FINE-TUNING FUTURE
ENVIRONMENTAL PATHWAYS

UC DAVIS
COLLEGE OF ENGINEERING
Each year the College of Engineering at UC Davis recognizes several of its notable graduates with the Distinguished Engineering Alumni Medal (DEAM). The 2015 DEAM awards will be presented at a special event on Saturday, February 28, 2015 at the St. Francis Yacht Club in San Francisco.

DEAM recipients are UC Davis engineering graduates with 15 or more years of professional experience; have a record of outstanding professional or technical achievement; have rendered distinguished service to the College of Engineering, the engineering profession or the community; and have contributed in a significant way to the reputation of UC Davis. DEAM awards are granted in three categories: Excellence in Business; Excellence in Education; and Excellence in Public Service.

For more information, please contact Oliver Ramsey at owramsey@ucdavis.edu, or visit http://engineering.ucdavis.edu

### 2015 Distinguished Engineering Alumni – Medal Recipients

**Academic Achievement**
- Elaine Scott, Dean, School of STEM, University of Washington, Bothell

**Business Achievement**
- John Wasson, President, COO, ICF Int'l
- April Fallon, Chief of Staff, Product, LinkedIn

**Public Service**
- Scott Johnson, Founder, Myelin Repair Foundation
- William Milliken, Senior Reservoir Engineer, Chevron
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"HEAVY ENGINEERING" ASSOCIATION HOPES TO STEER MORE STUDENTS TOWARD ON-SITE CONSTRUCTION WORK

THE UC DAVIS DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING just earned additional respect from some influential Beavers.

A “heavy engineering” construction association founded in 1955, The Beavers works to generate greater attention to the contractors who rarely get credit for their role in building and maintaining the massive American infrastructure. The association drew its name from the fact that many inaugural members were dam builders, with notable projects including the massive Hoover Dam.

Today, The Beavers Charitable Trust has established endowed scholarships for civil engineering and/or construction management at 41 U.S. colleges and universities, with a cumulative value of $5 million.

UC Davis, as one of those schools, has for the past decade benefited from a $20,000 endowed scholarship for undergraduate civil engineering students. That figure just received a significant boost: a $100,000 “Presidential Endowment” bestowed to the Department of Civil and Environmental Engineering by The Beavers’ outgoing 2013 president, Hirokazu (Hiro) Onozaki, of the Obayashi Corp.

This prestigious gift was made, in part, because of an existing relationship between UC Davis and Obayashi: a collaboration that began with considerable research work in the 1990s, at UC Davis’ Center for Geotechnical Modeling.

UC Davis alum DAVE WOODS, ’77, executive director of Beavers Inc. and The Beavers Charitable Trust, has been with the association since 1999. His job includes liaising with professors at the supported campuses. Woods’ liaison at UC Davis is John Harvey, a professor in the Department of Civil and Environmental Engineering, chair of the Transportation Technology and Policy Graduate Group, and PI of the UC Pavement Research Center.

“I’ve been working for years with John,” Woods explains, “I’ve watched as his department developed a construction engineering and management minor. We thought that was a great idea, because most civil engineering programs focus more on design than construction. Once Hiro announced his Presidential Endowment to UC Davis, we rolled that into the existing endowed scholarship, now targeting students in civil engineering, with the new construction engineering and management minor. Some of the funds also will help the department promote this program.”

This new endowment also is well-timed to take advantage of a rising industry trend that finds heavy engineering contractors seeking students as summer interns. Among its many other functions, The Beavers’ web site has a section that matches contractors and students for such internships.

Obayashi also is part owner of San Mateo-based Webcor Builders, the West Coast’s largest commercial construction company.

“Their students have been very successful,” Woods says. “In the fall of 2012, several UC Davis engineering undergraduates were among those who participated in San Francisco’s Student Day project,” Woods explains. “We put them in hard hats, safety glasses and gloves, and walked them around a $4 billion project in downtown San Francisco. A lot of students don’t realize how exciting such work is, until they’ve been on a construction site and witnessed the energy involved with building things.

“That’s one of the things that people in this industry take the most pride in: being part of projects that will serve society long after they’re gone!”

ONE WORLD

ONE UC DAVIS

Civil Engineering Gets a Boost FROM THE BEAVERS

BY DERRICK BANG

FROM THE BEAVERS

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CALIFORNIA CONGRESSMAN JOHN GARAMENDI (D-Fairfield, CA) convened a meeting of his Manufacturing Advisory Committee (MAC) on July 21, at the offices of TenCate Advanced Composites in Cordelia.

The MAC conversation focused on two issues: government tools available to increase U.S. manufacturing competitiveness; and strategies to develop America’s manufacturing workforce. Representatives from business, labor, government agencies, economic development organizations, universities and national labs participated in the conversation, including Enrique J. Lavernia, dean of the UC Davis College of Engineering, and a distinguished professor of materials science.

