. Engineering debuted in the mid-1980s under the College of Arts and Sciences banner. More recently, it was aligned within the School of Business.



Unfolding Humanity showcased a massive interactive unfolding metal sculpture at Burning Man, standing 10 feet tall, covered with 12 hinged and LED-illuminated pentagonal acrylic faces designed with the mutual reliance of art, language, mathematics and engineering.

The launch of the new school, with Chell Roberts, PhD, as its first dean, meant the time was ripe for a new direction, new ideas and, in the wake of USD's designation as an Ashoka U Changemaker Campus, a chance to stand out. Roberts' introduction included his aspiration for USD engineering to become a top 10 nationally ranked school.

Entering the 2019-20 academic year, Roberts can point to many accomplishments, including the program gaining significant ground from when it was 21st in the nation: "We've tripled the number of faculty, tripled the space, added degree programs, master's degrees and we're up to No. 13."

Okay, so USD isn't a top 10 school — yet. Don't be surprised if Roberts' proclamation comes true very soon. Why? Many pieces of the puzzle are in place and it's time for the Shiley-Marcos School of Engineering to move forward with a reimagined curriculum.

At a May meeting with USD's University Advancement division, Roberts gave an abbreviated history lesson on engineering — noting the contributions of the military and the Industrial Revolution in shaping it — and then stated why he believes another engineering revolution is calling. He expressed that he wants USD to be at the forefront. He's focusing on the type of students that engineering attracts, courses and programs USD offers, and faculty who can teach and lead students.

"I believe too many engineers are only educated mathematically and technically." Universities around the world are compartmentalized in the sense that they can do this one thing very, very well. But, if we're going to change the



world, and that's what I think USD is about, we can bring students and people here who want to change the world. To do that we need to teach engineers differently."

Coming to USD and starting a

school meant having a vision of being different, attracting difference-making students and faculty, Roberts said. Among his first acts was taking faculty and administrators to other campuses around the nation to see what others were doing and to inspire faculty to think differently.

Granted, USD engineering already has a distinctive BS/BA dual degree. All students receive a dual degree with a curriculum where engineers take a full slate of liberal arts classes on top of engineering classes for a substantially holistic education.

Roberts and his department chairs took a big step in 2015, applying for and receiving a \$2 million, five-year Revolutionizing Engineering Departments (RED) grant from the National Science Foundation (NSF). USD was one of only six recipients and the lone private university to obtain this grant in the first round. It attracted new faculty and created focus groups to study the vision and how it could expand students' knowledge.

"For us to truly prepare students to go out and become changemakers, to help influence the world, I think they really need this broader perspective," says Susan Lord, PhD, integrated engineering department chair and professor. "The problems that we are interested in solving require knowledge from a number of different places. If you only see your bit as one narrow technical piece, then you will miss out on all of those other places and you may not know where to go ask about them."

Some highlights of reimagining curriculum include:

- All faculty in the integrated engineering department have reimagined courses in the curriculum.
- The curriculum infusion brings social justice, sustainability, peace and humanitarian elements into the classroom. Classes with this mindset include Engineering 103

(User-Centered Design), Engineering 110 (Design of Coffee), Industrial and Systems Engineering 380 (Sustainability and Engineering) and Engineering 350 (Engineering and Social Justice).

- Two courses, Engineering 103 and Engineering 350, are engineering's first to fulfill diversity and inclusion and social justice requirements in the USD core.
- Beyond integrated engineering faculty, mechanical, electrical, and industrial and systems engineering faculty are teaching Engineering 103 or have developed course materials to diversify students' learning.
- New classes utilize interdisciplinary means, including Computer Science Assistant Professor Saturnino Garcia collaborating with environmental and ocean sciences faculty, and a drones for good class co-taught by Integrated Engineering Assistant Professor Gordon Hoople and Kroc School of Peace Studies Associate Professor Austin Choi-Fitzpatrick.
- Caroline Baillie, a professor of praxis in engineering and social justice, is a materials engineer with a social studies component that ties together education with local community groups to co-create environmental solutions.

Assistant Professor Diana Chen says the RED grant contributed to her interest in applying for a faculty position at USD. "I have a degree in general engineering and through the RED grant, we've re-created some of the curriculum to help our students see the connection between not just different types of engineering, but how engineering is reflected in the world, how engineering makes an impact on society and how to bring real-life scenarios into our classroom. With the liberal arts curriculum, our engineers feel they are citizens of the world, so we are focusing on how to connect the engineering curriculum to the things they care most about."

Everything is still developing but moving ahead. Integrated engineering faculty are branching out to new audiences. Gordon Hoople, PhD, gave a TED-style talk on "socio-technical" at Peace Innovators, a Kroc School of Peace Studies event; Dr. Chen participated in a yearlong Changemaker Faculty Fellows Development Program, including a visit to Mexico's Tecnológico de Monterrey to learn from its faculty and student innovators.

Integrated engineering graduated its first four students in 2019, including Jazmyn Gonzalez, whose interest is sustainability. "I've been very passionate about environmental justice for as long as I can remember," she said.

Because sustainability was not yet offered as a concentration, Gonzalez did an independent plan of study program emphasizing sustainability. She took classes in engineering, sustainability and social justice, and worked with female mentors. It all came full circle through her senior design project. She helped build a mini-robot prototype for Clarity Design and Clear Blue Sea. The latter company, which aspires to create solutions to rid oceans of harmful plastics, brought Gonzalez on board this past summer to upscale the robot prototype.

Giving students new ways to view and practice engineering is Roberts' vision. So, too, is the NSF's. Colleagues nationally, especially deans at Catholic universities, "are watching this most interestingly," he said. Roberts will host Catholic university deans this fall to show them what's possible.

"What makes you a leader?" Roberts asked. "The dual degree is one way and we've gotten a lot of mileage out of it. An engineering school has to be a leader in the eyes of others. We have an opportunity, as this morphs, to take it to the national stage as the leaders in this field." — Ryan T. Blystone

Video: www.sandiego.edu/AshokaTalk



In partnership with the local nonprofit Clear Blue Sea, USD engineering students designed and built a small-scale prototype of a Floating Robot for Eliminating Debris (FRED) to collect floating debris in the ocean that threatens whales, turtles and other sea creatures.

Industry Appeal

Imagine working on a Northrop Grumman-sponsored project to automate the amount of helium needed to test and operate the next generation of supercomputer chips at incredibly cold temperatures or devising a way to insert optical elements into virtual reality scenes for a classified project at Sandia Laboratories.

