Can you believe that the Cal Poly Biomedical Engineering Department is in its 10th year! I’m honored to return as chair of the department and see all the growth and change with fresh eyes. We’ve reformatted and renamed our newsletter, the BMED Pulse, to reflect the program’s special vitality — and so that you, too, can get a glimpse of our students’, faculty members’ and alumni’s wide-ranging success.

The last time I was department chair, in 2007, we were a brand-new department with about 200 students and a fresh crop of five new faculty — Professors Lily Laiho, Scott Hazelwood, David Clague, and Kristen and Trevor Cardinal. Back then, there was an entrepreneurial feeling of excitement at starting a program with no space, insufficient money, limited faculty and boundless potential.

Flash forward a decade, and it’s clear that we are no longer a startup. We have nearly 450 undergraduate students, 45 master’s students, 12 tenure-
track faculty and a full-time lecturer, plus nationally recognized research, and one of the largest and most highly qualified applicant pools of ANY Cal Poly engineering program. Our alumni are moving rapidly up the ranks of major biomedical companies or making their mark as successful post-doctoral researchers or practicing physicians. Or, in the case of our newest faculty member Chris Heylman, returning here to teach the next generation of students.

What has NOT changed, however, is the entrepreneurial spirit that’s so deeply embedded in our department culture. The attitude of “getting things done,” whatever the obstacles, was essential in creating the program — and it’s in our DNA still. The currency of our curriculum, the spectrum of hands-on student opportunities, the multidisciplinary nature of students’ involvement with clubs, projects and industry — all stem from a deep and abiding spirit of inquiry that is the hallmark of this department, where students can apply their passion through industry-relevant research and real-world practice. It is a legacy that keeps our eyes on the future, and will ensure that the value of a Cal Poly biomedical engineering degree continues to increase over the ensuing decades.

Best of all, the best is yet to be. We have many exciting initiatives on the horizon, and I sincerely hope that you will keep in touch. If you’ve been away for a while, please consider reconnecting — I would love to hear what you’re up to. Drop me a note at rcrocket@calpoly.edu. Here’s to the next decade!

Bob Crockett
Chair, Biomedical Engineering

“Flash forward a decade, and it’s clear that we are no longer a startup.”

BMED Pulse

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engined blood vessel mimic) and cells. I then used those cells in multiple experiments for new staining techniques that our lab had not had much prior experience with. Over the summer, I created my own experiments; communicated with professors, master’s students and vendors; solved on-the-spot problems; learned new imaging techniques; and did a lot of deep reading of professional journals. And those were just a few of my takeaways of the summer experience.

“The intense program opened doors of possibility that I would have never otherwise had,” he said.

“A culminating experience for me was the opportunity to accompany Dr. Cardinal to the Surfaces in Biomaterials Foundation conference in San Diego, where I presented my findings on a student panel. The conference was full of industry and academic professionals to learn from — both in terms of the fascinating presentations and the opportunity to get direct feedback from some of the leading practitioners and leaders in the field,” Dennis said.

Now in his first quarter of the department’s blended program, Dennis is leading a team focused on growing tissue-engineered blood vessels to test cerebral aneurysm devices. “I would not be able to do the work I do without the students in our lab. People specifically working on this project include Conor Hedigan (BMED) Ian Johnson (BMED) and Brandon Puccini (mechanical engineering).

“The gist of our work is to create mimic blood vessels that can be used in the preclinical stage of testing biomedical devices,” Dennis said. “In the medical field, animal testing and clinical trials are a major expense. By growing tissue-engineered vessels, we’re aiming to provide the industry an alternative model that is simple, cost effective and can potentially alleviate some of the need for animal testing.”

Marc Dawson (M.S., ’09), principal R&D engineer at Meditronic and an active industry advisor to the department, describes medical devices as a “young field that reflects the breakneck pace of discovery and innovation in the healthcare and life sciences sectors. It’s exciting to see how well Cal Poly’s biomedical engineering program is preparing students to be on the cutting-edge of research and innovation in these new and expanding frontiers.”
In his first three years in the biomedical engineering program, Ben Dennis has dived into the Summer Undergraduate Research Program, been accepted into the department’s blended master’s/undergraduate program, found a second home in Cal Poly’s Tissue Engineering Lab — and, more recently, discovered a class that appeals to his inner entrepreneur.

“I’ve always had a strong business sense and thoughts of starting my own company,” Dennis said. And, to his delight, he’s found that innovation and entrepreneurship are big part of Cal Poly’s biomedical engineering program.

“The ENGR 463 senior design class, in particular, does a great job in preparing students for any future entrepreneurial endeavors, which is the main reason why I chose to take it,” he continued. “And the further I’ve gotten into this course, the more I realize that the whole process of product development and testing correlates nicely with research and development as it’s practiced in the engineering field. I’m part of a project team that’s developing an all-terrain stretcher that can be used by first responders to extract individuals more safely, comfortably and easily from geographically harsh locations.”