“For almost every single one of you, as manufacturers, your biggest problem isn’t money; it’s finding a qualified staff,” Congressman Garamendi noted. “Much of my congressional work is focused on job training, career technical education, and support for our colleges and universities for precisely this reason. From UC Davis at one end, to UC Berkeley, UCSF, Stanford, and Lawrence Berkeley on the other end, along with every community college in between, we’re in what I call the ‘Research Crescent.’ There is amazing potential in this region.”
An undergraduate student design team from the UC Davis Department of Civil and Environmental Engineering claimed the top spot in the 2014 ASCE Steel Bridge National Competition, held May 23-24 at the University of Akron. The UC Davis team, named “Chrome Ollie,” finished first in the overall rankings, ahead of teams from MIT (2nd), UC Berkeley (3rd) and the University of Florida (4th). The competition featured 49 teams from institutions across the U.S., Canada, Mexico and Puerto Rico.

This was Team Chrome Ollie’s second top overall victory in the past 10 years; the UC Davis group also won in 2005. Among the components of its overall victory, Team Chrome Ollie finished 7th for Construction Speed; 1st for Lightness; 14th for Display; 6th for Stiffness; 9th for Economy; and 1st for Efficiency.

UC Davis’ Team Chrome Ollie is a student-run organization that provides undergraduates with the opportunity to design, fabricate and construct a roughly 20-foot span steel bridge. Duties and activities include optimization and iterative design, MIG and TIG welding, the fabrication of parts in the student Engineering Fabrication Laboratory, and the performance of timed construction runs, along with team social events, leadership and organizational opportunities. The “Chrome Ollie” team qualified for the national competition by finishing second at the ASCE Mid-Pacific Student Conference, held April 3-5 at California State University, Fresno.

The Student Steel Bridge Competition is sponsored by the American Society of Civil Engineers (ASCE) and by the American Institute of Steel Construction (AISC), and co-sponsored by the American Iron and Steel Institute, the James F. Lincoln Arc Welding Foundation, the National Steel Bridge Alliance, Nucor Corporation, Nelson Stud Welding, the Canadian Institute of Steel Construction (CISC), the Structural Steel Education Foundation (SSEF), Bentley, and DSS Solidworks.
OUT OF THIS WORLD is one way to describe the top 2014 graduating senior at UC Davis.

After a visit to the Kennedy Space Center while in high school, ASHLEY COATES of Hollister, California, set her sights on a career in the space industry. At UC Davis, she excelled in her studies of aerospace science and mechanical engineering, and was mentored by a former astronaut. Her experiences included helping to build a virtual-reality headset, reverse engineer a robotic arm, and design an airplane.

Coates interned in Professor Steve Robinson’s lab, where she helped design the optics for a helmet-based virtual testing device. Coates is the 2014 recipient of the UC Davis University Medal for excellence in undergraduate studies, outstanding community service, and the promise of future scholarship and contributions to society. The College of Engineering’s most recent prior University Medalist was Kyle Craig Pilgeram, in 2003.

When Coates received the award at her commencement on June 16, 2014, she joined an elite class of doctors, engineers, professors and others whose work ranges from seeking a cure for cancer, to helping the poor in developing countries. Coates achieved a cumulative grade point average of 4.0 while earning a bachelor’s degree, with a double major in aerospace science and engineering and mechanical engineering.

Robinson, a retired NASA astronaut, mentored Coates. “Ashley Coates is the type of student who will always represent the best of UC Davis, in both technical achievement and community service, and will be a wonderful role model for following generations of Aggies,” he wrote, in support of her recognition.

Coates’ stellar experiences at UC Davis have included volunteering with the Center for Human/Robotics/Vehicle Integration and Performance. The center, Directed by Robinson, conducts research to keep humans alive in extreme and highly hazardous environments, such as spaceflight, aircraft emergencies and robotic surgery.

In the center’s lab, Coates helped disassemble and study the workings of a NASA robotic arm and create a helmet-mounted, virtual-reality system for use in the design of cockpits. For a senior team project, she designed the landing gear and performed the cost analysis of a 75-passenger plane.

Coates worked at NASA’s Johnson Space Center this past summer, and began studies this fall at Stanford University, which named her a graduate fellow and provided a three-year award valued at $240,000.

She plans to focus on computational fluid dynamics — the use of numerical methods and algorithms to analyze and solve problems that involve fluid (air) flows — as she pursues degrees in aeronautics and astronautics. Coates hopes to work in the space industry, including NASA, and then as a university professor.
UC DAVIS PROFESSORS often accept assignments as visiting instructors at universities across the country, or even throughout the world: sometimes just for a week or two, perhaps even for a quarter or an entire academic year.

Rarely, however, has a “guest lecturer” program been proposed — let alone embraced — at a scale comparable to what currently involves the UC Davis Department of Chemical Engineering. Indeed, the ongoing “Agreement of Cooperation” between the College of Engineering and Vietnam’s Hanoi University of Mining and Geology could be unprecedented. In every significant sense, UC Davis faculty have been asked to replicate their chemical engineering curriculum for Hanoi University students, while also teaching this material — in English — at an accelerated pace.