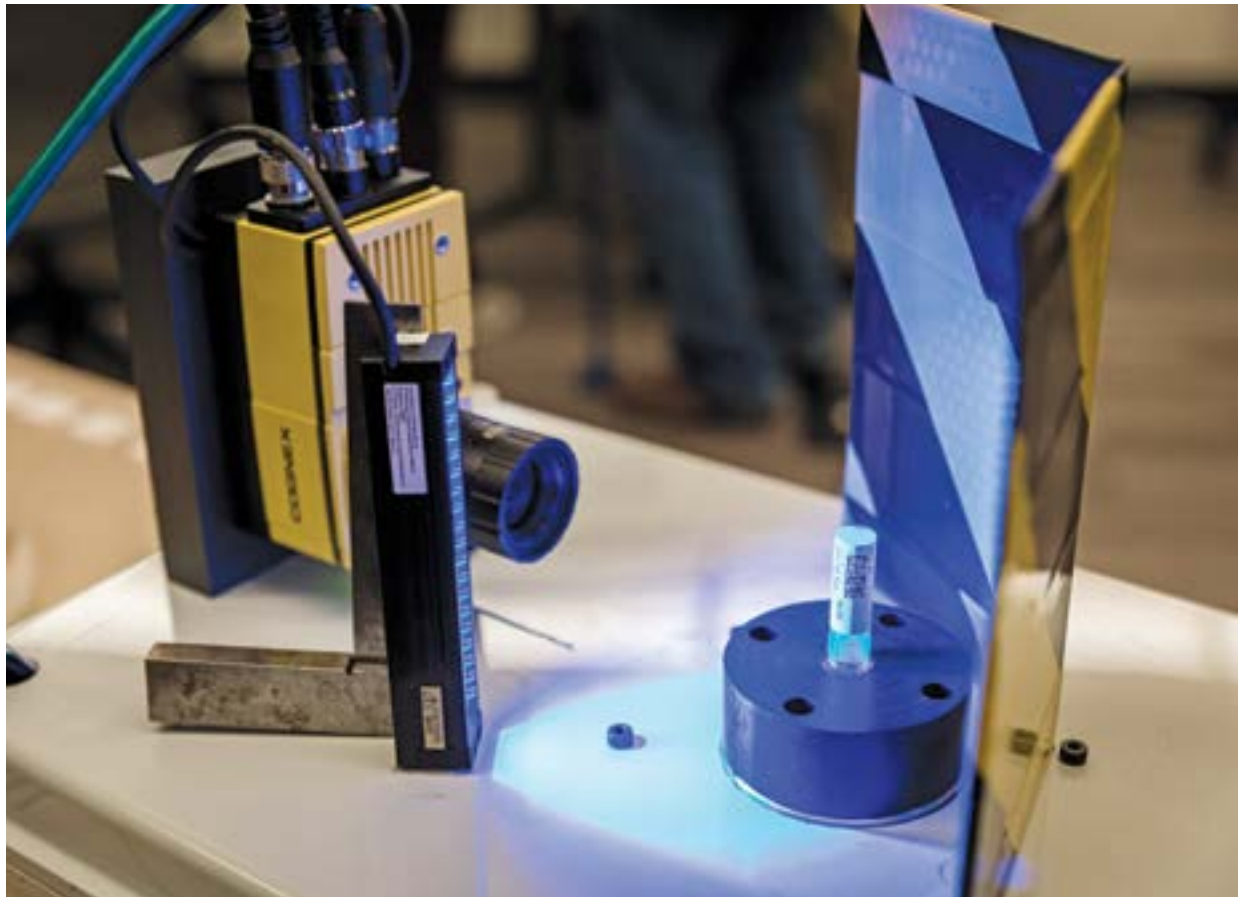
Futuristic and cutting edge, yes? But what's even more impressive is that USD engineering students are doing this work for their capstone senior projects.

Heavyweight partners like Northrop Grumman and Sandia Labs are now calling on the Shiley-Marcos School of Engineering to partner with instead of the other way around. "We are developing a regional reputation," says Venkat Shastri, PhD, De Sanctis professor of engineering and entrepreneurship and director of Industry Partnerships.

capstone projects from when I was a student certainly had their complexities and technical challenges," he recalls. However, "the projects I see today seem to have taken that to the next level. I find myself amazed and inspired by some of the projects and



"I've had such incredible mentors at every stage of my career, and that really began with the faculty at USD," says alumnus and industry partner Rasheed Behrooznia. "If I can pay that back and be of help to the next generation of USD engineers, I feel like that's the least I can do."



"It seems like we are getting more and more inquiries because of how comprehensive our senior design projects are," he adds. Those include designing and testing prototypes, weekly reports and design reviews. "It's everything the industry likes."

Rasheed Behrooznia, vice president of global product delivery for Cubic Transportation Systems, Inc. and a 2002 USD electrical engineering graduate who received USD's Alumni Honors award in 2018, echoed those thoughts. "The

how they are solving real-world problems."

Last spring's 2019 Engineering and Computing Showcase included a Cubic-sponsored project, Slimgate, an inexpensive electronic barrier to prevent subway ticket evasion. During Cubic's five years as an industry



sponsor, “we have been impressed with how our student projects embrace that philosophy while they deliver strong technical solutions to our problems. Also, Cubic feels strongly about supporting our community and fostering strong STEM (science, technology, engineering, mathematics) leaders for years to come,” he says.

The number of industry sponsors has doubled from six to more than a dozen since the partnership program was started four years ago. New sponsors eGrove Education, Glaukus and Hatsu, along with Northrop Grumman and Sandia National Labs, have joined existing partners Clarity Design, Clear Blue Sea, Cubic, FedEx, General Atomics, Imaging Healthcare, Jerome’s Furniture, MexLog, San Diego Gas & Electric, Solar Turbines, Thermo Fisher Scientific and Vildosola.

The increase in industry partners has contributed to the explosive growth in the number of sponsored projects, up from 24 in 2017, 34 in 2018 and now nearly 40 in 2019. Many of the sponsors are choosing to do more than one project, and the number is also rising due to many interdisciplinary projects with the addition of computer science and integrated engineering to the school in the last two years.

According to the school’s development director, Elisa Lurkis, many employers say it often takes new employees out of college at least two years to do any real work until they understand the interdisciplinary nature of most industry projects. “Real-world projects rarely involve just electrical engineering or mechanical engineering, so these types of projects really appeal to employers,” she says.

The Sandia Labs project, for example, where optical elements interact with a virtual scene, involved a team of electrical, mechanical and computer science students working together, each contributing their particular knowledge and skills.

“They figured the whole thing out,” Shastri says, and now “Sandia is very satisfied and wants to do more projects with us.”

Over the past three years, USD has moved the direction of the capstone senior projects to include more interdisciplinary learning experiences. Starting in 2018, this approach was amplified with the addition of computer science students working on two-semester projects.



“It is no longer just about building systems with mechanical, electrical and embedded software elements. It is now about data, visualization and machine learning. And, of course, our industry partners love it,” proclaims an invigorated Shastri. “Students who are cross-trained in engineering and computing are just the type of professionals they hope to hire and grow into technical leadership positions in their organizations.”

In fact, the number of projects is growing so fast, says Shastri, that the number of members on each team may have to be reduced from four or five to three or four. “It’s a good problem to have.”

In the near future, possibly next year, Shastri hopes to take projects to the next level by adding ones involving biology, chemistry or other science students.

“I’ve been talking to the faculty (in those departments) to see if we have groups of students for projects involving the intersection of engineering (with science disciplines),” he says. “Those are the kind of things that are going to happen to allow us to keep expanding the program.”

As biomedical, robotics, supply chain and other cross disciplines continue to develop, interdisciplinary projects will only benefit engineering and other USD students. “Think of the leg up this experience will give them as they apply for jobs or graduate school,” he says.

In the meantime, students rave about the teamwork, communication, critical thinking and other skills the projects help develop, along with the opportunity to interact with industry professionals as they prepare to apply for jobs and enter the workforce.

“Our industry mentors really helped us out,” says computer science senior Conor Shea, who worked on the Northrop Grumman project. “It was great interacting with them and getting into that business world environment.” — *Liz Harman*

[Link: www.sandiego.edu/industrypartners19](http://www.sandiego.edu/industrypartners19)



Planting more than just the seeds of sustainability, the Shiley-Marcos School of Engineering installed two Energi Plant renewable energy towers on campus, in partnership with Primo Energy.

Into the E-Maelstrom

Late in 1988, a college student named Robert Morris wrote a program designed to propagate across the network of computers and terminals that was yet to be popularly known as the internet. The Morris worm replicated aggressively and slowed activity across a web of some 60,000 machines worldwide to a worm's pace. It was the first cyberattack.



