Every dog has its day

Pogo takes a jaunt thanks to Pacific’s innovative students
YOU SEE THE WORLD DIFFERENTLY.

The world needs a safe network. You see the way to get us there.

Pacific’s Master of Science in Cybersecurity program prepares students to enter careers as cybersecurity professionals. This hands-on, laboratory-intensive graduate program is open to students with a bachelor’s degree in any field, and professional work experience can be used to accelerate degree completion.

Learn more at Cyberlab.Pacific.edu
I am thrilled to be sending you the 2018 edition of The Rock. This past year, the school has grown by offering new graduate programs, including a Master of Science in Cybersecurity in Stockton and our expansion of the Data Science graduate program to our Sacramento Campus. We now have programs at all three campuses.

The 2018 U.S. News and World Report rankings of undergraduate engineering programs ranked our school as #44; up 11 positions from last year. I am so proud of our faculty, staff and student accomplishments, which has helped elevate our school’s excellent reputation. Last fall, former Cisco CEO, John Chambers visited Pacific. His visit included a tour of our facilities and speaking with students in the John T. Chambers Technology Center. The highlight of the visit was his talk on the digital world to a standing-room-only crowd at the DeRosa University Center Ballroom.

We continue to strengthen support for our students to prepare them for success. We are expanding our experiential learning opportunities with growth in our legacy CO-OP program and opportunities for student engagement both inside and outside the classroom.

We are excited about the future of the School of Engineering and Computer Science and thank you for your continued support of our students.

With best regards,

Steven Howell, PhD
Dean, School of Engineering and Computer Science
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AWARD-WINNING COVER PHOTO
University Photographer Jaslyn Gilbert took second place last October in the University Photographer's Association Monthly Image Competition's science and research category.

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Pacific’s MEP (MESA Engineering Program) helps first generation and low income students develop personally and professionally during their years at Pacific in preparation for their future in the workforce. The program offers support, guidance and various resources, such as free tutoring services, 24/7 access to a dedicated study room, CO-OP placement assistance and volunteer and scholarship opportunities. Our goal is to ensure the students graduate on time.

For more information, please contact Patricia Lopez at plopez@pacific.edu or 209.932.2887.
Sepehr Amir-Mohammadian

A recent graduate of the University of Vermont, Amir-Mohammadian’s research interest lies in networking and cybersecurity with a focus on programming languages and techniques to provide formal software security assurance. He is collaborating closely with Drs. Shafer and El Kari in the newly implemented Cybersecurity program. In his spare time, he enjoys spending time in the outdoors—hiking, biking, swimming and paddle-boarding. He also enjoys listening to tech podcasts and reading books on logic, cyberspace and technology.

“The topic of information security has helped me analyze and evaluate programs and systems more critically. Whether it is flawed design or deployment of a network protocol that could be exploited for denial of service attacks, I tend to investigate potential vulnerabilities and further amelioration. I like to communicate this sensitivity when I teach different topics in computer science, for the sake of more robust, safe and secure design and deployment of systems.”

Fadi Muheidat

Muheidat comes from the University of Missouri, Columbia, where he received his PhD in electrical and computer engineering. His main research interests are eldercare technology, “internet of things,” sensor data analysis and patient-reported outcomes. He hopes to build a component of an automated health-monitoring system to enable independent living for elderly people and provide a practical smart home environment that improves quality of life, reduces health care costs and promotes independence. In his spare time, he enjoys playing soccer, reading, watching TV and taking walks with his wife and kids.

“I am always motivated by seeing the impacts of my work on my students and colleagues. I am very excited to be a member of the School of Engineering and Computer Science and very motivated to keep up the good standing of the program.”
Dana Nehoran

Nehoran earned her master’s degree in analytics from the University of San Francisco and brings a strong background in management of data-driven engineering programs and higher education analytics. She has held senior management and consulting positions with Fortune 500 companies, such as Intel and Cisco, and has taught classes in data science and computer science at various institutions, most recently at San Jose State University. In her free time, she likes reading historical fiction and hiking with her family and beautiful golden retriever.

“I have always strongly believed in the potential of collaboration between the academic world and the related industries, and have contributed to such partnerships from both sides. I hope I get the chance to continue that here, in addition to enhancing student success with advanced analytics and decision sciences.”

Shon Vick

Vick brings more than 30 years of data and computer science expertise and application. This past fall, Vick taught ENG 019: Numerical Analysis for Engineers and COMP 47: Discrete Structures in the Computer Science department. He has enjoyed interacting with various engineering and computer science students in the school. He is also working on a draft for an introductory computer science textbook geared for engineering and computer science students as well as scientists.

“I’m very pleased to be at Pacific where it’s easy and common to combine the best parts of a liberal arts and engineering education. The diverse student body and exposure to the liberal arts prepares many students for a successful engineering career. I am very much looking forward to teaching motivated students at Pacific.”