Previous agreements of cooperation have teamed UC Davis with Vietnam’s Nong Lam University, Hanoi’s University of Agriculture, and the National Institute for Agricultural Planning and Protection.

The program unofficially began in the summer of 2010, with the arrival of a delegation that included Tran Dinh Kien, rector of the Hanoi University of Mining and Geology; Nguyen Anh Dzung, chair of the campus’ Department of Oil Refining and Petrochemistry; and Nguyen Quang Minh, head of the International Cooperation Office. Their university had received funds from Vietnam’s Ministry of Education, to create a program in chemical engineering, with a curriculum presented in English. Wanting to model this program on one in the U.S., they selected UC Davis and contacted ROBERT POWELL, then chair of the Department of Chemical Engineering and Materials Science.

“It’s not uncommon for faculty members to visit, say, a university in Thailand to teach a course or two,” Powell admits, “but I’m not familiar with anything quite like this. We really are delivering the chemical engineering part of their university curriculum, and at least 75 percent of the courses are being taught by our faculty.”

“They proposed to model their program — Advanced Chemical Engineering — precisely after our curriculum, despite the fact that we’re on a quarter system, and they’re on a semester system. They sent several faculty members to us, to observe how we teach our courses. They then examined all of our freshman and sophomore courses, to determine which ones they could teach themselves, and asked for our help in developing and teaching all the upper-division courses, along with a few lower-division courses.”

The result is an intimate collaboration on an impressive scale. The initial Ministry of Education grant runs for five years, and is likely to be extended for an additional two years. Brightly colored posters mounted at Hanoi University promise students that “Together we can make your future become brighter,” thanks to this collaboration with UC Davis, “one of the most prestigious universities in the United States.” Annual scholarship opportunities come from Petrolimex, the PetroVietnam Exploration Production Corp. (PVEP), Perenco, Petronas, Schlumberger Ltd. and ConocoPhillips, among other petrochemical and energy corporations.

The UC Davis/Hanoi program formally began in 2011 with the first crop of freshmen, who are expected to graduate in June 2015. The average class size was 25 students that first year, but interest has increased as the program’s value has been recognized; the most recent freshman classes contain 50-55 students. The extremely competitive program demands a lot of its students, starting with a six-month crash course in English that precedes the CE curriculum.

UC Davis Chemical Engineering faculty who have taught in the program include Powell, Palazoglu, Pieter Stroeve, Tonya Kuhl, Nael El-Farra, James Shackelford, Klaus van Benthem and Brian Higgins.

Powell and Palazoglu make no secret of one key long-term goal.

“They want people who will be fluent in English, and who will be familiar with state-of-the-art tools. They see this program as a means of providing that work force.

“Some of the classes have true superstars, and we’re trying hard to recruit them for graduate school here at UC Davis,” Palazoglu admits. “We’ve established a solid foundation at the undergraduate level during these first three years, but Hanoi University also wants to collaborate at the graduate level, to boost their research profile. They want to send some of their students here, to get PhDs and then return to teach in their own country. And for our part, we’d love to get some of those post-graduate students.”
AGGIE ENGINEERS TRIUMPH IN
DESIGN AND RACING COMPETITION

THE UC DAVIS FORMULA RACING TEAM took third place overall, against stiff international competition, at the annual Formula SAE Electric Competition, held June 18-21 at the Lincoln Airpark, in Lincoln, Nebraska. Brazil’s Universidade Estadual de Campinas came in first, with Canada’s McGill University taking second, making the Aggie engineers the highest-placing U.S. entry, well in front of competitive teams from Carnegie Mellon University, MIT, Purdue, UC Irvine and others.

The event results proved particularly gratifying to the UC Davis engineers, on several levels. “We’re the first North American team ever to advance beyond technical inspection in the Formula SAE Electric Division,” noted team member Lucas Bolster.

Along with Universidade Estadual de Campinas and McGill, UC Davis was one of only three teams — from a field of 20 competitors — to complete the grueling 12km endurance event. The Aggies also placed in the Top 10 in all other divisions: Cost, Design and Presentation (achieving fifth place in the latter).

UC Davis Formula Racing is a student team that is challenged each year to go beyond textbook theory while designing, building and racing high-performance, environmentally conscious vehicles.
ALISSA KENDALL’S DESIRE TO CHANGE THE WORLD emerged at a young age. Her eventual interest in environmental engineering and life-cycle assessment (LCA) began with a childhood in Honduras.

“Moving to the U.S. after that was a culture shock,” says Kendall, now an associate professor at the Department of Civil and Environmental Engineering. “I had a sense of the injustice and unfairness of what people experience in different parts of the world. It seemed that a lot of the problems derived from a lack of water and a good sanitation infrastructure.

“I decided that I would become an engineer, so I could fix those problems.”

She majored in environmental engineering at Duke University, and then she spent two years as a product development engineer at Ford Motor Company’s headquarters in Dearborn, Michigan.