"We empower students by providing engaging curriculum and hands-on experience," says Adjunct Professor Doug Magedman. "Haydar, James and Richard have exhibited extraordinary talent and ambition as cyber professionals through their accomplishments within USD's MS in Cybersecurity in Engineering program."

Flash forward to 2015, when USD launched the Master of Science in CyberSecurity Engineering and Technology. A Yahoo hack just two years before had compromised some three billion accounts. Soon after the first students began the program, Marriott International would announce that more than 380 million customer accounts, including credit card and passport numbers, had been hacked for years before the intrusion was even discovered.

Chuck Bane, professor of practice at USD's Shiley-Marcos School of Engineering, says the USD program is unique in having two degree offerings. First, an online track that focuses on the business and administrative side of cybersecurity, and an on-ground intensive, hands-on engineering-focused program.

"Our mission is to provide a holistic education that does more than prepare students to meet industry demands," says Bane. "We created a program where students not only have a thorough understanding of the engineering involved in cybersecurity, but they are also versed in the professional and ethical aspects of an enormous global problem."

Cyberattacks take on a myriad of forms, from compromising everyday debit-card transactions to stealing classified military data and compromising a presidential election. Forbes estimates the international cost of cybercrime to be some \$6 trillion a year through 2021. And then it'll get expensive.

The first graduates from the innovate USD program have taken their training into this e-maelstrom.

Haydar Majeed was working as a credit union financial advisor when a chance meeting with USD's Center for Cybersecurity Engineering and Technology (CCSET) founding director took his life and career in a new direction.

"She personally took me on a campus tour as one of the first prospective students," he recalls, "and introduced me to the faculty and explained the hands-on engineering focus. I enrolled the next week."

Majeed realized that this industry, known for the multitrillion-dollar costs of cybercrime, was going to be a highly profitable endeavor, and he decided to take action. He founded CRIPTIQ (the Cyber Readiness and Information Protection Technology of Iraq) to assist and support the Iraqi government in their efforts to digitalize, secure and maintain their data and operations. Majeed grew up in Iraq and felt that with his skills, education and experience he could now make a difference in the lives of his family and friends back home by helping solve cybersecurity issues that the Iraqi government is facing.

"Iraq is a good country, but the computing infrastructure there is almost nonexistent," Majeed says. "Using the principles I learned at USD, we are helping

the government secure its data with encryption and better technical and administrative control.

We're trying to equip the people and agencies with the technology that will enable them to establish peace, stability and prosperity, not only for the Iraqi people, but for the entire region."



HAYDAR MAJEED

From his desk as an oil industry analyst at Phillips 66, **James Elumogo** saw an opportunity in cybersecurity. He also felt an obligation. Elumogo watched the 2016 presidential debates and heard the major party candidates agree on the threat cybercrime posed for the U.S.

"They talked about how we need to improve our issues in regard to cybersecurity. It sparked inspiration in my heart with the hopes of making an impact to support our nation."

He says the USD experience gave him something more than a foundation. "The professors helped me dive deep into the subject. You know that expression 'do the math'? Well, we did the math, got down to a very granular level. We learned to solve problems. We learned how to actually secure systems, not just bring them into compliance."

Now a cybersecurity engineer at Northrop Grumman working on the Battlefield Airborne Communications

Node the U.S. military uses to monitor battlefield operations, Elumogo sees himself as part of a larger, more patriotic effort.

"I had always been very excited about working for the Department of Defense, but cybersecurity is very much a concern for our president and I wanted to help."



JAMES ELUMOGO

Richard Rositas knows a little something about the relationship of cybersecurity to national security. He retired from the Air Force after 20 years of operating, maintaining and protecting programs like the U.S. global positioning satellite system, Global Broadcast Service, Airforce Satellite Control Network and the



RICHARD ROSITAS

Integrated Tactical Warning/Attack Assessment (ITW/AA) program. He entered the on-ground USD master's program with the goal of sharing his expertise with the next generations of cybersecurity personnel.

"I've got a lot of real-world experience, but the USD program really challenged me to learn and understand the engineering piece," says Rositas, who recently accepted a new position as director of information technology and cybersecurity, working for EMOLBI LLC at the Space and Missile Systems Center in Los Angeles, California. "We did a lot of advanced research and development in the Air Force to protect those networks, and the USD program has really helped me understand what's new and what's becoming obsolete — and why. Cybersecurity as an industry is starting to formalize roles and responsibilities, and it's really exciting to be a part of that."

Bane shakes his head in wonder as he talks about the program's successes that include the Ties that Bind Award, presented in 2018 by InfraGard San Diego, a partnership between the FBI and members of the private sector; the awarding of the student scholarship by SIM San Diego, the premier association for top technology executives in San Diego; and USD's Center of CyberSecurity Engineering and Technology's fourth consecutive awarding of the GenCyber Academy for Excellence grant by the National Security Agency and the National Science Foundation, designed to increase interest in cybersecurity careers and diversity in the workforce.

"We've come so far so fast," he says. "USD has shot to the top of cybersecurity programs nationally, and will continue to do so as our graduates continue to make their marks."

— Timothy McKernan

[Link: www.sandiego.edu/smartcities19](http://www.sandiego.edu/smartcities19)



The University of San Diego hosted the International Smart and Safe Cities Symposium in Spring 2019. Gordon Romney, PhD, director of the Center for Cybersecurity Engineering and Technology at USD, was a featured expert on a panel devoted to "How Smart Cities Leverage Privacy by Design and Other Trusted Privacy Models."



Elevating Entrepreneurship

Since 2016, USD's Shiley-Marcos School of Engineering entrepreneurship track has been on a whirlwind trajectory of growth, creating an entrepreneurial mindset that is permeating the fabric of the school — and beyond.

What started out as an idea born of instinct has developed rapidly into a full-fledged entrepreneurship track — not only for those interested in creating successful ventures to enter into incubators, acquisition or venture agreements, but also for those who wish to transition into companies looking for talent to inject innovation within their organizations.

"This was kind of an experiment," explains De Sanctis professor of engineering and entrepreneurship Venkat Shastri. "Dean Roberts is a nontraditional leader whose vision and passion for innovation has allowed entrepreneurship to flourish in the school."

"There is a rapidly evolving ecosystem of entrepreneurship worldwide where students are creating enterprising projects as part of their college experience," explains Dean Chell Roberts. "Because of that connection, and an economy that is thriving on entrepreneurship, we believe that having a successful entrepreneurial program, with an ingrained entrepreneurial mindset, builds our school's reputation in the eyes of incoming students, our current students and those who help us to grow the program."

In 2019, USD officially partnered with the Kern Entrepreneurial Engineering Network (KEEN) — a national network designed to develop best practices in engineering education and to champion the entrepreneurial mindset by infusing curiosity, connections and creating value (the three Cs) with broader innovative thinking in the workplace.

An advocate of KEEN's systematic training, Professor of Mechanical Engineering Ming Huang explains how people often associate entrepreneurship with startups. "It's more than that — it's an exploratory mindset of active learning that is very in line with our liberal arts emphasis. I wanted students to become more innovative problem solvers, to take charge of their learning, and KEEN has developed critical tools that I have successfully applied to my classes."

The school is harnessing this innovative spirit through a comprehensive three-tiered program — the eTrack Initiative — that begins with an entrepreneurial track for senior design. The second component is the Entrepreneurship Scholars Program, where students engage beyond the silos of engineering and take critical business courses to help round out their skills. Lastly, students participate in entrepreneurial competitions, which offer support and mentorship to turn an idea into something tangible.