Prasad Saripalli

Saripalli has an MS in Computer Science from Washington State, doctoral training separately in engineering and computer science from the University of Florida and post-doctoral training from the Institute for Computational Engineering and Sciences at the University of Texas, Austin. He currently serves as vice president of data science at Edifecs, an industry premier health care data interchange and analytics software vendor. He is a professor of practice teaching machine learning and computer science curricula at various universities, advising researchers to invent, patent and publish work in ML and SaaS applications.

“I am looking forward to teaching effective Machine Learning, AI and Computer Science courses, which help the students blossom into successful practitioners and researchers, and build Pacific’s Data Science program as one of the world’s finest.”
The School of Engineering and Computer Science is taking on this school year with full force. We have been staying busy with the launch of the Master of Science in Cybersecurity program, creation of the new cybersecurity laboratory, bringing on more faculty and staff to support our students and improving our facilities and recruitment. Read on to learn more about updates in each program and department.

**Data Science**  
*Rick Hutley, Program Director*

The Data Science (Analytics) program has had a busy year. Our first cohort has graduated and are well on their way in their data science careers. We now have two concurrent cohorts under way in San Francisco and two other concurrent cohorts underway in Sacramento. We are also excited to announce that we launched two new certificates in Computing for Data Science and Machine Learning in spring 2018.

**Bioengineering**  
*Dr. Shelly Gulati, Department Chair*

In July, Bioengineering was established as a department within the School of Engineering and Computer Science. This change in status from program to department was motivated by sustained growth in enrollment since the program began in 2000, expansion of course offerings and enhancement of laboratory capabilities in biomedical imaging and microfluidic fabrication. Bioengineering is further bolstered by the broad expertise of our four accomplished faculty.

**Civil Engineering**  
*Dr. Camilla Saviz, Department Chair*

The strength of our program continues to be demonstrated by the success of our students, alumni and faculty. Dr. Luke Lee was promoted to Professor, and Dr. Gary Litton serves as the SOECS Graduate Program Director. Students received numerous scholarships through ASCE and APWA and we took over 35 students to the ASCE MidPacific Student Conference. More than 40 percent of our graduating class was made up of women—four of whom received the department awards for Outstanding Graduate or Academic Achievement.

**Cybersecurity**  
*Dr. Jeff Shafer, Program Director*

Pacific’s new Master of Science in Cybersecurity program welcomed its inaugural set of students to campus in August 2017. Classes are being held in the brand-new, state-of-the-art cybersecurity laboratory located in the John T. Chambers Technology Center. This is a dedicated space for cybersecurity students to work with the latest software and hardware in a safe environment, while doing activities such as examining malicious software or probing internet of things devices for weaknesses. Two new cybersecurity courses were taught in the fall, covering topics in secure software development and computer networking.
**Electrical and Computer Engineering**  
*Dr. Ken Hughes, Department Chair*

Thanks to a grant effort led by Dr. David Mueller, the ECPE upgraded the Baun 211 Electronics Lab with new bench equipment. Dr. Ken Hughes developed a “flipped classroom” delivery for the Microcontrollers course during his development leave. Eight ECPE students participated in the 2017 Pacific Research Day, showcasing their accomplishments for the year.

**Computer Science**  
*Dr. Michael Doherty, Department Chair*

The primary focus of the Computer Science department continues to be producing strong, industry-ready students through the BS program. The department has also been working to increase support for computing in other disciplines through collaborations with the Media X, Data Science, History, and other departments. To meet the increased demand for computing courses while maintaining our student-centered approach, we have added three outstanding new CS faculty members: Sepehr Amir-Mohammadian, Dana Nehoran and Shon Vick.

**Engineering Management**  
*Dr. Abel Fernandez, Program Director*

Dr. Mehdi Khazaeei has been providing leadership for a university-wide faculty task force that is building on the successful Technological Innovation and Entrepreneurship minor. Faculty representing Law (Intellectual Property), College of the Pacific (Media X) and Education are involved in this effort. The South Campus Maker Space continues to grow and see more use supporting student projects from all majors.

**Engineering Physics**  
*Dr. Rahim Khoie, Program Director*

The Engineering Physics program is in the process of introducing a number of courses for EPHYS majors, including: EPHY 133 (Solid State Devices), EPHY 144 (Applied Electromagnetics), EPHY 195 (Senior Project I) and EPHY 196 (Senior Project II). This is the first step in giving the program better visibility to students and prospective employers.

