



Winter 2012

The Rock 2012

School of Engineering and Computer Science

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UNIVERSITY OF THE
PACIFIC
School of Engineering
and Computer Science

THE ROCK

**Applying Knowledge to
Impact a Global Community**

Chambers Technology Center
Granted LEED Gold

Alumni in Action

55th School Anniversary

WINTER 2012

THE ROCK

UNIVERSITY OF THE
PACIFIC
School of Engineering
and Computer Science

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ON THE COVER:

Like the engineers on the cover, Travis Ford (CE, '08) often gets a bird's-eye view of the world high atop the bridges he inspects all over the country.
Read his story on page 5.



THE ROCK

Winter 2012

University of the Pacific

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From the Dean

Ravi Jain, Dean of the School of Engineering and Computer Science



Greetings!

As we begin another year, it is appropriate that I thank you all for your continued support of the School of Engineering and Computer Science. Our School continues to rise in scholarship, partnership, and excellence, and I know that none of this is possible without the on-going support of alumni, industry partners, faculty, staff, students, and friends.

This year marks the School's 55th anniversary. Our tradition of excellence through these years can be seen in our partnership with industry, the quality of our faculty members and students, and the excellent teaching and learning infrastructure which all combine to provide an environment for students to learn and be challenged.

The School's graduate program, launched in 2009, has made a crucial difference in enrollment, quality of student applicants, faculty scholarship, and our academic reputation. During the May 2011 graduation ceremony, more than 20 students received their Master of Science in Engineering Science degree: a major achievement. Our enrollment of 670 students this past fall is a sharp increase from just 515 students in 2009, and many of our undergraduate students are beginning their graduate work through our streamlined Blended Program.

Enrollment is not our sole area of growth. In line with our mission to develop future engineers and computer scientists, we have introduced new courses to our curriculum and, using your feedback, continue to improve others through collaboration. Faculty partnerships and research continue to result in a significant number of publications. Alumni and industry partners have returned to campus to engage and connect with our current students. With all this and more, I am confident that the School will lead in the fields of engineering and computer science as we seek to serve crucial national and global needs.

It has been a privilege and honor to serve as dean of the School of Engineering and Computer Science since June 2000. As many of you know, I have announced my intention to retire from this position effective July 31, 2012. Involvement and support provided by alumni and friends of the School have been crucial to our success. Much of what we have accomplished was made possible by the extraordinary work of the faculty, support from the University administration, and alumni and friends of the School. Looking to the future, the upcoming anniversary celebration will be an opportunity for you to see the many recent developments at the School and University campus, and to consider how you may invest in future engineers and computer scientists. I want you to know that the School welcomes your continued support as we move forward to address new and exciting challenges.

With best regards,

Ravi K. Jain
Dean, School of Engineering and Computer Science



Applying Knowledge to Impact a Global Community

Pacific engineering students are known for their tenacity. Whether it's solving a problem in a classroom, applying knowledge to improve a situation, or championing a new initiative, they dig in and go out of their way to devise workable solutions.

Sometimes, that tenacity takes them farther afield than they ever dreamed. That was true for **Christina Ramirez** (CE, '10) and junior **Brianna Juhrend** this summer.



Inequity really bothers Christina Ramirez, a 2010 Civil Engineering graduate and current graduate student. When she learned that 50 million people in Latin America had no access to clean water, even though this resource is plentiful there, she became determined to help change that. That determination led her to Asuncion, Paraguay this past summer, where she worked with AVINA, an organization dedicated to sustainable development in Latin America.

“I worked in the area of conservation and management of natural resources, specifically promoting the vision of water as a public good,” she says. “Water systems in Latin America are either decaying or have collapsed, and the people in the communities have not been taught how to maintain those systems. In some cases, new housing developments are built before water connections are made.”

Ramirez worked with the water board in Horqueta, a city in the northeast of Paraguay where a new housing community serving 1,400 families did not have water and sanitation systems.

“I helped to expand the water system to serve the new homes by determining the appropriate pipe diameters needed to distribute the amounts of water needed. I also created a map of the new water service area on AutoCAD,” she says. As she visited other water boards, she documented what she learned with photographs and written descriptions.

She also helped organize the first annual National Water Conference in Paraguay, giving recognition to and proving the importance of the community water boards.

AVINA encourages proactive alliances based on trust among social and business leaders by brokering consensus around agendas for action. “AVINA does not have the financial means to aid the water boards, but we tried to give the boards more visibility with the government and more recognition in the country,” she says.

Now back in the United States, Ramirez is using what she learned in Paraguay to further her graduate research in water security, toxicity testing, water monitoring, and environmental impacts. “My thesis covers chemical toxicity and water monitors, and I am hoping to focus it on developing countries, like Paraguay,” she says.

Pictured opposite-right: Christina Ramirez (CE, '10) worked with local water boards in Paraguay, helping to improve access to clean water.

Finding environmental commonality in Russia and the United States

To prepare for her summer cross-cultural exchange program, Brianna Juhrend, a junior majoring in Civil Engineering with an environmental emphasis, spent time breaking in her hiking boots and learning Russian.

Selected as one of the participants in the Tahoe Baikal Institute Summer Environmental Exchange Program (SEE), Juhrend delved into watershed sustainability and soil assessment research in the United States, Russia, and Mongolia.