Austin Hirsh '19 was awarded \$8,000 at USD's 2018 V-2 Pitch competition for his eco-friendly lawn mower project, Picket. This year, he also made the semifinals of the Fowler Global Social Innovation Challenge with another project, Re:fresh Smoothies. His experience at USD inspired him to pursue his master's degree in entrepreneurship at the University of Washington. "I am really excited for this intensive program because I will be able to develop and launch a real venture as my thesis."



Jordan Schultz '17, founder and CEO of Trash Tracker, explains, "The entrepreneurship program acted like an incubator, giving me access to people with useful feedback on the product and business strategy and helped push me to pursue the project at times when I had doubts."



AUSTIN HIRSH: GSIC SEMI FINALIST

Don De Sanctis, Founder and Chairman of SDI Systems, Inc. and an eTrack advisor, established a professorship in engineering and entrepreneurship at USD. He believes the Shiley-Marcos School of Engineering is "building an excellent incubator where students can explore their entrepreneurial ideas and instincts and launch their projects as startups in the world of commercial business and research." He continues, "Given that in just three short years, students have already launched four companies — I think they are on to something good. This is the kind of program that will create the next generation of leaders in engineering, management and entrepreneurship."

Looking back over three years of pushing boundaries and building dreams, Shastri reflects with a spirited gleam in his eye, "We feel our instincts were well placed, given the increase in interest and activity from students, mentors and industry partners. Looking forward, we intend to further collaborate with USD's School of Business to develop graduate programs to serve as advanced training for professionals already in the industry. The sky's the limit!" — Michelle Sztupkay

A Right to Succeed

The National Society of Black Engineers (NSBE), which is committed to increasing the number of culturally responsible black engineers who excel academically, succeed professionally and positively impact their communities, provided USD's chapter members the opportunity to attend the 45th annual NSBE convention in Detroit, Michigan, in spring 2019. The conference showcased and connected black students and professionals who are passionate about STEM (science, technology, engineering, mathematics).

First-year student Maleah Harshman, a computer science major, recently elected as the 2019-20 Southern California zone chair, was one of three USD chapter members to be nominated and win a regional position.

"I felt the best part of the convention was the connections I made with people across the country that not only

TJ Horn organized meetings with high-profile campus administrators to share the meaning and intrinsic value that the convention held for the students and worked collaboratively to gain funding for the students to attend.

Elisa Lurkis, director of development for the Shiley-Marcos School of Engineering, made inroads with Clarity Design, Meijer and the top contributor, San Diego Gas and Electric, who matched funds up to \$10,000. In total, through a student fundraising campaign, individual donors, and USD divisions and industry support, USD's NSBE chapter raised over \$27,000 to cover the registration fees, housing and flights for 18 members.

Rhonda Harley, USD's NSBE advisor and assistant director of career development for the Shiley-Marcos School of Engineering, worked with the NSBE executive board organizing logistics for the convention, preparing

USD's chapter of the National Society of Black Engineers found success at the largest annual NSBE convention to date and has its sights set on an even bigger presence in 2020.

was elected to hold the NSBE Region VI programs chair position for 2019-20 after giving a speech to the other chapters from the region.

"Being nominated for such a high-up regional position was an honor," says Washington.

In addition to the conference, industrial and systems engineering alumnus Matt Craig '03 and regional vice president of Meijer's eastern region, took the entire USD team to a Detroit Red Wings hockey game and hosted the chapter for a panel discussion with local professionals, including Keith Way from AT&T Engineering (retired); John King from General Motors Autonomous Vehicles; Sheri Crawley, founder and executive director of the Pretty Brown Girl Foundation and Sandra English from Cleveland State University's College of Engineering.

"It was great to sit down with engineering leaders and entrepreneurs to discuss business and career pathing with the students," says Craig. "Anytime we can all work together to help our USD students and any other future leaders grow, it's a win."

Washington reflects on the hopes of USD's NSBE chapter having a bigger presence in 2020 to share its mission statement on campus and across San Diego, California. "We won our first-ever regional award for having the highest attendance from a small chapter. Next year, we are going to strive to win chapter of the year because we hope to see and bring new faces to the NSBE national convention in San Antonio, Texas." — Vayunamu Bawa '19

Link: www.sandiego.edu/NSBE19



looked like me, but also shared a passion for STEM," says Harshman. "I want other students like me to understand that they have a right to succeed, no matter what field they study or career path they are on, and NSBE is the national base of support dedicated to helping us achieve that."

Coordinating the logistics for all USD NSBE chapter members to attend the conference was no small feat.

President of the USD NSBE chapter,

students for the event with tips from USD and NSBE alumni, and assisting attendees as they navigated the career fair. "This was a very meaningful and impactful experience for all participants," professes Harley.

Kathe Myrick, from the Office of Student Affairs, also provided critical assistance.

Many USD chapter members had job interviews on site with one student receiving an official offer.

Second-year student Lauren Washington, USD NSBE vice president,



Featured above is Rhonda Harley, USD's NSBE advisor. Matt Craig '03 and retail chain leader, Meijer, provided Harley and Chell Roberts, dean of USD's Shiley-Marcos School of Engineering, with tickets to experience the musical *Hamilton* in Detroit, where the NSBE Conference was held. Edred Utomi '13 (BA) played the lead role of Alexander Hamilton.

Faculty Achievements

Every full-time faculty member of USD's Shiley-Marcos School of Engineering has a strong commitment to student learning, as well as a breadth of practical experience and scholarship. The quality and dedication of our faculty members is one of the reasons the program is so highly rated among its peer institutions.

Sherry Abbasi, PhD, adjunct associate professor, presented a paper, co-authored by Ernest Kim, PhD, and Thomas Schubert, PhD, titled "Diligent Analog Discovery 2 and Bench-top Instruments: A Comparison," at the American Society for Engineering Education (ASEE) Conference in June 2019. The paper summarizes and evaluates their efforts in integrating new and emerging technologies in electrical engineering courses and laboratories.

Mark Chapman, PhD, assistant professor of integrated engineering, joined the University of San Diego in Spring 2019. As the growing department launches a new concentration in biomedical engineering in Fall 2019, Dr. Chapman infuses his expertise into the program, offering two new courses, including GENG 330 – Biomaterials Design, which introduces the concept of implantable biomaterials, and GENG 494 – Bioinformatics, which explores genomics, transcriptomics, gene editing and bioinformatics.

Daniel Codd, PhD, assistant professor of mechanical engineering, received several newly issued U.S. and international patents, including wearable injectors licensed by Amgen, continuous glucose sensing devices assigned to Dexcom and a baseball bat training weight developed with local professional athletes — the Hitting Knob. Dr. Codd's decade of industrial innovation prior to USD continues to serve the biomedical, advanced manufacturing and renewable energy markets — now totaling 21 issued U.S. patents and dozens more worldwide. Notably, pilot and commercial versions of his direct absorption molten salt solar collection and storage system co-developed at MIT were recently commissioned in both Abu Dhabi, UAE and Yumen Xinneng, China.

Video: www.sandiego.edu/dcodd

Gordon Hoople, PhD, assistant professor of integrated engineering, had a productive year in research. He and the other integrated engineering faculty members brought in a \$250,000 NSF grant to design a new sophomore-level energy course. He was also the engineering lead on a large sculpture project, *Unfolding Humanity*, that was showcased at Burning Man and Maker Faire. Bringing together over 80 faculty members, students and community members,



Unfolding Humanity explored the interplay between technology and humanity. Lastly, Dr. Hoople delivered a TED-style talk at the Joan B. Kroc School of Peace Studies' annual Peace Innovators event, making a compelling case about the need for a holistic understanding of both social and technical elements of problems in order to achieve lasting peace.