“I worked on the battery system of the electric Ranger, released only as a fleet vehicle. Those early-gen batteries had to be charged constantly, and I instinctively knew that this wasn’t good for the environment, in Michigan, all that electricity was coming from coal. How could that possibly have been better than gasoline, from the standpoint of air pollution, climate change and fossil fuels? And how could that be determined?”

Such questions brought Kendall back to environmental engineering, and inspired her interest in the concept of life-cycle assessment. She returned to academia, enrolling at the University of Michigan, Ann Arbor, in its School of Natural Resources and Environment. She worked on a large National Science Foundation grant in Materials Use: Society, Engineering and Sustainability. “Our part of the project involved cement materials, and I must confess that my enthusiasm initially was limited,” she laughs. “But my advisor pointed out that cement is the second-largest emitter of CO₂, after power generation ... and that made it interesting.

“So, yes, my dissertation was on cement, and our resulting LCA model was the first-ever designed to include sustainability variables such as infrastructure, durability, repair rates, traffic delay due to work-zone congestion, the health effects of increased accident rates, and other indirect effects.”

After completing her PhD at Michigan in 2007, Kendall joined the faculty at UC Davis.

A few years later she obtained funding through a grant from a steel industry organization to study life-cycle vehicle greenhouse gas emissions. CAFE (Corporate Average Fuel Economy) standards address only fuel economy, but recent EPA standards have focused on CO₂ emissions at the tailpipe, so the two standards must cooperate.

“But my question was, why were we examining only the tailpipe, when we potentially were moving a lot of emissions away from the ‘use phase,’ and into the production phase?

“Traditional vehicles have engines connected to drive trains.
Hybrids have an engine, a reasonably large battery and a traction-drive motor: many more parts. A plug-in hybrid has even more parts. In all cases, you're also doing a lot of other stuff, like trying to 'lightweight' the vehicle. As a result, we're pushing a lot more emissions to the production stage ... so, if we look solely at the tailpipe, do we get the right answer? Will we, via policy, promote the right vehicle?

“We did our research and discovered that the worst material being used was magnesium, a lightweighting material. Magnesium is a rather basic material, but, unfortunately, it's produced quite 'dirtily' these days. But if we start recycling it, does it remain such a bad material?

“The same can be said for lithium and various rare earths, which are important for newer future cars: hybrids, plug-in hybrids and electric vehicles. Automotive production is experiencing enormous changes at the moment. Demand has increased, and production capacity has gone way up; new sources must be found.”

By coincidence, Kendall was exploring these questions just as the National Academies of Science and various government agencies were releasing studies concerning critical materials, particularly those for clean energy: rare earths, lithium and even magnesium.

“I put together a proposal to dynamically model all these materials over time, so we could understand the long-term implications of introducing such vehicles to the marketplace. For example, I wanted to account for the fact that we might be able to set up a recycling infrastructure. We also have to consider all the potential sources that might come on line, over time, and how their impacts would vary. Even when abundance exists, there often are constraints on production, and a lot of variability in the environmental impacts associated with one production site over another.

“So, as we meet this ever-increasing demand for clean-energy materials — materials also used in many electronics — how do their environmental impacts change, and can we predict how they'll change in the future? Which tech becomes environmentally preferable?”


Her project will concentrate on four metals considered critical to clean energy technology: lithium, magnesium, neodymium and dysprosium. The research will allow clean energy technology developers to anticipate the long-term negative environmental consequences of selecting a particular material in a design, thereby facilitating life-cycle decision-making at the earliest stages of product development. At the same time, the project also will help policymakers and industry anticipate the timing required for identifying alternative materials and resources, when necessary, and for developing a robust recycling infrastructure.

“The big-picture goal is to help governments and tech developers think about, and anticipate, future opportunities and future problems ... so they know, for example, that 10 years down the road, if using a given material, they'll need to invest in a recycling infrastructure, to avoid potential problems.

“One takeaway will be the ability to answer this sort of question: What’s the likely life cycle inventory of dysprosium in the year 2030? You then can integrate that answer with a vehicle LCA model, and have a much better picture of what technology to invest in, over time, and how that will affect the long-term performance of that technology.

“What are the preferred environmental pathways to the future? My primary field of study is climate change mitigation, but we don't want to study only greenhouse gases, because other environmental issues could be equally enormous: toxicity, radioactivity, tailings from different processes ... things that aren't necessarily obvious when we buy electronics or 'clean' energy.

“And that's the important next step: How do we take all this information and do something that helps us prioritize a more holistic vision of environmental improvement?”

Kendall pauses, and smiles.

“So you see, that's a lot bigger than what comes out of a tailpipe.”
QUN (Q.) JANE GU IS QUITE CONCERNED ABOUT THE “INTERCONNECT BOTTLENECK.”

Gu, an assistant professor in the Department of Electrical and Computer Engineering, understands the biggest challenge that faces the World Wide Web. In a word: space.

This seems counter-intuitive, since users generally imagine the Web’s parameters to be boundless. But we’re talking about bandwidth space, which definitely has its limits.