“I love learning, so this summer couldn't have been any better!” she says.

Juhrend and the other ten participants studied the ecosystem surrounding the bodies of water at Lake Tahoe, the Selenga River in Mongolia and Lake Baikal in Russia. Her first summer research was done at Lake Tahoe, assessing the impact of erosion. “I spent several days in the field wearing a vest and hard hat working on the steep slopes of Mt. Tallac,” she says. Then, it was on to Russia to study Lake Baikal, the world's oldest and deepest lake. It contains the volume of the five Great Lakes combined, holds approximately 20 percent of the world's fresh water, and is located in both Mongolia and Russia.

“I spent four days backpacking in the jungle of Siberia, following the River Oskinovka from its start to its finish up in the mountains,” she says. “The trails system in Russia is not as established as in the United States, which meant that only about 20 percent of the river had a trail and for the other 80 percent we followed a Russian guide across wild terrain.”

Juhrend took geobotanical descriptions and identified soil characteristics along the trail, while trying not to fall into the river. “Once we made it back to the small Russian village, we worked in the office to determine which soils are most sustainable for future trail development,” she says.

“The work that I completed at Tahoe will help inform future decisions on best management practices in communities with eroding slope,” she says. “The work at Baikal will help the Strict Nature Preserve plan a sustainable trails system.”

Upon returning to the United States, Juhrend began her co-op with Naval Facilities Engineering Command in Alameda, Calif. “I am enjoying seeing the naval bases around the bay and being exposed to various environmental remediation projects,” she says. “I look forward to being back on campus in January. Go Tigers!”

Pictured opposite-left: Brianna Juhrend participated in sustainable economic development and watershed management research at Lake Tahoe, the Selenga River in Mongolia (pictured here), and Lake Baikal in Russia.

Center's Sustainable Design Acknowledged with LEED Gold Certification



LEED FEATURES OF THE JOHN T. CHAMBERS TECHNOLOGY CENTER:

- 100 percent use of non-potable water for irrigation
- 53.3 percent reduction in the use of potable or "drinking" water
- Use of native and low-water demanding plants in landscaping
- Radiant barrier roofing to reduce heating/cooling costs
- Non-reflective walkways to reduce heating/cooling costs
- Low-E windows to reduce heating/cooling costs
- Bicycle racks
- One preferred low-emissions/fuel efficient vehicle parking space
- Solar panels on roof that generate 4.11 percent of the building's electricity
- Shared mechanical system with three buildings, reducing energy usage for all three
- Dedicated areas for collection and storage of recyclables



From the materials it was built with to the amenities it features, the John T. Chambers Technology Center models sustainability and has been granted a LEED Gold certificate by the U.S. Green Building Council. This is the first building at University of the Pacific and only the fifth project in San Joaquin County to receive a gold rating. Only ten projects in the county have received LEED certification.

"With the rapid adaptation of sustainable practices in engineering, this entire building is a hands-on example for our engineering students of what the future holds for them," said Ravi Jain, Dean of the School of Engineering and Computer Science. "Our students no longer just read about these new standards in a book but can literally see them in real life."

The LEED Green Building Rating System is a third-party certification program and the nationally accepted benchmark for design, construction, and operation of high-performance green buildings. The system is designed to promote a "whole-building approach to sustainability" through five key areas of human and environmental health:

sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

LEED-certified projects usually cost less to operate and maintain than conventional buildings, largely because they are energy- and water-efficient. On average, they save 30 percent on energy and up to 50 percent on drinkable water compared to conventional buildings.

That is the case with the Chambers Technology Center, a 24,500 square-foot, two-story building with labs and offices for the School of Engineering and Computer Science. It uses 100 percent non-potable water in surrounding irrigation, features bicycle racks to encourage people to ride bicycles to work, low-flow water fixtures, native plants in the surrounding landscaping, reflective glass to reduce the need for cooling in the building, and low-reflective materials on the roof and sidewalks which also reduce heat. The building uses 53 percent less potable water than other buildings because of some of these features. The building is also Pacific's first structure to have solar panels. The panels generate about 4 percent of the building's power.

A Bird's-Eye View of the World

“The problem-solving skills I learned at Pacific and the encouragement I had to ask questions continue to serve me well.” – Travis Ford, P.E.

Q. What were some activities you participated in as an undergraduate?

A. I participated in ASCE, Pacific Baseball, and Aquatic Chemistry Research with Dr. Gary Litton and completed co-ops at Lee & Ro (wastewater design and consulting) and Engeo (geotechnical engineering).

Q. What is your job title, and please describe your work and its impact.

A. Technically I am listed as a water resources engineer but I practice structural engineering and work in a group called Dams and Hydraulic Structures.

On the job I travel around the country inspecting dams and bridges using rope access or other means. I then take findings from the field and apply them to structural analysis and retrofit work. Much of the nation's infrastructure is often in disrepair. This provides non-stop learning opportunities about the history of our nation's Civil Engineering practice as well as opportunities to apply new three-dimensional technologies (computer modeling) to structures typically designed in two dimensions. Over time, we have also gained knowledge about how structures behave. Often when we analyze an old structure, we find it does not meet the current design criteria. When structures do not meet current code or are unsafe, it spurs a retrofit or repair.