**Mechanical Engineering**  
*Dr. Chi-Wook Lee, Department Chair*

Professor JuEun Lee and her student, Craig Chavez ’19 were named the 2017-2018 recipients of the Hoefer Prize for Student-Faculty Research/Creative Project for their project “Investigation of Bone Volume Fraction Relationships to Bone Drilling Forces with Applications to Osteoporosis Fracture Treatment.” Professor Scott Larwood is on Faculty Development Leave at Penn State working with a faculty member in the Aerospace Engineering Department for adding new functionality to a wind turbine analysis code, XTurbo. He is also observing classes related to wind energy so that he can plan his future course at Pacific. Prior to July 2017, some of the bioengineering faculty were part of the department. Now that bioengineering became its own department, Professors Shelly Gulati, Jeff Burmeister and Shadi Othman have a new home.
Ramping Up Toward the Future

Pacific’s bioengineering program expands to prepare students for success in this growing career field
Since its establishment in 2000 as the School of Engineering and Computer Science’s newest program, bioengineering has experienced continued growth in enrollment with nearly 80 students currently. This year, the program is being expanded and transitions to become the school’s newest department. The change will open up new opportunities to prepare Pacific graduates to succeed in an ever-broadening interdisciplinary career field.

Bioengineering department chair Shelly Gulati shared that this change allows for new electives and course offerings, widening the scope to additional areas of bioengineering, such as biopharmaceuticals.

Students will also see increased cross-disciplinary collaboration, particularly with Pacific’s renowned health science programs in pharmacy, dentistry, physical therapy, speech-language pathology and audiology, and physician assistant studies. Being able to explore courses in the medical disciplines will support students’ preparation for work within the medical arena.

A recent manifestation of new collaborations has been the department’s co-sponsorship of the Science Seminar Series, which brings scholars from a wide range of disciplines to Pacific, offering students the opportunity to learn about cutting-edge research.

“Bioengineering is a bit different than the other engineering fields,” said Gulati, “in that research opportunities—even at the undergraduate level—are very important to future employers.”

Preparing work-ready graduates for success in their lives and careers is a core value of the school and the university.

The school’s emphasis on undergraduate research and practical experience through its CO-OP program has laid an excellent foundation to ensure Pacific graduates are strong candidates for careers in bioengineering, and for furthering their education at the graduate level. With expanded collaborations and curricular offerings, the new department will build on this foundation with more teamwork-oriented, hands-on courses and cultivate additional avenues for interdisciplinary undergraduate research.

“The change is about targeting what students need to succeed in their professional lives once they leave Pacific,” said Gulati.
DISTINGUISHED ALUMNA OF THE YEAR

Kerry McCracken studied electrical engineering during her time at Pacific. Shortly after graduation, she worked at rapidly growing tech companies, including Silicon Graphics Inc. and Flex Ltd., where she remains today. She is currently the vice president and general manager of Flex Connect at Flex. During her tenure at Flex, she has held a wide variety of roles in supply chain, manufacturing operations, IT, mergers and acquisitions, and new product introductions. Outside of work, she and her spouse, Annabella, recently established a charity called Arrive and Thrive to assist refugees in becoming thriving members of the community. McCracken serves as a source of inspiration for the School of Engineering and Computer Science through her commitment to volunteerism and distinctive career achievements.

KERRY MCCRAKEN '87
Electrical Engineering

DISTINGUISHED SERVICE AWARD

Pete Wallace came to Pacific in 1952 on a football and diving scholarship. His schooling was put on hold as he served four years in the Korean War. He then returned to Pacific and graduated from the School of Engineering in 1959. After graduation, he worked for Teichert, International Paper Co. and several other companies before buying Sanger Works Factory, which builds and sells packaging machinery worldwide. Wallace retired in ’92 and has been a longtime fundraiser for Pacific. He helped developed the engineering management curriculum as well as Senior Project Day. He served on the Dean’s Council for 25 years and helped support the building of the John T. Chambers Technology Center. He continues to provide unparalleled dedication and support to the School of Engineering and Computer Science.

PETE WALLACE ’59
Engineering Management

Do you know someone who would be a great candidate for the 2018 Alumnus of the Year or the Distinguished Service Award? Please send your nominations to: Tom Sasser at soecsevents@pacific.edu by April 1, 2018.
This past summer, I had the incredible opportunity to work at the National Aeronautics and Space Administration (NASA) as an intern. I first heard about the opportunity at a talk given at Pacific by alumna Lieutenant Commander Leedja Svec ’01, now a colleague. She explained a program through which a student can apply for an internship at NASA directly at or under the Department of the Navy called the One Stop Shop Initiative (OSSI).

I was really excited to hear about these opportunities. After the talk, I immediately went back to my dorm room and started looking at NASA’s OSSI website. Through OSSI, college students can find internships and upload resumes, transcripts along with applications to internship positions they find interesting and related to their majors. I applied to 20 positions, all in an effort to secure an internship for the summer.

After months of waiting, I finally received a notification that I had been selected for an internship. It has always been a childhood dream of mine to work at NASA, so I immediately accepted the internship and anxiously waited for summer to come. That feeling of excitement was similar to how I felt on the first day of college—a mix of nervousness and optimism.