The Internet’s exponential growth, fueled by its increasing importance to world communications and commerce, has placed ever-expanding demands on inter- and intra-chip communication bandwidth. But the electromagnetic spectrum, in terms of the ranges currently exploited, has only so much “space.” The cellular and wireless spectrums already are quite crowded, due to the explosive growth of both users and the increasingly varied — and sizable — types of data being transmitted. Hence, the interconnect bottleneck: the limits on integrated circuit performance that result from connections between components (as opposed to their internal speed).

The communications industry needs to achieve a superior interconnect solution that delivers high energy efficiency, high bandwidth density, high reliability and low cost … not to mention fast adaptability and scaling capabilities.

Gu studied Ph.D. work at UCLA, embracing research that reflected her true passion: using silicon semiconductor processing to design circuits, in order to meet the ever-increasing demands for the universal capabilities that users expects from their gadgets. This quickly led to her work with interconnect: the high-velocity Internet that provides connectivity via an array of state-of-the-art products.

“Back then, interconnect established chip-to-chip connections in vertical stacking chips,” she recalls. “The goal was high data rate, low power, small size, and high reliability. We successfully developed a method — a capacitive, coupling-based, short-distance interconnect scheme — which achieved a method for high reliability.” Gu was only two years into her Ph.D. work when this research was published at the 2004 Institute of Electrical and Electronics Engineers (IEEE) International Symposium on Circuits and Systems (ISCAS). The further improved work was published in the flagship conference in solid-states circuits society, IEEE International Solid-State Circuits Conference (ISSCC), in 2007.

Gu completed her doctorate that same year, and worked in research and teaching positions in California and Florida. She joined the UC Davis College of Engineering in August 2012.

“UC Davis and my department environments are marvelous,” she says. “I’m indebted to all my colleagues here; they’re approachable, supportive and collaborative in all sorts of ways, large and small. Our department staff members also are extremely helpful; when I need
The major goal is to solve the need to keep increasing the data transmission rate from chip to chip, or within a single chip. The data transmission rate always increases, because the demand keeps going up. So the density of data being transmitted — bandwidth density — must be allowed to increase, without increasing the size of the device.

“Cell phones can’t be allowed to get physically larger,” she laughs, “or they won’t fit into our pockets. That means our desire to transmit more and more data must be squeezed into the same physical space.”

But that’s only part of the problem.

“We also must increase power efficiency, or else power consumption will increase in tandem with the increasing data rate. That would be bad: In a very few years, the power consumption related to data transmission alone would hit intolerable levels, and all the chips would burn up. So, power must be reduced by orders of magnitude.”

Gu believes she has a solution, and it relates to the terahertz (THz) region within the electromagnetic spectrum, which covers a frequency range roughly 100 times that currently occupied by all radio, television, cellular radio, Wi-Fi, radar and other users.

In other words, plenty of space.

“The terahertz region hasn’t been studied or developed much yet, because its frequency has been regarded as too high for interface with conventional electronics, and too low for the optical spectrum. Despite this, its position ‘in the middle’ can be used to leverage the advantages from both the electronics and optical sides.”

It’s essentially a hardware problem, which is right up Gu’s alley.

“We must design an electronic device that can generate and receive such high-frequency signals; that’s the electronics side. And we also need to design the ‘channel’ that can provide the low-loss/high-bandwidth capabilities; that’s the optical side. Then we need to integrate these two achievements, to produce the desired terahertz interconnect.”

Gu expects to develop the first prototype within two years. “It won’t have very high throughput and very low power consumption immediately,” she admits, “but it will demonstrate proof of concept. After that, we’ll work to improve performance for higher bandwidth density and lower power consumption.”

All of which begs a question: Given the always-increasing growth of data movement — not merely phone calls, but also video streaming, cloud storage and the exchange of sensitive data, to cite just a few examples — will bandwidth technology itself be replaced by something entirely new and different, that we can’t even imagine yet?

“Not any time soon,” Gu smiles, “but technology does always evolve!”
CALIFORNIA FARMERS frequently face a shortage of field workers. This situation is becoming increasingly dire each year, with vineyards and farmers leaving fruit unharvested in the field, due to the diminished number of pickers.

Until that trend reverses, the only solution involves increasing the efficiency of the available work force. STAVROS VOUGIOUKAS, an assistant professor in the UC Davis Department of Biological and Agricultural Engineering, believes technology may help to solve the problem.

A native of Thessaloniki, Greece, Vougioukas arrived at UC Davis in 2012, after completing his doctorate in robotics and automation from New York’s Rensselaer Polytechnic Institute and several years in industry.

“California is the right place to be, and this is the right time, for work in agricultural robotics automation and mechanization. And Davis is the place to do such work; this department has a long tradition of agricultural mechanization.”