Q. How did your experience at Pacific influence where you are today?

A. The problem-solving skills I learned at Pacific and the encouragement I had to ask questions continue to serve me well. I also benefited from homework assignment collaboration, which was encouraged in upper division coursework so we could help educate each other and learn to walk into the professors' office without fear.

Q. What was the most significant experience you have had during your career? Why this experience?

A. The in-depth steel bridge inspection in Portland, Ore. comes to mind. Our team performed a structural inspection of the entire bridge in ten days (rope access and mechanical equipment) with minimal impact on Portland daily life. There were moving vehicles, pedestrians on walkways, and light and freight rail on this movable double-decker lift span bridge, as well as large boat traffic underneath. It was like trying to inspect a moving carnival ride. The views from the bridge, the attention from the public, and the coordination required to complete the project were incredible. Rappelling into a small boat and then riding the lift span while it was moving are experiences I will never forget.

Q. What are your goals for the future and why?

A. I have been leading projects in the field and have begun performing some project manager tasks. I hope to keep marketing our team and bringing in work for the company as well as taking projects from the initial lead to completion. I also plan to either finish my master's degree in Civil Engineering or attend an MBA program.

Q. What advice would you give a graduating senior?

A. It is somewhat hard for seniors to find work right now. I suggest that in your job search you be willing to try something new and do the research on what that company or agency needs. If you can't find a job or do not like the one you do get, then you can quickly sign up for a graduate degree. It seems like the graduate degree is a nice backup plan if you do not get what you are looking for. Using a graduate degree as a backup plan will give you more opportunities to find what you really want to do and to make sure that the graduate work you plan to pursue is what you really want to specialize in.



MEET TRAVIS FORD, P.E.
CIVIL ENGINEERING '08

Then:

“I explored several different fields in Civil Engineering before settling on structural.”

Now:

“Structural was dry in school but is a blast in the workplace.”

Impact:

Travels around the country inspecting dams and bridges and applies his findings to structural analysis and retrofit work.

Structural engineer Travis Ford (CE, '08) is pictured here high atop a steel bridge in Portland, Ore., performing an infrastructure inspection.

School News

- Bioengineering
- Civil Engineering

Bioengineering

Practical applications impact all of society

The Bioengineering program has a strong emphasis on practical application, as evidenced by this past year's senior projects. These projects included an automatic tourniquet designed to aid medical personnel in safely and efficiently drawing blood from a patient by eliminating the potential for serious injury by a tourniquet being left on a patient too long; a smart cane designed with an ultrasonic sensor to detect objects three meters in front of the user and two feet to the right, left, above, and below the sensor; and an infant incubator monitoring device to reduce infant deaths due to malfunctioning incubators.

The winning senior project was the ergonomic control system for a powered human

exoskeleton, which was a partnership between a Bioengineering team and a Mechanical Engineering student. Together they developed a mechanical exoskeleton that a user can control as if it were an extension of the body, and which is designed to lift greater weight and produce less fatigue.

Bioengineering has applications in various fields, as demonstrated by Visiting Professor Shelly Gulati, who is working with the Ecological Engineering Research Program to develop new strategies to estimate the true pollutant loading in the San Joaquin River due to agricultural activities. For this project, she uses her background in biotransport to evaluate a numerical simulation tool to help with the estimation. Along with her

teaching and research activities, Dr. Gulati is developing a research program in biomedical diagnostics applications that will involve student research projects.

Many graduates from the Bioengineering programs have begun careers in research or with engineering companies, while others have gone on to graduate programs in medicine or dentistry, such as recent graduate Tyler Van Hensbergen, who is pursuing his M.D. at Georgetown Medical School.

For more information, please contact Dr. Jeff Burmeister at 209.946.2470 or jburmeister@pacific.edu.

Civil Engineering

Enhanced facilities underpin exciting research and learning opportunities

Our four new laboratories in the John T. Chambers Technology Center have greatly enhanced our teaching and research capabilities in structural modeling and simulation, sustainability management, water quality analysis, and ecological engineering. In addition, a new structural load frame and MTS testing apparatus was installed in the Felix Wallace Structures/Systems Laboratory.

The department welcomes the arrival of our new administrative assistant, Peggy Shubert. She provided over ten years of exemplary service in our Co-op Office before joining us. We are also pleased to announce the award of tenure and the promotion of Dr. Luke Lee to associate professor. Dr. Lee's teaching and scholarship are well respected by students and colleagues.

Student academic and professional accomplishments have been amazing this year. Our Civil Engineering undergraduates received over 15 scholarships; several of these awards were from national, highly competitive sponsors including the American Society of Civil Engineers (ASCE) and Tau Beta Pi, the Engineering Honor Society. Our ASCE student chapter represented us well in the Mid-Pacific Conference, finishing third overall. In addition, two of our students spent the summer abroad: one in Russia and Mongolia and another in Paraguay.

Undergraduate and graduate enrollment remains strong. This is our third consecutive year with over 40 new students entering the Civil and Engineering Management bachelor's degree programs. The total Civil Engineering

department enrollment now exceeds 175 students. Many of our Civil Engineering undergraduates have chosen to pursue a blended Master of Science in Engineering Science (MSES) degree simultaneously with their bachelor's degree coursework.