When summer finally arrived, I began working at NASA Ames Research Center in the Silicon Valley under Lt. Cmdr. Svec. Through her interagency program, I was sent to work for Dr. Ved Chirayath at Ames’ Laboratory for Advanced Sensing. While I was there, I primarily worked with two of their main novel instruments called MIDAR and FluidCam, and a large set of data they collected from a previous survey campaign.

I was given the task of creating code to process the large dataset and producing telemetry from a drone’s flight computer to pair with the dataset. The dataset combined with this telemetry is used to create an incredibly high resolution three-dimensional model of a coastal coral reef system that can be used for a large number of different applications. In order to create the code to extract the telemetry data from the flight computer, I had to use the coding language Python, a language I had no prior experience in. I used principles taught in my computer science classes to teach myself the basics of Python and was able to successfully create the code.

A typical day, if there ever was one, usually included arriving at the office at eight o’clock in the morning and reading through Python documentation to learn new tools. Later, when my bosses arrived, they would usually have a small side task for me to help out with. If not, I’d work on developing my code and generally helping around the office.

If I had to pick my favorite part about this internship experience, it would be marching with NASA in San Francisco’s Pride Parade. It was such a fun time and definitely an experience I was not expecting to come from this internship. All in all, working at NASA over the summer was a once-in-a-lifetime experience and certainly the greatest summer I’ve ever had.

“A DREAM COME TRUE
Dalton Kaua ’19 lands his dream internship at NASA

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“IT HAS ALWAYS BEEN A CHILDHOOD DREAM OF MINE TO WORK AT NASA, SO I IMMEDIATELY ACCEPTED THE INTERNSHIP AND ANXIOUSLY WAITED FOR SUMMER TO COME” — Dalton Kaua ’19
Career Fair
The annual Fall Career Fair brought 30-plus employers and over 125 students and alumni. The event proved to be a continued success, leading to the school's first-ever spring career fair.

Senior Project Day
Seniors showcase and demonstrate what they’ve learned in the classroom with design projects that are presented before a panel of alumni and industry experts.

Commencement
Congratulations to the class of 2017! We were honored to celebrate you and cheer you on as you transitioned from Pacific students to lifelong Tigers.

Awards Banquet
Dean Howell presents awards to valedictorian Colleen Motoyasu '17 and outstanding graduates Gina Myers '17 and Alex Obert '17.

25th Anniversary of SJYEH
2017 marked the 25th anniversary of San Joaquin's Expanding Your Horizons, a conference encouraging and inspiring young girls to pursue careers in math and science.

SOECS in photos
Cardboard Boat Regatta
It was a fun day at the pool as first-year students tested their boats in the water for the first time in the annual Cardboard Boat Regatta. This year had stricter rules: students could only use 15 pounds of cardboard and three rolls of duct tape.

Cybersecurity Laboratory
The Master of Science in Cybersecurity launched last fall. Above, students practice with the latest hardware and software in the new cutting-edge cybersecurity laboratory in the John T. Chambers Technology Center.

Here are highlights and memories from the past year. 2017 was certainly a historic year of innovation and new opportunities for our students.

SOECS Legacy Reception
During Homecoming weekend, the School of Engineering and Computer Science hosted its first-ever Legacy Reception, connecting alumni with current and emeriti faculty. Thanks to everyone who came!

John Chambers Visits Stockton Campus
Former Cisco CEO, John Chambers, visited the Stockton Campus last fall. His visit featured interactions with students in the John T. Chambers Technology Center and a talk on the digital world to a standing room only crowd.

Annual Mono Lake Trip
Drs. Litton and Saviz took students and alumni to Mono Lake to camp, hike, learn about civil engineering and experience an ecosystem.
Civil engineering student Alisha Rodriguez ‘18 had always dreamed of studying abroad, but thinking about an internship in the Czech Republic was a little bit scary at first. Thanks to her perseverance and the encouragement and support of her Pacific professors, she took on the challenge. The result was a tremendous learning opportunity and a life-changing journey of self-discovery. Here’s her story.

Internship Experience

My internship was an eight-week research program in Prague, Czech Republic called Research on Vadose Zone for Understanding Water and Chemical Transport at Various Scales. In this program, I studied water and chemical transport through the layer of the Earth that’s between the surface and the water table, the vadose zone. The program was funded by the National Science Foundation and included four American students, including myself and three other students from universities in Nebraska. We spent the summer working with faculty and students at Czech Technical University (CTU) in Prague.

Most of the research we performed was focused on the calibration and testing of a six-station prototype, the Automated Minidisk Infiltrometer. Infiltrometers are used to measure the ease at which water flows through soil or rock. This prototype infiltrometer, if successful, would allow users to place an infiltrometer on the soil and leave it alone for hours. In contrast, the infiltrometers now in use require someone to constantly monitor and record water levels. What was fun about this project was that it was completely unique to CTU, and it involved technology and equipment that wasn’t in the United States yet. In addition to the calibration experiments, we spent two weeks doing fieldwork, presented research at a conference, visited a CTU facility that included a green roof, took soil samples to Brno for CT analysis, sat in on lectures and much more. The other students and I created a blog* of everything that we did during the eight weeks.