Other members on the team include Drew Carlson, biomedical engineering; Sam Suri and Garrett Janetzky, industrial engineering; Aleks Vetushko, computer science; and business majors Kai Bedell and Ryan Johnson.

“I’m not just working with people in my major, but instead get to work with people from all different backgrounds, who all bring different skills to the table,” said Dennis. “I think that, alone, is reason to take the class — engineering has become a hugely multidisciplinary field. This class has really given me glimpse into what it will be like once I go to work in industry — or, one day, start my own company.”

New BMED Faculty

CHRISTOPHER HEYLMAIN

A Cal Poly general engineering alumnus (’07), Christopher Heylman went on to earn a Ph.D. in biomedical engineering from Case Western University, including postdoctoral work with the Armed Forces Institute of Regenerative Medicine and, more recently, heading the diagnostic instruments startup Velox Biosystems. As one of Cal Poly’s newest biomedical engineering faculty members, he hopes to foster innovative faculty and student collaborations throughout the college and across the campus, particularly in the interdisciplinary fields of regenerative medicine. “New opportunities for multidisciplinary fields to interact can help us to develop significantly superior materials and therapeutic strategies for healing major tissue defects,” he said.

MICHAEL WHITT

An entrepreneur and academician, Michael Whitt has an MBA from UCLA’s Anderson School of Management and a doctorate in biomedical engineering from Rutgers University. In addition to founding Cortex Systems, a maker of cardiovascular diagnostic devices, he has taught business at the University of Notre Dame, chaired the engineering department at Miami Dade College and taught mechanical engineering technology at Purdue University. Current research interests include early detection of cardiovascular disease and heat stress through non-invasive means. He is also exploring the use of biomaterials and coatings to expand the use of nanotechnology in diagnostics.
Biomedical students get a jumpstart in the interdisciplinary field of biomechanics through a variety of classes, labs and research opportunities offered by the Human Motion Biomechanics (HMB) lab and program, which received a boost two years ago from a $350,000 grant from the W.M. Keck Foundation.

For her BMED 410 class, Elizabeth Heyde, a biomedical engineering junior and HMB member, along with fellow HMB member Brad Wash, a mechanical engineering graduate student, recently used the HMB lab to gather human motion data for a class assignment.

“Elizabeth and Brad’s use of the lab represents the educational component of the Keck award, which includes funds to develop lecture and lab materials and to gain experience in the use of HMB lab equipment,” said Biomedical Engineering Professor Scott Hazelwood, who is co-director of the HMB program with Steve Klisch, mechanical engineering professor. “On the research side,” Hazelwood added, “a significant portion of the Keck award has included the purchase of key equipment and funding for approximately 10 students each year to work on research projects focusing on the prevention, treatment and rehabilitation of injuries or degeneration of the hip and knee joints.”

One such Keck-funded student researcher, Megan Pottinger, a biomedical engineering graduate student, is analyzing the biomechanics of patients who have undergone ACL (anterior cruciate ligament) reconstruction. “Both my parents have had ACL issues, so when I saw an ad for the lab in my junior year, I jumped at it. Being especially interested in the mechanical aspects of biomedical engineering, I feel that, with this kind of opportunity, I have it all.”
The Biomedical Engineering Department is taking its culture of innovation to new levels with the hiring of the school’s first professor of practice — the first of its kind for the department, and a new model for the College of Engineering.

“The title ‘professor of practice’ may be new to us, but it’s well-established among many of Cal Poly’s peer institutions,” said Bob Crockett, department chair. “The designation, in our case, describes Marc Cortez, a talented and accomplished business leader who will bring world-class experience and excitement to our graduate students. As undergraduates, our students are steeped in applied research and hands-on experiences — and now, through a pilot project-based master’s option, they’ll have the same opportunities at the graduate level. Marc is ideally suited for shepherding them through the rigors of research and development as it’s practiced in the real world.”

Over a 30-year career, Cortez has led global initiatives with some of the world’s largest manufacturers, such as Samsung. In addition to his corporate experience, he has also co-founded six companies, including Truhound, a biotech company that commercializes technology developed at Cal Poly. Cortez has a bachelor’s degree in mechanical engineering from Colorado State University and an MBA from Pepperdine University.

The non-tenured professor of practice position is designed specifically to meet the special demands and opportunities posed by the department’s growing number of company-sponsored projects at the graduate level. “That’s where Learn by Doing takes on new dimensions,” Cortez said. “Students will be solving complex real-world problems with bottom-line company impacts by a combination of research and development, innovative thinking and stakeholder management.

“A big part of my job is helping students understand the importance of their work and to ‘own’ the solutions they propose. “It’s all about building on the department’s strong culture of healthcare innovation and entrepreneurship.”