For more information, please contact Dr. Gary Litton at 209.946.3070 or glitton@pacific.edu.

- **Computer Science**
- **Electrical and Computer Engineering**

Computer Science

Award-winning research and increased enrollment

The department is seeing growth in both enrollment and scholarship. Over 100 students were enrolled in Fall 2011, compared to the 70 students who were enrolled in 2009. Additionally, students enrolled in the graduate program are participating in international research conferences.

The School's faculty provides strong academic scholarship for the department. Professor Bill Ford is completing major work for a mathematics book on applied numerical linear algebra. He has a contract with Elsevier, an international publishing company. Assistant Professor Emma Bowring co-authored a paper titled "Empirical Evaluation of Computational Emotional Contagion Models" with her former

thesis advisor. The research won Best Paper Award at the 11th International Conference on Intelligent Virtual Agents in Iceland in September. Professor Jinzhu Gao continues to work on her research involving the development of computational algorithms and analysis tools for molecular-level understanding of complex atmospheric nucleation processes. The research is funded through a National Science Foundation award of over \$600,000.

Research done by graduate students has led to international participation in conferences. In addition to the students who presented in China and Australia last year, graduate student Kai Zhu presented a paper in the 2011 Second International Conference on Networking

and Distributed Computing (ICNDC) in China. His paper was co-authored with Professor Jinzhu Gao and graduate student Huaguang Gao. Blended graduate student Katie Crader participated in the Symposium on Spatial and Temporal Databases at the University of Minnesota in Minneapolis in August. The conference discussed research in spatial, temporal, and spatio-temporal data management and related technologies. Crader's graduate research includes work in the spatial and temporal database realm.

For more information, please contact Dr. Bill Ford at 209.946.3028 or wford@pacific.edu.

Electrical and Computer Engineering

New course offerings advance scholarship

Strong enrollment and the first graduates from the Master of Science in Engineering Science program are highlights of the year. New graduate courses in sensor networks, computer networks, and computer vision have been offered, and new graduate courses on cloud computing and quantum and nano devices are scheduled to be offered next year. The graduate classes had interesting projects associated with them. The sensor networks class mounted sensors on the Calaveras foot bridge and collected data with wireless communication between sensor nodes, and the computer networks class implemented an IP router on a FPGA platform. Several graduate students are working on these in the areas of iris biometrics, energy systems, and computer networks.

The department is offering a new course in power electronics this semester. Development of the course, which includes use of a laboratory platform for switch-mode converter analysis and design, was supported by a Department of Education workforce development grant. Professors Elizabeth Basha and Jennifer Ross introduced new content in the Introduction to Electrical and Computer Engineering class, notably the introduction of PCB design and surface mount soldering in the context of a microcontroller project.

Most classes are now taught in a studio classroom in the new John T. Chambers Technology Center. Facing forward, students work in a traditional classroom environment with a whiteboard and projector screen.

By turning around, they have access to test equipment and computers and can view projector screens to follow software tool demonstrations or instructions that the instructor may be projecting.

For more information, please contact Dr. Cherian Mathews at 209.946.3075 or cmathews@pacific.edu.

School News

- Engineering Management
- Mechanical Engineering

Engineering Management Tenth anniversary milestone

In the past ten years, our program has graduated 116 professionals. These alumni are successful, diverse, accomplished, and motivated. They work in industries as wide ranging as consulting, health care, education, aerospace, and construction; they have job titles such as project manager, manufacturing engineer, satellite operator, and many others. Our graduates are leaders in project management, technical marketing, systems engineering, construction management, and manufacturing engineering.

This coming year our program is up for re-accreditation with ABET (the engineering accrediting organization). Accreditation

provides an opportunity for us to demonstrate that we are committed to maintaining our program's quality and that we are performing at the level required by the engineering professions. The process is intense, but will continue to brand our program with international recognition of quality.

For more information, please contact Dr. Abel Fernandez at 209.946.3061 or afernandez@pacific.edu.

In the past ten years, our program has graduated 116 professionals.

Mechanical Engineering

Faculty, student achievements highlight the year

Pacific's Mechanical Engineering program continues to grow and thrive with more than 150 undergraduates and 32 graduate students, many of whom follow the Blended Program where they earn both their bachelor's and master's degrees in Engineering Science in five years. Our course offerings have expanded to include advanced manufacturing, mechatronics, polymer and composite materials, and combustion. These have helped our students secure co-op positions and jobs after they graduate, despite the strained economy.

Collaborative student design projects led to the development of a fluid flow simulation system and a powered human exoskeleton. Both projects were exhibited at our annual Senior Project Day at the end of April. Graduate students also made presentations about their research activities on tool wear measurement with advanced image processing techniques, and measurement of the dynamic behavior of thin polymer films used for applications such as advanced magnetic tapes. The latter project was undertaken by

Nick Rummel, who became the first recipient of a Master of Science in Engineering Science in the Mechanical concentration.