View the blog at ires.unl.edu.

I enjoyed the fact that there wasn’t a typical day on the job. For example, one week was spent in the Jizera Mountains, a mountain range near Poland, where we performed infiltration testing, took large soil cores for CT analysis at a facility in Brno and performed ponded infiltration tests to find saturated hydraulic conductivity. The days started early in the morning and lasted until we were finished with experimentation, which sometimes went to 7 pm. I had never performed fieldwork before, so the experience was challenging, but also rewarding. Other weeks were spent...
completely in the lab, performing lab ponded infiltration experiments, calibrating the instrument or sitting in on a lecture on environmental isotopes. I was thrown a lot of information in the eight weeks, but it was exciting to know I was always learning something new. What was also great about the program was that I could travel on the weekends and explore Prague when I was done with work. I took weekend trips by train to Vienna, Budapest and Český Krumlov. There were also inexpensive flights that allowed me to spend a weekend in Oslo and five days in London. The program took me all around the Czech Republic, including Děčín, Brno, the Jizera Mountains, the Broumov region and, of course, Prague. I had never been to Europe before so getting to see five countries in eight weeks was a dream come true. The culture and traditions in Europe are incredibly rich, and it was amazing to see those sights in person.

Looking Back

It's crazy to think that I almost didn’t apply for the program. My adviser, Dr. Mary Kay Camarillo, heard about the program from a colleague and sent me the link for the application four days before it was due. Even though there was a huge time crunch, I applied, because it had always been a dream of mine to study abroad. Thankfully, I was able to find professors who were willing to write me letters of recommendation on such short notice. I believe what landed me this internship was a combination of my letters of recommendation, grades, and the diversity of classes that I have been able to take through the civil engineering program at Pacific. My professors emphasize that the classes that we take only prepare us for a small amount of what we will see in the workforce, so it’s important to focus more on the problem-solving aspect of engineering. In this program, I learned a lot of the techniques in the field. My coursework at Pacific allowed me to think critically, and to apply knowledge from one subject to another. I found that I could pick up on new techniques quickly because of how focused the faculty at Pacific is on creating critical thinkers.

My biggest advice for anyone who has the strong desire to do an internship abroad is to talk to your advisers. They have so many connections, resources and years of experience that will bring you opportunities you never imagined. If there is a country you really want to visit, do some research on it, talk to the Office of Cooperative Education advisers, and be proactive in your desires. My adviser brought the opportunity to me because she knew how much I wanted to study abroad. Another piece of advice is to keep an open mind. I never saw myself spending two months in a country where I didn’t know the language or any of the other program participants beforehand, but you may surprise yourself. There are numerous amazing experiences out there if you take a little time to look for them.

This internship experience was initially terrifying for me because I had no idea what to expect. I didn’t know any of the other students, had no knowledge of the Czech Republic, and I didn’t have any plans except to get on the airplane. I had always thought I needed others to go on adventures with, but through this experience, I was able to become more independent and confident in myself. I loved that I was constantly learning new things and becoming more comfortable with the realization that I still had so much to learn. I realized that I enjoy fieldwork and research, which solidified my decision to pursue a higher degree.

About Alisha Rodriguez: I am studying civil engineering with a minor in music at Pacific where I will be graduating in May 2018. I enjoy being involved and am a member of various Greek organizations, honor societies and professional clubs, such as American Society of Civil Engineers (ASCE), and I’m a Pacific Ambassador. I am currently in the process of applying for PhD programs in groundwater research.
Thanks to the generosity of our alumni, faculty, friends and students, we raised the minimum $50,000 to reach the Powell Match! That means any additional funds raised are now automatically matched. We were able to give out scholarships to five students so far.

Hear from the inaugural scholarship recipients

**Joey McElhany ’17**
A local Stocktonian, McElhany graduated from Pacific in 2017 with his BS in Civil Engineering. During his time at the university, he worked at the local geotechnical engineering firm KANE GeoTech.

“*This scholarship has helped me not only financially but helped my endeavor to graduate from an amazing university and become a competent and ethical future civil engineer.*”

**Sara Weimer ’18**
From the small town of Placerville, CA, Weimer intends to graduate from Pacific in 2018 with a degree in Civil Engineering. She worked at Teichert as an Engineering Associate and is currently on CO-OP as a Water Design Engineer at HDR Inc.

“I couldn’t thank the scholarship committee, alumni, Powell Family, and associates enough for the scholarship I received in 2016. Your kindness has allowed me to attend college and grow as an engineer.”

Make checks payable to:
University of the Pacific | 3601 Pacific Ave., Stockton, CA 95211

Give online at Pacific.edu/MakeAGift
Please click Civil Engineering & Engineering Management Scholarship when prompted

**MSES**
MASTER OF SCIENCE IN ENGINEERING SCIENCE

The MSES program is designed to strengthen students’ technical, analytical and professional breadth and depth. All students receiving an MSES degree will complete a set of core courses that covers the broader subjects of research and analysis.