Video: www.sandiego.edu/ghoople

Eric Jiang, PhD, professor of computer science, continues to serve on the editorial board of the international journal, *Intelligent Data Analysis*. As an invited speaker, he presented a research paper on effective classification models at the international conference on computer modeling and simulation in Sydney, Australia. Dr. Jiang also taught COMP 494 – Data Mining during summer session in Shanghai and Beijing, China.



Imane Khalil, PhD, associate professor of mechanical engineering, was elected a fellow of ASME. The ASME Committee of Past Presidents confers the fellow grade of membership on worthy candidates to recognize their outstanding engineering achievements. Nominated by ASME members and fellows, an ASME member has to have 10 or more years of active practice and at least 10 years of active corporate membership in ASME.

Video: www.sandiego.edu/ikhali

Jae D. Kim, PhD, assistant professor of industrial and systems engineering, developed a new course called Data Science and Analytics that provides students an opportunity to apply various statistical methods for exploratory, predictive and prescriptive analytics on a diverse set of problems across industries using the R programming language. He also published an article in the journal *Energy Policy* called "Insights Into Residential EV Charging Behavior Using Energy Meter Data," which showed energy profiles across different rate groups based on two years of energy meter data from the entire SDG&E service territory.

MARK CHAPMAN

IMANE KHALIL

GORDON HOOPLE

Susan M. Lord, PhD, professor and chair of integrated engineering,

received the IEEE Undergraduate Teaching Award at the 2018 Frontiers in Education Conference for “contributions to the development of more inclusive and innovative undergraduate teaching in electrical and computer engineering.” She has given invited talks at the NSF-sponsored Engineering Deans Forum on Broadening Participation, the University of Florida, the University of California, Irvine and California State University, Los Angeles. With colleagues from Purdue University, Rose-Hulman and USD, Dr. Lord published an article in the *Journal of Engineering Education* on “Beyond Pipeline and Pathways: Ecosystem Metrics.”

Video: www.sandiego.edu/slord-exsj

Truc Ngo, PhD, professor and chair of industrial and systems engineering,

recently completed the HERS Institute Higher Education Leadership Development Program at Wellesley College in March 2019. She also submitted a National Science Foundation grant proposal to introduce the hands-on integrated learning approach into the current sustainability curriculum for the school of engineering. During 2019 spring break, Dr. Ngo led a group of students in the Design of Coffee class to Guatemala to learn about coffee farming, harvesting, production, export and the impacts of the coffee industry on various Guatemalan communities. In June 2019, Dr. Ngo traveled to El Cercado, Dominican Republic (her fifth humanitarian engineering trip to the DR), to help local Dominicans start the plastic and agricultural waste repurposing project. USD engineering lab technician Sam Burt, Jumanah Jamal '18 (EE), students and a teacher from Southwest High School, and a former graduate from Instituto Tecnológico de Tijuana, Mexico also joined Dr. Ngo on this trip.

Video: www.sandiego.edu/tngo

Leonard Perry, PhD, professor of industrial and systems engineering,

is working on a collaborative workshop, Leading Your Organization to Greater Social Impact with Lean Six Sigma, with the SOLES Nonprofit Institute. The workshop will streamline operational processes and reduce current inefficiencies and redundancies. Participants will learn how to lead their organization through a structured improvement journey utilizing Lean and Six Sigma techniques.

Video: www.sandiego.edu/lperry

Thomas Schubert, PhD, professor of electrical engineering,

has been inspiring USD engineering students since 1987. As one of the founding faculty members of the engineering program, Dr. Schubert will be teaching his last semester at the Shiley-Marcos School of Engineering in Fall 2019 before retiring from the university. Over the years, his two true joys have been his interactions with students and his passion for music. And aptly so, he has developed an innovative new course that he will teach in his final semester,



ENGR 494 and 241 – The Acoustics of Musical Instruments. The course is a labor of love that Dr. Schubert has been developing for years and explores the interaction of technology, science and music through analytical analysis and practical applications.

Department Highlights

Computer Science (CS)

The CS department launched a revised BA degree program and added a new BS degree program. Saturnino Garcia, PhD, received tenure and was promoted to associate professor, and Tom Lupfer and Chuck Pateros, PhD, were brought on board as professors of practice. The Association for Computing Machinery (ACM) club took the organization to the next level by inviting industry professionals to share their career experiences, participating in competitions and hosting workshops and industry speakers.

Electrical Engineering (EE)

This year, the EE department averaged 25 students per class, an EE faculty task force was created to propose a computer engineering program within the department and three EE senior design students launched a startup company. ENGR 121 has been eliminated, with programming in C and the introduction of IoT covered in ENGR 102. EE students now take ELEC 311 – Semiconductor Electronic Devices in place of ENGR 311 – Engineering Material Science.

Industrial and Systems Engineering (ISyE)

The ISyE department piloted a new student mentorship program this year. The department also received multiple grant awards, won Honorable Mention for Modeling Skills in the Simio Student Simulation Competition and held their first faculty team building event. Two of the school's past three valedictorians were ISyE majors. In 2018, Truc Ngo, PhD, was promoted to full professor and Odesma Dalrymple, PhD, received tenure and was promoted to associate professor.

Integrated Engineering

Initially launched as general engineering, the integrated engineering department has been rebranded to convey their more holistic approach to engineering. Students within the major develop a strong technical foundation across multiple areas of engineering and science, and an understanding of the profound impact engineers have on society. The department also added three new concentrations: sustainability, engineering and the law and, most recently, biomedical engineering — a befitting tribute to renowned biomedical engineer Donald P. Shiley.

Mechanical Engineering (ME)

In 2019, Imane Khalil, PhD, received tenure and was promoted to associate professor. Two tenure-track faculty members, Melissa Gibbons, PhD, and Bryan Cornwall, PhD, completed their first years of service. A new course on water technology was developed in collaboration with Azrieli College of Engineering in Jerusalem. USD students traveled to Israel for lectures, labs and course-related site visits. The department also collaborated with integrated engineering to develop two courses on biomechanics and medical devices, co-taught by ME faculty.

Engineering and Computing Showcase

Shiley-Marcos School of Engineering students imagine, innovate and inspire to create solutions to any number of societal challenges. Their work was on display at last spring's Engineering and Computing Showcase, which featured over 30 entrepreneurship, community, student and industry-sponsored projects.



LEFT PAGE

Top: The USD NG team explains the Automated Cryogenic Flow Control project to computer science assistant professor Saturnino Garcia.

Bottom left: SmartCoach is an augmented tool for dance teachers to assess and evaluate their students.