Our faculty have continued to distinguish themselves. Professor Chi-Wook Lee is leading the refurbishment of our Mechatronics Lab, and continues to perform collaborative research on acoustics and methods for improving the assessment of engineering education with colleagues from Korea and Pacific. As the leader of a NSF-sponsored research team, Professor Ash Brown presented an ASEE paper entitled "Development and Assessment of Finite Element Based Active Learning Modules" at the ASEE Annual Convention in Vancouver in June 2011. Professor Kyle Watson continues to lead our senior design efforts and presented a peer-reviewed paper at the 2010 ASME Power Conference on a liquid torrefication process for producing a storable, energy-dense fuel from biomass feedstock. Together with Professor Jian-Ching Liu, he has also worked with Professor Brown to integrate finite element

analysis techniques into undergraduate courses. In addition to his activities to enhance our manufacturing facilities, Professor Liu has been working on a grant from CQS, Inc. on methods for metal cutting manufacturers to minimize the time required to estimate manufacturing costs while retaining accuracy. Professor Liu presented a peer-reviewed paper entitled "Cutting Tool Wear Measurement by Using Active Contour Model Based Image Processing" at the 2011 IEEE International Conference on Mechatronics and Automation in Beijing. The paper was co-authored with graduate student Guangxi Xiong and Adrian Avila. Professor Brian Weick continues to serve as the Mechanical Engineering Chair, and has found time to continue his research activities on magnetic tape materials through sponsorship from the Information Storage Industry Consortium.

For more information, please contact Dr. Brian Weick at 209.946.3084 or bweick@pacific.edu.

PROGRAM UPDATE

Experiential Learning Defined by Industry/ Student Partnership

Combine students motivated to learn, each with a solid grounding in engineering scholarship, with industry partners who value those students as an important resource and you have the makings for a renowned experiential learning program.

Pacific Engineering and Computer Science students continue to garner real-world experience through programs including:

- **Cooperative Education:** As noted by the accreditation board, our co-op program is the “crown jewel” of the school. Students relate their classroom theory to professional practice, increasing their confidence, motivation, and professional maturity. The program benefits industry partners by providing a long-term recruitment vehicle with access to a valuable short-term source of talent, continued connectedness with the university, and a constant infusion of the latest technology into their companies.
- **Engineering Industry Fellowship:** In the Engineering Industry Fellowship Program (EIF), the university secures talented students to work for partner companies throughout their entire college career. EIF students are accepted into the program through rigorous screening based on academic success, community involvement, and overall leadership ability. Students are provided guidance to develop a personal curriculum plan that includes working for their EIF sponsor during academic terms, summers, and their 7.5 month co-op term. The company enjoys lower recruitment and training costs as they retain top tier talent who are often invited to join the company on a full-time basis upon graduation.
- **Directed Experiential Learning:** Students in Pacific’s Master of Science in Engineering Science (MSES) program may opt for a Directed Experiential Learning assignment. Similar to the co-op program, these students define a specific project at work related to their interest area, and define five to ten technical learning objectives. Their final report and presentation defend their project.
- **Master of Science Industry Fellowship:** These students are especially strong academically and bring a minimum of a year of completed graduate coursework to the company, and most have technical work experience from an undergraduate co-op placement. The company provides a reasonable graduate salary for the final 7.5 months of the student’s degree program, and a meaningful project as part of their job description. Students are ready to join the employer as full-time, entry-level hires at the completion of their MSIF placement, if both have found the experience beneficial.

Co-Op Sharpens Student’s Skills

Joseph Hasekamp (EE, ’11) had his car packed and was ready to leave for his co-op assignment with Sandia National Laboratories in Albuquerque, N.M., before he realized he was not quite sure what his role as part of a Systems Engineering team would be.

“I knew what project I was going to be part of, but I wasn’t quite sure what it meant to be a Systems Engineer,” he says.

Undaunted, he headed to his new assignment. Over several months he planned and executed testing on different mechanical components in electrical, thermal, and mechanical environments. Those tests included wide band electromagnetic shielding effectiveness testing, impact tests into water using a large diameter air gun, and thermal testing of a newly designed assembly.

“I learned that a Systems Engineer is a mix between a project manager and a technical engineer such as an Electrical or Mechanical Engineer,” he says.

With the experience under his belt, Hasekamp recognizes the mentorship that he received on the job as imperative to his skill development.

“I needed to improve my written and oral communication skills and learn how to lead a team to be effective and detailed,” he says. “Through the guidance of mentors in my department I learned how to take control of a meeting and steer the conversation to a productive outcome while still learning from the expertise that the senior members of the team had to offer.”

Anniversary Timeline

1924

Engineering Instruction at the College of the Pacific begins.

1957

University of the Pacific School of Engineering established with a Bachelor's Degree offering in Civil and Electrical Engineering.

1960

The Rock is first positioned in front of Khoury Hall.

1971

Civil and Electrical Engineering programs are accredited.

1978

Computer Engineering program begins.

2012 Marks the School's 55th Anniversary

In 1924, the popularity of Ford's Model-T was driving the first major road building project in the nation's history. Radio was king and the mechanical television (the precursor to modern TV) was invented. That was the year engineering instruction began at the College of the Pacific.