Pacific.edu/MSES
CELEBRATING 60 Years OF EXPERIENTIAL LEARNING

THE SCHOOL OF ENGINEERING AND COMPUTER SCIENCE celebrates the 60th anniversary of its founding in 1958 from an engineering department dating back to the 1920s. Central to the school’s core values is a commitment to experiential learning opportunities for students. Reflecting these values, the Cooperative Education program and Senior Project Day are some of the longest-standing and most important traditions of the school.
LEARN AND EARN WITH COOPERATIVE EDUCATION

One of the main reasons engineering students choose Pacific is the Cooperative Education (CO-OP) program—a seven-month paid experiential internship that is built into the curriculum. The innovative concept was developed by engineering faculty back in 1968 when there was nothing like it on the West Coast. The goal was to give students the opportunity to earn a salary while working in a professional setting so that they could gain relevant experience and also help with college costs. The program was approved in 1969 and was formally established in March 1970. The school felt the program’s impact immediately, experiencing an 83 percent increase in enrollment over the previous year.

“The Cooperative Education Program provided the student not only with a superior education by integrating classroom studies with real engineering projects,” said emeriti professor Robert Hamernik, “[it] gave the student income to help defray the cost of college, an off campus cultural experience, career guidance and, often, job placement opportunities from a CO-OP employer.”

As the program continued to grow, so did the number of companies where students were placed. They were hired for positions all over California and the United States as well as overseas in Japan and Germany. Involvement with local engineering firms and community events also increased as more and more people discovered the importance of the field. Pacific soon became a leader in cooperative education on the West Coast, and coordinators for the program were invited to conduct workshops and trainings for other universities and industry partners.

Fast forward almost 50 years later, and the CO-OP program is still going strong. With access to over 200 employers and industry partners worldwide, the Office of Cooperative Education has remained a hub for connecting students with companies and potential future employers.

“The biomedical field is rapidly growing, resulting in more jobs for mechanical, electrical and bioengineering graduates,” said Irene Camy, director of Cooperative Education. In fact, 95 percent of all students who apply for a CO-OP receive offers and accept, often leading to jobs post-graduation. Through their CO-OP experiences, students have found that they are able to learn firsthand what a career in their chosen major would look like, how well they perform in it and how much they will enjoy it.

PROSTHETIC DOG LEGS AND WEATHER BALLOONS AND MESSAGING APPS, OH MY!

While many students like to take senior year a little easier, the engineering and computer science seniors are busy at work completing their design projects—incorporating what they have been learning in the classroom and into real-world applications. After spending time designing and building their projects over the course of a year, the projects are showcased, presented and judged by a panel of alumni and industry experts shortly before graduation day. It’s also a fun day for the rest of the
students and community to see and experience the projects firsthand and even talk about future senior project ideas.

“The senior project is the beginning of ‘welcome to the world’ where no one tells you what to do, when to do it and how to do it. It transitions the student to real-world problems where situations are unstructured and uncertainty reigns,” said Dr. Abel Fernandez, director of the engineering management program. “At the end of the project, students feel comfortable defining problem requirements, designing a solution and implementing the design.” These are all skills they will apply every day in their careers after graduation.

The project concepts are only limited by the students’ imagination. Last year, projects ranged from an American Sign Language Interpreter, which included a glove-like model with flexible sensors, to a microcontroller and motion sensor that communicated with a motorized underwater camera to aid swimmers in their training and technique. Other projects included a video game controller that tells the user which buttons are the most frequently pressed; a password encryption manager that safely stores important information; an artificial neural network stock analyzer that uses both genetic algorithms and an artificial neural network to understand stock trends; and—as seen on the cover—a prosthetic dog leg for a dog with a deformed leg that would prevent the need for amputation.

Pogo, who belongs to mechanical engineering graduate Eric Zhang ’17, was born with a deformed front leg caused by the leg developing against the side of his mother’s womb. The purpose of the prosthetic dog leg project was to design and create a prosthetic leg that eliminates the need for amputation and would also be comfortable and useful for the animal. Traditional prosthetics are made of thermoplastics and do not incorporate shock absorption or force damping.

To provide an ideal fit for Pogo, students created the leg attachment using a 3D scan of his leg. The prosthetic leg features an adjustable spring and damper system, paw structure, paw pad, top hat and, of course, the leg attachment. Pogo’s unique prosthetic leg provided a cheaper alternative, costing less than $115 compared to the traditional cost ranging from $2,600 to $4,500. It also increased his quality of life, preventing his deformity from leading to more pain and helping with rehabilitation.