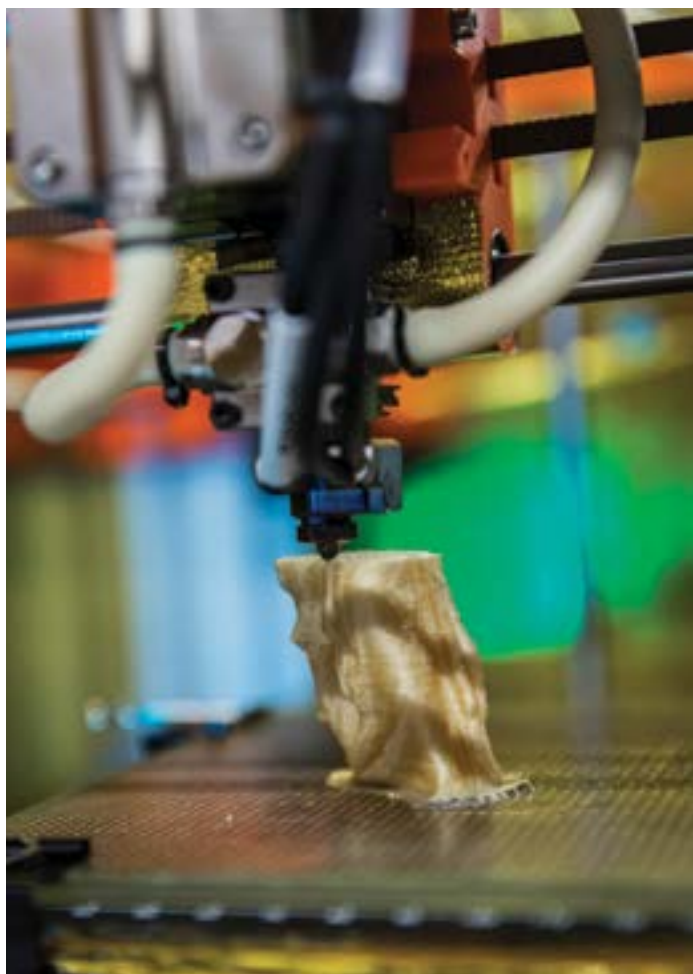
Bottom right: Samantha Terranova places fourth in the women's speed event at the ASME Human Powered Vehicle Competition.

RIGHT PAGE

Top: Close up of Click and Print's 3D printer — winner of the David Malicky Innovation Award.

Bottom: Entrepreneur Austin Hirsh shows off his team's automated lawnmower, Picket.





Graduate Employment

The USD Career Development Center compiles data on students completing their undergraduate degrees. This data, gathered from multiple sources, reflects the initial career destination for 82.7 percent of the 150 students who graduated from the Shiley-Marcos School of Engineering between August 2017 and May 2018.

Graduate Outcomes

91.1% of 2017-18 respondents are employed, in graduate school, in the military or participating in full-time volunteer service.

77.4% Employed Full Time	4.8% In Graduate School	1.6% Volunteer Service Full Time
8.1% Seeking Employment	3.2% Self Employed	0.8% Other
	3.2% Military Service	

Representative Employers of Graduates

Aerjet Rocketdyne	Hologic, Inc.	Northrop Grumman
Boeing	HP	SPAWAR
Clarity Design, Inc.	Lockheed Martin	Thermo Fisher Scientific
General Atomics	NAVAIR	

First Job Offer

98.0% of 2017-18 respondents that are employed full time reported that they received their first job offer within three months of graduating (76% before graduating and 22% within three months).

Annual Salaries

\$60,614	\$30,000–\$100,000
Average Salary	Salary Range

Full-Time Employment by Industry

36.8%	Engineering and Design
21.1%	Technology
6.6%	Manufacturing and Product Development
6.6%	Science and Research
5.3%	Health and Medical
3.9%	Energy and Utilities
3.9%	Public Service, Government and Nonprofit
2.6%	Finance and Banking
2.6%	Marketing, Sales and Consumer Products
2.6%	Transportation
1.3%	Education and Child Development
6.6%	Other

Alumni Notes

USD's Shiley-Marcos School of Engineering is nationally recognized for developing world-class engineers and computing professionals empowered to become leaders with global perspective and social awareness.



1995

Keith Resch (EE)

continues to work for Sony in San Diego, California, and in 2018 was promoted to director of engineering for Consumer Audio Products. He leads a team of engineers who are designing headphones, speakers and soundbars for the North American market and spends much of his time working in Tokyo, Japan, with the Japan design teams. He is married to his wife, Olivia, and has two daughters, Alyssa, 4, and Coralie, 1.

1996

Mike Mahan (EE) continues to work in insurance, but enjoys his ham radio hobbies in his spare time. He and his wife, Annie, bought a home in Washington state.

2000

Ricardo Valerdi, PhD (EE) was promoted to professor in the Department of Systems & Industrial Engineering at the University of Arizona (UA). In addition to his academic role at UA, he is the faculty athletics representative to the Pac-12 and NCAA.

2001

Mark Heffernan (EE) continues as senior program manager at Thales and recently started an all-natural nonalcoholic ginger beer company called Zingabrew.

Michael Spencer (EE) and wife, Jennifer, were blessed with the birth of daughter Natalie Yvonne in September 2018. Their first daughter, Caroline, turned 3 in May



2019 and is a future engineer/artist/ ballerina/superstar. Michael continues to work at SSC Pacific and leads a branch of the Navy Network Design Facility. He completed a SME role for a DARPA program called Tactical Undersea Network Architectures (TUNA). He is president of Scripps Mesa Fireworks, who organizes the Fourth of July fireworks show over Mira Mesa.

2002

Rasheed Behrooznia (EE) and his wife, Michelle '01, welcomed their third child. Daughter, Suri Indira Behrooznia, was born on December 1, 2018.



RASHEED BEHROOZNIA



MATT CRAIG

2003

Matt Craig (ISyE) and his wife, Jessica, welcomed their fourth daughter, Katelyn Rose Craig, on November 12, 2018. He previously referred to his three girls as the trifacta but has now revised this to the quad squad.

2007

Ali AlMatrouk (EE) is still the vice chairman and managing director at Jadeite Group, a family-owned business focusing on real estate ownership and development and investments. Jadeite Group is on its way to finishing its first residential project called JADE in Kuwait, which is scheduled to welcome its residents by December 2019. Ali's tech startup in grocery deliveries in Kuwait, www.tons.com, raised \$2 million in funding, and plans to expand its operations and footprint in the Kuwaiti market. Ali was blessed with a baby boy, Abdulaziz.



DANA HERNANDEZ

Dana Hernandez (ISyE) and her husband, Will Tuddenham, opened a creative studio named Loop Services shortly after they relocated to Amsterdam, Netherlands, in July 2018. Their focus is on elevating the work of artists by offering arts administration and experimental design services to artists and organizations who share in their vision of an inclusive, equitable and fun world.

Matt Petrucci (ME) recently moved to the Bay Area where he is continuing his research focused on Parkinson's disease as a postdoctoral research fellow in the Department of Neurology at Stanford University.



Colin Porterfield (ME) continues to work at Flowserve in Los Angeles, California. He was recently promoted to general manager of his facility and celebrated the birth of his second son in June. Porterfield's main hobby is spending time with his sons, including big brother Carson, age 2.

2008

Karl Riesen (EE) is the director of marketing for Alpha Informatix at Alphatec Spine. He, his wife Kat and their two boys, Nicholas and James, live in the Bay Ho neighborhood in San Diego, California.

2009

Nate Allera (ME) has recently begun working in the business development division of Healthcare Services Corporation, MAXIMUS Federal Services, Inc. in the Washington, D.C. area.

2010

Jessica Foster (formerly Skaar) (ISyE) continues to work for United Technologies at Aerostructures in Chula Vista, California. She and her husband were blessed with a baby boy, Holden Atwood, in June 2019.

Matt Leigh (ME) continues to work as a music producer, mix engineer and session musician at The Tracking Room in Nashville, Tennessee. Matt recently engineered sessions for country music legends Ronnie Milsap and Willie Nelson. Matt is currently working with the Nashville Predators (NHL) to compose and develop new music for their pregame festivities.