Last October, Vougioukas received a grant of $1,123,463 from the U.S. Department of Agriculture, to help fund a four-year project devoted to the development of what he terms “FRAIL-bots,” short for Fragile Crop Harvest-Aiding Mobile Robots. As envisioned by Vougioukas, these small machines will increase harvesting efficiency by (for example) reducing the “dead time” that results from the need to transport fruit-laden containers from deep within a field, to the field’s edge where storage vehicles wait.
“This USDA project is part of the National Robotics Initiative, which focuses on people and robots working together, whether in space, defense, manufacturing or agriculture,” Vougioukas explains. “My proposal lays the scientific and technical foundation for a human/robot collaboration.”

Vougioukas and his research team are concentrating on strawberry harvesting, which involves considerable wasted time when workers in the field are required to walk long distances to empty their containers, and then walk back to resume picking the fruit. Mindful that such a perishable crop must be harvested in a manner that ideally brings such “dead time” to zero, Vougioukas has developed small and relatively inexpensive robots that function as a courier service.

“The USDA proposal suggested a crew of 50 people and a fleet of five or six robots to transport the strawberries, with each robot serving more than one person. These would be intelligent, autonomous ‘smart’ machines.

“But we’re simultaneously exploring a slightly different concert: a much cheaper robot, not as smart, that would be specific to each worker. This robot would go back and forth only in that person’s furrow. You take that robot with you while picking; when it’s full, you push a button and it goes to the end of the furrow, where somebody unloads it, pushes another button and returns it to you. Meanwhile, you continue picking.

“We’ve already prototyped that one; a group of students in our department built a working model as a senior design project. This year, I’m collaborating with Kent Wilken, interim chair of the Department of Electrical and Computer Engineering; student teams of both electrical and mechanical engineers will develop a second version of that robot, as a cross-departmental senior design project.”

Vougioukas expects to have fully working prototypes of both sets of robots within the grant’s four-year term. “Whether they then can be commercialized is another story,” he admits, “but the strawberry industry definitely is interested, because economics favor precisely this sort of breakthrough.”

A second, related area of Vougioukas’ research involves much more ambitious robotic or mechanical harvesting from fruit trees, such as pears and peaches. This challenge is exacerbated by the huge divide — and expense — between concept and field testing.

“When engineers design something new, the first step is to model the environment, then simulate it, then use computer engineering tools to iterate and optimize performance, and then commit to a physical prototype and build it. But we can’t do that in agricultural engineering, because we can’t model the environment. So, 99 percent of the time we build something, test it in the field, evaluate data and make changes ... over and over. That’s time-consuming and expensive.

“Maybe we imagine a peach harvester that sits on an orchard platform, and has 50 mechanical arms. We imagine that each arm is cheap and slow, but 50 of them are acceptably efficient. Could such a machine be prototyped and built? No, because we wouldn’t know where to start.”

Vougioukas smiles, his enthusiasm building by the second.

“So, my students and I created technology that allows us to digitize the positions of thousands of fruits: a 3D map of little fruit. Next we’ll digitize branches and trees, and soon we’ll have a virtual orchard wherein a computerated engineering tool can be introduced. That will allow you to come up with a design idea for a machine, and put that machine into the virtual orchard, and assess its performance before committing to the funds necessary to build it.

“A major problem in ag robotics is efficiency: How much fruit can be picked per second? Even if your machine has perfect perception and dexterity — and those are different technical challenges — what are the necessary structure, kinematics, dynamics and geometry of a machine that could do this work? Do you need larger, longer picking arms? Smaller arms? Do you surround the tree from different sides?

“With our virtual orchard, many — most? — of these issues could be worked out in the design phase!”

It has become clear, since Vougioukas’ arrival at Davis, that he’s now, finally, in the right place to embrace these and other agricultural engineering challenges.

“Half a century ago, this department already was filled with scientists who were the cream of the crop, and were well known internationally for their bio-ag engineering work. The academic environment was great then, and it’s even greater now!”
Ben McCoy understands the value of mentorship and collaboration.

“I admire the way undergraduate students have banded together to help each other,” McCoy explains. “I’m particularly impressed by the tutoring efforts, where juniors and seniors help freshmen and sophomores. It’s an excellent thing, particularly for chemical engineers, because it’s a difficult program that requires a lot of work. Engineering solutions involve a wide spectrum of approaches: a process rewarded by interacting with other people.

“Plus, when you teach somebody how to do something, you learn better yourself, as well.”

McCoy joined UC Davis in 1967, with a newly minted PhD in chemical engineering from the University of Minnesota. “There were only five of us in the Department of Chemical Engineering then; Joe M. Smith had founded the department just three years earlier.”

The department has grown significantly, into the current Department of Chemical Engineering and Materials Science. The department also has seen an ever-expanding pool of undergraduates. A group of alumni recently established a scholarship award to honor McCoy, designed to acknowledge and reward undergraduate mentoring and tutoring activities. The Ben McCoy Undergraduate Student Award is supported by matching funds contributed by alums Pam Fair, Karl Gerdes and Dave Macway. The goal is to raise $30,000, and all gifts will be matched $1:$1 until the matching funds are depleted.

In addition to teaching and research, McCoy served as chair of the Department of Chemical Engineering and Materials Science from 1980-89, when he became the College of Engineering’s associate dean for research, where he remained until retirement in 2002.