Much has changed since then. From two academic concentrations, the School has grown to include a variety of programs that better equip students for the engineering practice of tomorrow. Students can choose from eight majors, five minors, and a Master of Science in Engineering Science degree, which was first offered in 2009. This program offers three concentrations in Civil Engineering with paths in Environmental, Management, or Structural Engineering; Computer and Electrical Engineering and Computer Science; or Mechanical Engineering. The unique Blended Master's Program allows students to begin graduate courses as seniors and complete both their bachelor's and master's degrees in as few as five years.

Over the years, the School has offered students a personalized education, quality teaching, and an exceptional learning experience. Although the School has experienced increased enrollment in the past years (670 students in the fall of 2011), the average class size is still 16 students and each receives the personal attention of a faculty advisor. Classroom

education is enhanced by the renowned co-operative education program where students spend a semester and a summer working full-time in industry, completing paid, practical experience as an undergraduate student. Students can even go abroad with paid internship opportunities in Japan and Germany through the International Engineering Co-op Program.

Additionally, a superior environment for teaching and learning is fostered through the School's well-equipped laboratories and classrooms. The John T. Chambers Technology Center, completed in the fall of 2010, features seven research, teaching, and industry project labs, studio classrooms, study areas, and faculty offices. It accommodates teaching, learning, and research as well as beta sites and benchmarking to attract industry support for collaborative research.

2012

1981

Engineering Physics program begins.

1982

Mechanical Engineering program begins.

2000

B.S. in Bioengineering is approved.

2009

Master of Science in Engineering Science offered.

2010

- *Forbes* ranks Pacific School of Engineering and Computer Science top 20 Best Colleges.
- John T. Chambers Technology Center opens.

2011

US News and World Report ranks Pacific's Engineering and Computer Science programs in the Top 20 percent of all such programs in the country.



The School celebrated its 40th Anniversary in 1997 with over 250 alumni, students, friends, and supporters.

12

Anniversary Reunion June 22–24

You are part of the history we are commemorating this June. Plan to attend the anniversary celebration during Pacific Alumni Weekend, June 22–24, 2012.

For more information or to help with the event:

866.575.7229

pacificalumni@pacific.edu

Student Achievements

5,000

Over 5,000 SHPE members attended the conference in Anaheim, Calif.

Pacific SHPE Chapter Receives National Award

Pacific's student chapter of the Society of Hispanic Professional Engineers (SHPE) received the Most Improved Chapter of the Year award at SHPE National Conference 2011 and was also recognized as the Outstanding Student Chapter of its region.

Over 5,000 SHPE members attended the conference in Anaheim, Calif. Pacific students Alejandra Aguilar, Adrian Escoto, Michael Ledesma, and Diana Valenzuela Medina were chapter representatives and participated in events from a nano-technology workshop to networking activities and more. The positive

impression on potential employees even led to an interview for one of the students with Intel.

SHPE encourages scholarship in the S.T.E.M. fields (science, technology, engineering, and math) and supports the application of professionalism in both the school and career environment. The chapter is one of the School's most active engineering societies, with members participating in outreach to younger students, providing bilingual college planning workshops, and supporting other engineering activities on campus. The chapter continues to grow in both enrollment and scholarship.



Pacific's Geo-Challenge team swept all awards for its competition and won first place overall at ASCE Mid-Pac.

Pacific Places Third in ASCE Mid-Pac

Pacific placed third overall at the Mid-Pacific Student Conference (Mid-Pac) hosted by the American Society of Civil Engineers last spring. A total of 28 students from Pacific participated in the conference at Sacramento State University.

"To be such a small school and place third in the overall competition was so inspiring," says senior Kenneth Danielson. "It really showed people how accomplished our school and our students are."

Students who participated in the steel bridge, water treatment, and geo-challenge competitions began fundraising for, designing, and testing their systems months in advance. Points were given for their placement in these competitions and mini-games, as well as overall participation and spirit. Pacific swept all three awards for Most Efficient Design, Aesthetics, and First Place Overall in the Geo-Challenge competition. In addition, ASCE Student Chapter President Caroline Grant won first place for her paper in the Daniel W. Mead Student Contest. The teams are preparing for this year's competition which will take place from March 22-24, 2012 at University of California, Berkeley. Those involved are hoping for increased participation from students.

"We hope to have freshmen and sophomores participate, gain experience, and then lead the team their junior or senior year," says senior Justin Pyun, who has participated in Mid-Pac for the past two years.

Participating in the conference provides students numerous opportunities to develop skills and apply classroom knowledge.

"These competitions offer more than technical experience, they offer leadership opportunities and improving teamwork and communication skills, not to mention networking with individuals as well as industry," says junior Natalie Muradian.

"You learn so much about engineering projects that can't be taught in the classroom," says Pyun. "We hope other students will be involved. We need them on the team."

Students Compete in 2011 Team Tech

Pacific's Society of Women Engineers (SWE) members partnered with alumni to design a biofuel system as part of their competitive entry in the annual SWE Team Tech competition. The system, designed to be operated manually, converts green waste into biofuel that will be used by Guatemalans primarily in rural villages.

The group's industrial partners were Christina Espinosa (Global Studies, '10) and John Paoluccio (ME, '02). Espinosa lives in Guatemala and was working with the non-profit groups Tree's Water People and Alterna. She provided invaluable local expertise. Paoluccio,

owner of Paoluccio Engineering, helped the team with manufacturing and design recommendations.