Alisa Sieber-Johnson (ISyE) commissioned into the Marine Corps after graduating and became a KC-130J Super Hercules pilot stationed at Miramar. She and her husband, Shawn Johnson '06 (political science), live in Escondido,

California, with their two daughters. During her time serving, she started a national nonprofit, Dogs on Deployment, which provides an online foster network for military members to find volunteers willing to board their pets during their service commitments. She is leaving the Marines this fall to begin a search for her next professional move, potentially continuing her education in engineering.

2011

Deep Bedi (ISyE) was promoted to chief product officer for PayMe at HSBC in Hong Kong and was featured on the Forbes 30 Under 30 Asia list for consumer technology.



Matt Gigli, EE/CS is going into his fourth year at Trellisware Technologies, working on military radios as a software team lead. Matt and his wife Danielle welcomed their first baby, Carson Joseph Gigli, into the world on March 30, 2019.

David Leyva (ME) is currently pursuing a master's degree in ocean and resources engineering at the University of Hawaii, Manoa. He received a teaching assistantship with the university to help support his studies and is interested in conducting research directed toward autonomous underwater vehicles.



Chase Tushaus (ISyE) and his wife, Julia, live in downtown San Diego, California. Tushaus serves as a financial advisor for RBC Wealth Management in La Jolla, California. He remains active at USD as a member of the USD Alumni Board, Engineering and Computer Science Alumni Council and the Engineering Exchange for Social Justice. He and his wife enjoy opportunities to mentor teens through her counseling work at Cathedral Catholic High School and their involvement at St. Charles Borromeo in Point Loma, California.

I3@USD, the University of San Diego's engineering magazine, is published annually each fall. Alumni notes are solicited each spring/summer from alumni of the USD Shiley-Marcos School of Engineering. Notes submitted should total 50 words or less and include professional and personal updates. Photos submitted should be high resolution (300 dpi). To submit your professional update, email elurkis@sandiego.edu.

To submit a class note to **USD Magazine**, which is published three times a year, please email classnotes@sandiego.edu.



Samantha Levine (ISyE) was promoted to senior program manager for Pratt & Whitney's CH-53K and C-27J APU product lines in West Palm Beach, Florida. Samantha and her fiancé recently bought a house with a large enough backyard for their four dogs.

2012

Brandon Blom (ME) left Qualcomm at the end of 2018 to take a project engineering position at General Atomics ASI, in Poway, California. Blom also married his wife, Katie, at the beginning of 2019.

Juliette Coupez (ME), who played on USD's women's tennis team, was recently promoted to project manager at Framatome (designer and supplier of nuclear power plants). She has been a technical leader there since she graduated and moved to France for graduate school. Juliette married her long-time girlfriend and high school sweetheart, and lives in Lyon, France.

Harmonie Jacobson (ISyE) is currently an MBA candidate at UNC Kenan-Flagler Business School in Chapel Hill, North Carolina, graduating in May 2020. She was elected as the president of Carolina Women in Business. During the summer, she interned at Google in New York City.



HARMONIE JACOBSON

2016

Boris Fratkin (ME) works at Cubic Global Defense. He was recently promoted to be the lead mechanical engineer in two major foreign defense contracts. Fratkin and his wife, Alejandra, who also works in defense, enjoy spending their Fridays off together, and have two beautiful rescue cats.

Rodrigo Sicre (EE) recently started to work as an associate PV designer at Sunrun in pursuit of his goal to positively impact the world through renewable energy.

Anya Soloviov (ISyE) continues to work for Amazon as a startup project manager (III). After two years of traveling 80 percent of the time, she has transitioned to working primarily in the Seattle, Washington, offices. She just bought an apartment and was married in June 2019.



ANYA SOLOVIOV



PHILIP G. HOSKINSON

2014

Philip G. Hoskinson (ME) defended his thesis in concentrated solar power for U.S. National Laboratories when he wasn't surfing, hunting and fight-training his way to victory.



JULIETTE COUPEZ



IAN GRAY

2014

Ian Gray (ISyE) continues to work at Thermo Fisher Scientific and has recently gone back to school at University at Buffalo for his MBA. His recent excursion to Paris and Rome reignited his love of travel, which he plans to do more frequently.

2015

Nicholas Clements (ME) continues to work at BSE Engineering in San Diego, California, where he is an HVAC design engineer. He just passed the Professional Engineers exam in December.

Allyson Ward (EE) is now working at an autonomous robotics company called Brain Corporation in San Diego, California, as a project manager. She also graduated from Johns Hopkins University in December of 2018 with a Master of Science in Technical Management.

Kim Woodbury (ISyE) continues to work at Thermo Fisher Scientific, but has transferred to a new role and a new city. After seven years in San Diego, California, she now lives in San Francisco, California, as a kit development manufacturing engineer. She's excited to work with R&D and Operations for new product development.

2017

Devyn Bryan (ME) continues to work for San Diego Gas & Electric as an associate engineer in the Rotational Program. Bryant has finished his first six-month rotation at the Palomar Energy Center and will be moving on to his next rotation in District Construction and Operations. He is also a founding member of the new USD Engineering and Computer Science Alumni Council. In his free time, he continues to coach high school football and track at Mount Miguel High School.

Noah Thomas (CS) continues to work for Lockheed Martin in Denver, Colorado. He recently married USD mechanical engineering alumna, Tabitha Ary, who also works for Lockheed Martin.

Nicholas Watson (ME) began pursuing a PhD in biomedical engineering from the University of Texas at Austin in Fall 2019.

Engineering News Briefs

New Engineering and Computer Science Alumni Council

In Spring 2019, USD's Shiley-Marcos School of Engineering held its first Engineering and Computer Science Alumni Council meeting. Council members serve a two-year term and engage in the following activities as ambassadors and mentors to our alumni and student population: facilitate industry introductions that serve the school and its alumni, encourage alumni to provide career presentations to students and make meaningful gifts in any amount to support scholarships, capstone senior projects or other areas within the school. The school is honored to have such passionate and devoted alumni support.

Link: www.sandiego.edu/SMSE-AlumniCouncil

Engineering: A Lifetime of Learning

Executive advisory board member, Katie Busch-Sorensen, provided the keynote presentation at the 2019 Evening with Industry (EWI), hosted by USD's Society of Women Engineers (SWE) student chapter. Busch-Sorensen, a global senior solutions architect for Cubic Transportation Systems, has led teams worldwide and shared her inspirational story, citing how diversity among engineering teams creates more robust products and solutions, how globalization spreads opportunity and increases the standard of living and how honing one's engineering skills takes a lifetime of learning. "With the world population approaching eight billion people, sustainability and overpopulation are the key issues of our time," professes Busch-Sorensen. "If our humanity has a chance of making it, it is because of diverse, balanced and intelligent engineers and scientists, female and male, collectively pulling together."

Improving Operational Effectiveness at USD

The Executive Council of the University of San Diego approved funding for a strategic initiative titled the Operational Excellence Development Program. The initiative was submitted by Bradley Chase and Leonard Perry, associate professors of industrial and systems engineering, and Simon Croom, professor of operations and supply chain management in the School of Business, to address the university's *Envisioning 2024* strategic goal of improving structural and operational effectiveness. The two-year grant supports the design of the Operational Excellence Academy, a professional development program for USD employees focused on improving process effectiveness across campus operations. The program incorporates a faculty-supervised project that will address a real-life operational issue and is intended to define, measure, analyze, improve and control process effectiveness in the participants' area.