McCoy is proud of his long association with UC Davis, and he speaks warmly of what makes the university so special. “It goes back to its founding as the UC system’s ag campus, and the resulting foundation in ag, food production, biology and more. That foundation in biology is one of the key factors that distinguishes chemical engineering and materials science at UC Davis.

“The department has long had close contacts with the university’s departments of Food Science & Technology, and Viticulture & Enology, dating back to when I arrived in 1967. We’ve always had faculty with joint appointments in both areas, and UC Davis always has had a strong spirit of collaboration and interactions with people in other departments, and other areas of expertise.

“That’s what makes UC Davis a rich environment: people working as colleagues and comrades, rather than competitors.”

That collaborative spirit, in turn, is behind this new financial gift. “It’s something of a new concept,” McCoy admits. “It’s not like giving a scholarship to a straight-A student who’s already doing well; this is a way to support the entire community of chemical engineering students.

“I hope that other alumni — and community members — recognize the value of such undergraduate mentoring and tutoring programs, and help support them in an equally vigorous manner.”
The Engineering Translational Technology Center (ETTC) is a technology incubator at the UC Davis College of Engineering designed to speed the transfer of high-impact, innovative ideas to the marketplace to meet society’s needs. ETTC supports technology transfer by facilitating the development of startups, supporting tenure-track professors during a critical stage of idea development, in a familiar, secure environment, while remaining close to their research and teaching mission. ETTC has already launched two firms, Dysonics and Ennetix, and currently has 10 resident startups.

Bo Yu, a PhD candidate in the Department of Electrical and Computer Engineering (ECE), has received the Best Conference Paper Award at the 15th annual IEEE Wireless and Microwave Technology Conference (WAMICON 2014), which took place June 6 in Tampa, Florida.

The paper, titled “Micromachined Silicon Channels for THz Interconnect,” is authored by Yu, Yuhao Liu, Xing Hu, Xiaoxin Ren, Xiaoguang Liu and Qun Jane Gu. It was presented by Yu during an afternoon oral session devoted to Passive Components and Antennas.

Yu obtained his undergraduate degree in electrical engineering in 2007 at China’s Sichuan University. He completed his master’s degree, also in electrical engineering, at China’s Peking University and the International Technological University, in San Jose, California. He began his PhD work at UC Davis in October 2012, with a research focus in RF circuits design. He expects to earn his doctorate in 2017.

Chen-Nee Chuah and Qing Zhao Share NSF Research Grant

Chen-Nee Chuah and Qing Zhao, both professors in the Department of Electrical and Computer Engineering, have received a three-year National Science Foundation grant of $300,000 for their proposal titled “NeTS: Small: Beating the Odds in Traffic Measurements/Detection with Optimal Online Learning and Adaptive Policies.”

As the Internet continues its exponential growth and becomes increasingly essential to worldwide communication and commerce, it also becomes more vulnerable to malicious activities. Firewalls and intrusion detection/prevention systems monitor network traffic in order to understand and better engineer the Internet “backbone,” and therefore prevent such incursions, but the precise analysis of data — known as “packet traces” — has become more difficult as the information highway has accelerated to 100Gbps (gigabits per second).

John Owens Shares Inaugural Adobe Award

Adobe, a global leader in digital marketing and digital media solutions, has presented one of its inaugural Digital Marketing Research Awards to John Owens, the Child Family Professor of Engineering and Entrepreneurship in the Department of Electrical and Computer Engineering. Owens and co-PI Stephen Boyd, a professor of electrical engineering at Stanford University’s Information Systems Laboratory, will share the $50,000 grant for their collaborative project, “Scaling Convex Optimization with GPUs.”

Robert L. Powell Named to LLNS and LANS Boards of Governors

The regents of the University of California have appointed Robert L. Powell, a professor in the Departments of Chemical Engineering and Materials Science, and Food Science and Technology, as an executive committee governor on the Lawrence Livermore National Security, LLC (LLNS) and Los Alamos National Security LLC (LANS) Boards of Governors.

Powell also will chair the LLC’s Science and Technology Committee. All three appointments take effect immediately.

Earlier this year, California Gov. Edmund G. Brown Jr. appointed Powell as science advisor for the California Natural Resources Agency, in order to provide guidance on the complex scientific issues involved in well stimulation treatment, and assist in developing the scope of the independent scientific study required by Senate Bill 4 (popularly known as the state’s first “fracking bill”).
ECE TEAM RECEIVES NSF GRANT

The National Science Foundation’s Division of Electrical, Communications and Cyber Systems (ECCS) has awarded a three-year grant of $500,001 to a team led by PI XIAOGUANG “LEO” LII, an assistant professor in the Department of Electrical and Computer Engineering (ECE). The project, titled “Reconfigurable Bandpass Sampling Receivers for Software-Defined Radio Applications,” will be a collaborative effort with co-PIs PAUL J. HURST, BERNARD LEVY and STEPHEN H. LEWIS, all professors in the ECE Department.