Camilla Saviz and Louise Stark were the team's advisors. Team members included 11 students from five different engineering fields including Chelsea Spier, '12 (presenter); Caroline Grant, '12 (team leader); Kristina Hammarstrom, '12 (team leader); Molly Beckler, '12; Natalie Muradian, '12; Rhett Kilgore, '12; Caroline Dozsa, '13; Joseph Hasekamp, '12; Ruhui Gan, '13; Jessica Ovieda, '12; and Kim Mercurino, '13.



Pacific students participated in SWE's Team Tech Competition and presented at SWE's annual conference in Chicago, Ill., last October.

Senior Project Team Saves Employer Money

When Mohammed Inani, Mohammed Alsheiri, and Julio Luna teamed up to apply their engineering skills to a redesign project for their employer, they had a hunch that a basic adjustment could maximize efficiency.

"Our group worked on a fan housing for a parking lot sweeper that my employer, Masco Sweepers, manufactures," Luna explains. "We had a design in mind, but wanted to make sure it would not increase the expense of the machines."

The team performed airflow simulations using SolidWorks Simulation to show the difference in airflow between the original design and the new design. "As expected, our design

showed significant improvement in airflow, not only increasing the efficiency of the fan housing but of the whole sweeper system," he says.

The team made slight modifications to the design to make it easier to weld, and Masco has instituted the new fan housing in some of the sweepers they manufacture. But Luna and his teammates have some more ideas to make the housing even better.

"We have suggested further possible improvements, such as rubberizing parts of the housing and manufacturing a curved fan. Masco is now testing those suggestions," he says.



Engineering management students Mohammed Inani, Mohammed Alsheiri, and Julio Luna pictured with Engineering Management Program Director Dr. Abel Fernandez. The team's design has been adopted by Julio Luna's employer, Masco Sweepers.

Senior Thesis Focuses on Improved Scalability and Performance of Hadoop Programming Model

When it comes to collecting and consolidating vast numbers of complex computations on large clusters of computers, Adam Yee (CS, '11) is finding there is room for improving performance.

Yee's research into Hadoop, the programming model written in the Java programming language, centered around creating a simple, efficient, and universal Application Programming Interface (API). The API allows the integration of different distributed file systems with Hadoop's MapReduce engine.

"Currently, my API has achieved proof of concept by integrating Hadoop and OrangeFS on a small cluster while maintaining high

performance. Future research includes large scalability testing, performance tuning, and testing with other file systems such as Ceph and Lustre," says Yee.

Yee conducted his research under Dr. Jeff Shafer, who has a background in cloud computing, and with support from the open source community and parallel computing research groups at Carnegie Mellon University and Clemson University.

"I hope my research can be extended by other prospective master's thesis students here at Pacific or elsewhere. I also plan to open source the API and continue contributing to it with the open source community," he says.



Adam and Vicky Yee are both completing a research thesis as part of the Masters of Science in Engineering Science program.

Janet Y. Spears Named 2012 Distinguished Alumnus



Working hard, leading by example, and giving back are the personal qualities that define this year's distinguished alumnus and have been the foundation for her success.

Janet Y. Spears (EE, '86), an acclaimed business development manager and community activist has been named the School's 2012 Distinguished Alumnus.

"Janet's leadership at the School of Engineering and Computer Science Dean's Council has been exceptional and has served as a source of inspiration for me personally."

– Dean Ravi Jain

Janet Y. Spears (EE, '86) is the Chief Operating Officer of the East Bay Community Foundation where she is responsible for the Foundation's asset development, donor services, marketing, communications, community investments, and public and private partnerships. The Foundation serves the 2.5 million residents of Alameda and Contra Costa through programs, organizations, and grants designed to help young children succeed and enhance economic opportunities for adults and families. She joined the organization in 2008, where she first served as Managing Director of Development and External Relations, and managed strategies and systems supporting marketing, development of financial assets, and services to donors for the Foundation.

She joined the organization after completing a 21-year career at AT&T, where she served as an Executive Director in Marketing and Vice President in Strategic Sales, Engineering and Operations. While at AT&T, she led a national sales team of 75 professionals who were responsible for business development and design of complex systems. Her direct leadership served managers whose client base represented over \$4 billion in revenue. As executive sales lead for AT&T eContact Solutions, the teams she led sold an average of \$20 million in annual call center solutions.

Janet graduated from Pacific in 1986 with a Bachelor of Science degree in Electrical Engineering and completed her master's degree at Purdue University in 1988. In 2000 she received an Executive Management Certificate with emphasis in marketing, finance, operations, and human resources, from The University of North Carolina at Chapel Hill.

While at Pacific, Janet was an active member of the Alpha Kappa Alpha Sorority Inc. and the Society of Women Engineers. She credits her co-op experience with Hughes Aircraft Company and Mobil Oil Company as instrumental in developing experience working in multi-functional environments and on multi-disciplined teams. She especially appreciates the unique contributions three faculty members made to her development as an engineer: Dr. Andres Rodriguez, Dr. George Schroeder, and Dr. Richard Turpin.