Link: www.sandiego.edu/envision2024

Designing Human Powered Vehicles

The USD Shiley-Marcos School of Engineering senior design team placed fifth overall at the 2019 American Society of Mechanical Engineering (ASME) Human Powered Vehicle Competition (HPVC). This is the school's second year of participating in the competition, requiring teams to design vehicles for safe and sustainable transportation that is not infrastructure intensive. Design team members included Cody Anderson-Parks, William Calder, Nathan Sauer and Nathan Smith. The competition team included Samantha Terranova who placed fourth in the women's speed event. G. Bryan Cornwall, PhD, served as the faculty advisor. Special thanks to mentor John A. Mullen of Quartus Engineering for his outstanding support.



BROCK WILSON

Brock Wilson (ME) moved to Cape Canaveral, Florida, after graduation where he worked as a ground controller launching rockets for SpaceX. He recently moved to Los Angeles, California, to work on fluid system design for the Commercial Crew Program.

2018

Michael Doyle (EE) has started a new career at the MITRE Corporation as a machine learning engineer. He works with computer vision models to make the world a safer place and head bangs at punk rock concerts to make the world a more rebellious place.

Cyro Kamogawa (CS) is a software engineer for an engineering consultant firm, SOLUTE, based in San Diego, California.

Jesse Kotsch (EE) has been working in San Diego, California, at Northrop Grumman as a digital engineer since she graduated in May of 2018.

Duy Ngo (ME) continues to work for Boeing at its location in Everett, Washington. He is working in Boeing's 777X program while learning more about additive manufacturing through MIT xPro courses.

Chris Sheehan (ME) accepted a position as a quality engineer at Alphatec Spine after graduation. He enjoys working for a company that is quickly becoming the fastest-growing, most innovative medical device company in the spine industry.

Tabitha Thomas (formerly Ary) (ME) works for Lockheed Martin in Denver, Colorado. She recently married USD computer science alumnus, Noah Thomas, who also works for Lockheed Martin.



TABITHA AND NOAH THOMAS

Hannah Winterbottom (ISyE) recently got a job as an operations industrial engineer with the United States Postal Service in Denver, Colorado. She took some time off between graduating and starting a full-time job to volunteer in Cusco, Peru, and embark on a four-day backpacking trip to Machu Picchu.



HANNAH WINTERBOTTOM

Class of 2018 and 2019

In 2019, USD's Shiley-Marcos School of Engineering graduated 151 students. The class was composed of 26 computer science majors, 21 electrical engineers, 27 industrial and systems engineers, four integrated engineers and 73 mechanical engineers. Here is a sample of what some of them have been doing since graduation.



CLASS OF 2019 VALEDICTORIAN

Madison Horn earned a 3.98 GPA and majored in industrial and systems engineering. Active in honor and professional societies, she served as the president of USD's Society of Women Engineers chapter, as vice president of USD's Institute of Industrial & Systems Engineers chapter and as an officer of Tau Beta Pi. A native of Portland, Horn will be staying in San Diego, joining G2 Ops, Inc., a technology and cybersecurity firm, as a systems engineer I.

COMPUTER SCIENCE

Mia Kim moved to New York, New York, to work as a full stack software engineer for Iac Applications.

Ethan Romney is working as a full stack web developer for Asignio out of Seattle, Washington.

Matthew Roth received three job offers and is working for Qualcomm in San Diego, California, as a software engineer.

Nicholas Wahl is working for Cubic Transportation as a software engineer intern in San Diego, California.

Taylor Wong accepted an offer from RiskSense, a cybersecurity company in Albuquerque, New Mexico. The position title is a security automation engineer and prototype developer. Wong is looking into master's degree programs at the University of New Mexico.

Link: www.sandiego.edu/twong

ELECTRICAL ENGINEERING

Joshua Barrio is attending the University of Colorado Boulder to start his PhD program in aerospace engineering. He and his wife also welcomed their first child this summer.

Laura Becerra spent time after graduation as an international volunteer in Ecuador, South America, working as an elementary school teacher for six months. She started attending UC San Diego's Electrical and Computer Engineering PhD program in Fall 2019.

Christopher Bridgeman is working as a mechanical/electrical/plumbing (MEP) engineer for McCarthy Building Companies in Newport Beach, California. His work involves working with large-scale 3D models, identifying design or constructability issues prior to build, managing subcontractors during build and verifying quality.

Gautam Daryanani, who also minored in math and computer science, is working for Qualcomm in San Diego, California, as an engineer.

Mariella Saviola is working as an electrical hardware engineer I for Northrop Grumman in San Diego, California.

INDUSTRIAL AND SYSTEMS ENGINEERING

Abdullah Almoammer accepted a position at Becton, Dickinson and Company and is working as a process improvement engineer in San Diego, California.

Jose Luis Estrada is working as an engineering intern for Ciari Guitars, a startup in San Diego, California, with the plan of transitioning to a permanent position in fall 2019.

Vanessa Felix is now working as a quality engineer for Weber Metals, Inc. in Paramount, California, after working as a summer intern.

Lauren Kafka received two job offers and accepted the position as supply planner for Marvell Semiconductor in Santa Clara, California, for whom she interned.

Rebecca Kruger is working for industry partner Clarity Design in San Diego, California, as a purchasing engineer.

INTEGRATED ENGINEERING

Jazmyn Gonzalez continued working on her senior design project as an engineering intern for Clear Blue Sea over the summer. The project, located in San Diego, California, is a mini floating robot designed to eliminate floating debris in the ocean.

Matteo Salom received two job offers and is working as a software engineer in Government Technologies for Qualcomm in San Diego, California, after traveling over the summer.

Conor Shea is now an ensign for the United States Navy and is stationed in Coronado, California.

MECHANICAL ENGINEERING

Danielle Gadbois received two job offers and is now working for GenMark Diagnostics in Carlsbad, California, as a mechanical engineer I.

Austin Hirsh made the semifinals for the 2019 Fowler Global Social Innovation Challenge for his entrepreneurial project, Re:refresh Smoothies. He is now pursuing his master's degree in entrepreneurship at the University of Washington Foster School of Business in Seattle, Washington.

Erin Kendrick is a purchasing engineer for industry partner Clarity Design in San Diego, California.

Amanda Kennedy accepted a position as mechanical engineer I at Raytheon in Goleta, California. She had an internship with the company while studying at USD.

Brian Lee is a mechanical engineer at the Naval Information Warfare Center in San Diego, California, where he works on research and development of communication devices to be used by the U.S. Navy.

Kyle Maloney accepted a job as a project engineer for Silicon Valley Mechanical in San Jose, California. He had an internship with the company while attending USD.

Chasen Mariano was accepted to the Navy Officer Candidate School with a pilot contract, after which he will attend flight school at the Naval Air Station Pensacola and eventually become a naval aviator.

Lauren Mohrman received three job offers and accepted a position with Critchfield Mechanical, Inc. (CMI) as a project engineer in San Jose, California. She will be responsible for project management, design and construction of HVAC systems. Mohrman held a position as a project engineer intern with CMI in 2017 and 2018.

Sydney Reiners received two job offers and accepted a position locally in San Diego, California, as a systems engineer I for G2 Ops.

Michael Sween received two job offers and elected to work for Blue Origin as a test engineer in Kent, Washington.

Hayden Spencer accepted a position as project engineer for University Mechanical, located in El Cajon, California.

Maaron Tesfaye is working at Seaspine in Carlsbad, California as a design engineer on the product development team for spinal implants.

Jayden Yoeman is now working as an associate engineer for SDG&E in San Diego, California.





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October 3, 2019

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December 6, 2019

Engineering and
Computing Expo

May 8, 2020

Engineering and
Computing Showcase

May 23, 2020

Graduate
Commencement

May 24, 2020

Undergraduate
Commencement