The project was completed by the mechanical engineering senior project group of Eric Zhang ’17, Carter Crowell ’17, Austin Hagyard ’17 and Ben Jamison ’17, with advising from Professor Kyle Watson.
In case you haven’t been paying attention, we are in the midst of the “Artificial Intelligence (A.I.) Revolution.” Just “ask Alexa,” your Google Home assistant or soon-to-be six-year-old, Siri. Having lived through a number of technological revolutions, including very-large-scale integration (VLSI), the personal computer, the Internet, the World Wide Web, Google’s PageRank algorithm, and now A.I., we’re in exciting times.

Building on and integrating these previous innovations, A.I. has spectacular transformative potential, as tiny embedded machines, ubiquitous in the Internet of Things, learn to recognize, communicate and act on patterns they see in their environment.

Einstein spoke about knowledge and imagination in the context of scientific research and creativity. However, one could argue (and I’m sure my colleagues in the philosophy department would argue back) that these two qualities are fundamental components of intelligence. How do knowledge and imagination turn up in artificial intelligence? One of the fundamental aspects is the new wifi-enabled, smartphone-connected and on-demand Information Age. It is composed of a vast amount of knowledge—facts, books, images, real time data and information of every possible kind at our fingertips—anytime, anywhere.

In the late 1980’s, less than one percent of the world’s stored information was in digital form; by 2007, less than 30 years later, that fraction had grown to 94 percent. The ability to copiously reproduce digital information (text, sound, images, data, and now physical 3D objects), at low or no marginal cost, and to transfer it instantaneously virtually anywhere on Earth is transforming the world.

But the promise of the “Artificial Intelligence Revolution” is more about imagination than knowledge. When my daughter and I lie on the grassy hill near our home and find dragons, turtles and butterflies in the passing clouds, we are using our imagination to find patterns and matching them to items in our knowledge base. Artificial intelligence is about doing something similar, at scale.

Fans of the original Star Trek series will remember the Universal Translator, a device that listens to a speaker of one language, Klingon for example, and repeats the phrase in English. A similar tool is Google Translate, used by over 200 million people daily, in which users type a phrase in one language (or even let Google guess the typist’s native tongue), and see the phrase translated into any of more than 100 other languages. The service was created in 2006 and first worked by coding linguistic knowledge into grammatical algorithms. Then it had set up equalities between the information contained in bilingual dictionaries. This knowledge-based approach worked reasonably well, but would often translate phrases such as “minister of agriculture” to “priest of farming.”

About a year ago, Google tried a different approach with computational (or artificial) neural networks. These networks are computer programs that try to simulate the connectivity and interaction of neurons in the brain. Google essentially lets deep learning, multi-layer computational neural networks look for patterns in the way people speak and write in one language, and then match those patterns to similar patterns in the way people speak in another. The result made Japanese Twitter accounts explode with awe as users wondered how Google had suddenly learned to translate Japanese so fluently.

If Einstein was right, and imagination is more important than knowledge, then perhaps we should reconsider the “A.I. Revolution” happening all around us, not as the Artificial Intelligence Revolution, but as the Artificial Imagination Revolution.

Dr. James Hetrick is Assistant Director and Professor of the School of Engineering and Computer Science’s Master of Science in Data Science program offered on the San Francisco and Sacramento campuses. More information can be found at Pacific.edu/DataScience.
The hybrid (classroom and online) program is offered at Pacific’s San Francisco and Sacramento campuses. Built for working professionals, the MS in Data Science equips students with the transferable skills and industry connections to be game changers across multiple industries.

For more information on the MS in Data Science program, visit: Pacific.edu/DataScience
The Digital Delta Project makes Stockton’s Little Manila come to life.

Of what was once the busy Little Manila community of Stockton 50 years ago, only a few buildings remain. Others have been torn down to make way for the Crosstown Freeway connecting Interstate 5 and State Highway 99. Students from various disciplines at University of the Pacific came together to preserve the history of Little Manila and help make it come to life through virtual modeling.

The Digital Delta Project, spotlighting under-documented populations in the Delta, was initially funded by a $100,000 Pacific Strategic Educational Excellence Development grant. That money helped to hire digital curator Joshua Salyers and also underwrote the cost of the five-week summer fellowship for four students. Additional funding from the University Library underwrote two more.

Students from a wide range of disciplines, including Jamie Culliap ’19 (computer science), Danielle Thomasson ’19 (graphic design), Kyle Sabbatino ’18 (graphic design), Sarah Kuo ’17 (geological and environmental science), Ronnie Sanchez ’19 (social sciences) and Hannah Tvergyak ’18 (history) came together to create a 3D simulation game in which players could roam around Little Manila and interact with locals.

The project incorporated digital modeling, mapping, historical and archival research, and conducting interviews with former Little Manila residents. The opportunity to work on an interdisciplinary team was a key component in this project, according to engineering and computer science professor Dan Cliburn, faculty mentor on the project.

“In the professional world, often what computer scientists are doing is helping develop software for people in other disciplines. So, it’s really hard to replicate that in a classroom environment,” said Cliburn. “If a student can speak with people from disciplines outside of computer science, that’s a really valuable skill. Students who can do that are going to find jobs.”