Today she serves on the Dean's Council for the School and was part of the campaign to name the Kemet Conference Room in the John T. Chambers Technology Center, honoring and defining a sense of place for black alumni of the School. Recognized as a dynamic speaker, she has been part of many events at the School including the first Alumni and Student Career Symposium last fall.

Alumni and Student Career Symposium 2011



More than 20 alumni shared their experiences with current students during open panels, workshops, and a networking lunch at the School's first Alumni and Student Career Symposium (ASCS) this fall.

Throughout the day, students and alumni engaged in one-on-one conversations, small group discussions, and panels. Alumni openly answered questions and shared their experiences on topics ranging from getting the first job after graduation, to marketing yourself for promotions, to maintaining a work-life balance.

"ASCS was a unique opportunity to hear from Pacific graduates who have a wide range of experience and expertise," says senior and graduate student Kristina Hammarstrom. "This diversity allowed all students in attendance to benefit, whatever their background."

Alumni from graduation years as early as 1959 to the most recent graduates from 2010 attended and shared their various perspectives of the working world. Young alumni provided advice in the areas of networking and marketing yourself for the first job. Alumni who spoke from many years of experience emphasized the importance of integrity, business practices, and how to rise within a company.

"The amount of information that the students received in the few hours we were in session took me years to figure out in the work world," reflects alumnus Mark Quijano (CpE, '06). "The information shared at this event is not something that can easily be taught in a classroom nor read from a book or website."

But aside from exchanging thoughts and experiences, the symposium was also an opportunity for personal development and giving back to the School.

"It really made me reflect on how I got to where I am," says Travis Ford (CE, '08), "and I got a few good messages out to influence some career choices."

"I really appreciated the fact that the alumni who came back took the time out of their busy schedules to talk to us and tell us about their experiences," says senior Molly Beckler.

Pictured above: Alumnus Janet Y. Spears (EE, '86) and junior Richard Snider had an opportunity to talk on an individual basis during the symposium.

Enhancing Efficiency and Performance of Wind Turbines

The power that allows windmills to produce energy is also their nemesis. A steady wind turns the blades of modern-day windmills, powering turbines and producing energy. Gusts, however, can cause unwanted loads that shorten wind turbine life spans and impact reliability. The key is to achieve a stable average mechanical torque. Professor Scott Larwood is researching how to do just that by pitching the blades of a windmill to regulate rotor speed.

Larwood recently co-authored an article in *Wind Energy* with Scott Johnson, C.P. van Dam from UC Davis, and Congressman Gerald McNERney. The article, "Balancing fatigue damage and turbine performance through innovative pitch control algorithm," is based on the development and testing of a patent held by McNERney that has the potential to reduce damage and increase the life span for wind turbines.

Larwood's research is part of the controller research topics designed to lower blade fatigue loads, specifically evaluating the load limiting algorithm (LLA) used to improve pitch control. The research analyzed a turbine pitch control strategy using the LLA which features a new control parameter, the minimum pitch angle, to mitigate positive wind gust with a marginal energy penalty. If implemented on new turbines, the LLA could minimize extreme fatigue loading on the blades, allowing for a larger rotor to capture more energy.

Larwood continues his research in wind energy, working on a contract with General Electric to further develop analysis methods for swept wind turbine blades. He is also completing evaluation tests of a sensor embedded in a wind turbine blade bolt, along with training an independent-study student to determine wind turbine performance and loads using industry-accepted software.

PLAN AHEAD TO IMPACT THE FUTURE

We all have the power to impact tomorrow – especially through funding the future of the School of Engineering and Computer Science. Your gift helps provide the education necessary to ensure the world will have engineers, scientists, and technically-grounded entrepreneurs for tomorrows to come.

.....

Plan a gift today by including a charitable bequest to the School in your will, living trust, retirement plan, or life insurance policy. In this way, you will be able to give in ways not necessarily possible during your lifetime and ensure the School's long-term strength and viability.

.....

For more information about bequest gifts,
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Calling all Alumni of University of the Pacific School of Engineering and Computer Science

Get involved in our Alumni Calling Students Program. The School is looking for volunteers to call accepted and prospective students in Spring 2012.

Share your experiences. Have you started a company? Moved to a foreign location? Climbed up a corporate ladder? Let us know.



Call or email: Veronica Brown at 209.946.7499 or vbrown@pacific.edu

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APRIL

28

Senior Project Day and Award Banquet

Projects on display from 2–3:30 pm in the School's General Area
Banquet at the DeRosa University Center Ballroom, Pacific Campus
Reception: 4:00 – 5:00 pm
Dinner and program: 5:00 – 7:00 pm

Spend the Day...Promote Your Business

Alumni, industry partners, and friends are invited to view our graduating seniors' capstone projects on **Senior Project Day, April 28**.

Later that evening, the School will host its **15th annual Senior Awards Banquet** to honor graduating seniors for their academic achievements and accomplishments. The evening will feature a keynote speaker, departmental award presentations, and the Senior Project Awards.

Table sponsorships for the banquet are available, and are a great way to support the School and gain exposure to our students, faculty, and guests. Sponsorships include recognition of your company in the running slide show, at your table and from the podium, as well as two complimentary banquet tickets so you may host your table.

For more information, please contact:

Assistant Dean Gary Martin at 209.946.3064 or gmartin@pacific.edu