This project has continued to open doors for the students involved. Last September, students Culliap and Tvergyak, along with Cliburn and Salyers, attended the 15th Eurographics Workshop on Graphics and Cultural Heritage in Graz, Austria, to present their project and showcase how they were supporting cultural heritage through modern technology.

To learn more about the project and play the interactive game, visit LittleManila.DigitalDeltas.org.
C. Robert (Bob) Clarke '50
Having been in one of the first engineering classes to graduate from the School of Engineering after World War II, Clarke worked in Hawaii after graduation for the family business in contracting crushed rock, ready-mix concrete, pre-stressed concrete and paving. After his father passed away, he took over as president and sold the business in 1959, staying on to manage for five years. He served on Pacific's Board of Regents from 1960 to 1990. He and his wife, Joanne Seemann '51, moved to California part-time in 1990, as he had planted a small wine grape vineyard in Shingle Springs (Latrobe), which he recently sold. He is currently working from home, running the music record label he started in 1965 and doing some commercial investing.

Keith Porter '63
Porter retired from Telecom to a busy volunteer life in Grass Valley, CA. He has been married to Shirley for 55 years and has two children, four grandchildren and four great-granddaughters. He is currently keeping up acres of woods and an orchard; running a building project for The Center for the Arts; chairing the board for InConcert Sierra; singing bass in the Sierra Master Chorale; taking an acting class and occasional small stage roles; and hosting an interview show about civic engagement on KVMR 89.5 FM.

Bruce Oliver '67
After graduating with his degree in civil engineering in 1967, Oliver enlisted in the Air Force and later went back to school at USC where he earned a degree in Urban and Regional Planning. He worked in the field for four years at the Southern California Association of Governments and Mayor Bradley's Office of Economic Development. Afterward, he worked with Pacific Bell Yellow Pages for 18 years. After taking an early retirement, he worked for the consulting company Shiftwork Solutions. He now works part-time for his company, Shift Schedule Design, the only company in the English-speaking part of the world that designs employee work schedules. He celebrated his 50th wedding anniversary this past November and has two children and two grandchildren.

Hussam Abdullah Al-Roumi '83
After earning his computer engineering degree from Pacific, Al-Roumi served as head of programing at Kuwait Airways from 1983 to 1989 and chief of IT at the Public Authority for the Council of Ministers from 1989 to 1990. He currently serves as the Minister of Public Works and Minister of State for Municipal Affairs on the Kuwaiti Cabinet.

Cindy (Johnson) Machnov '87
Since graduating from Pacific with a degree in computer engineering, Machnov has been working for the Navy primarily on network and communication transport systems. In her position as principal assistant program manager for tactical communications, she oversees a multi-million-dollar portfolio of programs that span a variety of communications systems, from wireless to satellite communications. She is one of only two female executives in her Command in this highly coveted technical field that provides communications systems for the entire Navy and USMC. She recently became a grandmother and is also enjoying her youngest child’s final high school years.

Tana Franko '97
Franko received the Competent Communicator award in Toastmasters.

Tasha Farnaam '15
Farnaam will graduate in May 2018 with her Doctor of Pharmacy degree from Pacific's Thomas J. Long School of Pharmacy and Health Sciences. She plans to seek a career path integrating the fields of health care and technology.

Donny Marra '15
Marra double majored in computer science and computer engineering. While attending Pacific, he secured two internships at Hewlett Packard in Roseville, CA. It was during his second internship that he met an IP attorney who helped inspire him to get into law. He is now a first-year law student at University of Pennsylvania.

Taylor Osterchrist '16
After graduating in December 2016, Osterchrist received a job offer at Ellicott Dredges in Baltimore, MD. Having since been promoted to network administrator, he currently is part of a team of three responsible for supporting all of their national and internationally-based operations.

Ashley Watanabe '16
Watanabe graduated from Pacific in 2016 with a BS in engineering management. She has worked the past two years at Accenture in San Francisco as a management consultant, taking on a variety of roles with artificial intelligence implementation, data analytics and more.

Matches

Brianna Juhrend '13 and Robert “RJ” Barton '15
Both civil engineering alumni, Juhrend and Barton are pleased to announce their engagement.
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Data Science
- Responding to the market demand for data scientists

Diversity and Inclusion
- Building exceptional leaders of every background who understand the value of diversity and its marketplace implications

Funding Progress

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save the dates:

Feb. 20  Pledge to Professionalism
          Stockton Campus

Feb. 22  Spring Career Fair
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Apr. 02  Tchobanoglous Water Lecture
          Sacramento Campus

Apr. 27  SOECS Alumni and Student BBQ
          Stockton Campus

May 05  Senior Project Day
          Stockton Campus

May 12  Commencement and SOECS Diploma and Hooding Ceremony
          Stockton Campus

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