The proposal addresses issues crucial to the wireless technologies that have become ubiquitous in today’s world: the need for future systems to possess greater functionality, longer battery life, smaller size and lower cost. Liu and his team have proposed a bandpass sampling receiver architecture that will be reconfigurable in terms of operating frequency, bandwidth and signal waveforms. These next-gen receivers will enable highly versatile mobile systems and a more economical and environmentally friendly telecommunication infrastructure, resulting in a more efficient utilization of — and greater public access to — the radio spectrum.
OMEED MOMENI NAMED PI IN NSF GRANT PROJECT

The National Science Foundation’s Division of Electrical, Communications and Cyber Systems (ECCS) has awarded a three-year grant of $219,994 to OMEED MOMENI, an assistant professor in the Department of Electrical and Computer Engineering. His project, titled “Terahertz PLL-Based Phased Array for Wide-Band Radar/Sensing Systems in Silicon,” is a collaborative endeavor between UC Davis and UC Irvine.

Momeni will lead efforts to implement a scalable, high-power terahertz (THz)-phased array transmitter for various radar and sensing applications. Current THz systems employ expensive and bulky devices for high-resolution radar, 3D imaging, security screening and the detection of concealed weapons. Momeni’s project introduces a novel methodology to implement a compact, on-chip THz system that will overcome the many challenges facing such high-frequency systems. He has proposed a novel phase-locked loop (PLL) architecture that will help increase output power and tuning range, while lowering unwanted phase noise.

ISLAM, OLSON RECEIVE NSF INNOVATION AWARD

The National Science Foundation’s Division of Industrial Innovation and Partnerships has presented an award to M. SAIF ISLAM, a professor in the Department of Electrical and Computer Engineering, and director of the campus’ Center for Nano and Micro Manufacturing (CNM2). This Partnerships for Innovation: Accelerating Innovation Research (PFI-AIR) Technology Translation award, in the amount of $199,895, is for a project titled “Micro and Nanofabricated Semiconductor and Ceramic Blade Arrays for Surgical and Hair Removal Applications.”

Islam is PI on the project; his co-PI is JIM OLSON, of the UC Davis Graduate School of Management and the campus’ Engineering Translational Technology Center (ETTC). The project will bring atomically ultra-sharp semiconductor and ceramic-based disposable surgical blades to market via standard semiconductor processing techniques used by Silicon Valley’s microelectronics industries, thereby addressing a need for low-cost blades used in cataract surgery, tissue-cutting and hair-removal applications.
FORMER CEE PHD STUDENT WINS BEST PAPER AWARD

London’s Institution of Civil Engineers has awarded its annual TK Hsieh Prize to Brina Montoya, Jason DeJong and Ross Boulanger, for their paper “Dynamic Response of Liquefiable Sand Improved by Microbial-Induced Calcite Precipitation,” published in the March 2013 issue of Geotechnique.

The paper is based on Montoya’s PhD work at UC Davis, which included a series of centrifuge tests at the campus’ world-renowned Center for Geotechnical Modeling. She worked with DeJong and Boulanger, both professors in the Department of Civil and Environmental Engineering.

The study explored how microbial-induced calcite precipitation (MICP), a novel method of bio-mediated ground improvement, might be used to mitigate the potential hazards of liquefaction-prone soils. These results could lead to significant changes in the way soils are selected and treated, prior to major construction projects; bio-mediation improves the strength and stiffness of the soil, thereby reducing its susceptibility to damage due to earthquakes and other loading conditions.

ANGELIQUE LOUIE AND ERKIN ŞEKER SELECTED FOR NAE SYMPOSIUM

Angelique Louie, a professor in the Department of Biomedical Engineering; and Erkin Şeker, an assistant professor in the Department of Electrical and Computer Engineering; were selected to attend the National Academy of Engineering’s annual Frontiers of Engineering Education Symposium. The event took place Oct. 26-29 at the National Academies’ Beckman Center in Irvine, Calif.

All invited participants were asked to outline their innovative teaching methods on posters displayed during an expo-style symposium, where attendees circulated and listened to informal presentations from each speaker. Louie’s proposed methodology acknowledges the retention problems created by traditional lower-division coursework that focuses exclusively on chemistry, math and physics, at the expense of hands-on engineering projects that would better engage undergraduate students and encourage them to embrace this field. Şeker’s methodology, titled “Employing Fellowship Proposal Development to Teach a Biomedical Device Engineering Course,” addresses the need to expose students to the essential tools needed to facilitate the pursuit of a specific idea with a multidisciplinary scope. This work builds on a graduate-level course that Şeker developed and taught: “Micro- and Nano-Technology in Life Sciences.”

EDUARDO A. SILVA RECEIVES HELLMAN FELLOWSHIP

Eduardo A. Silva, an assistant professor in the Department of Biomedical Engineering (BME), has been selected as a 2014-15 UC Davis Hellman Fellow. The award includes a stipend of $18,884, to help support Silva’s research activities.

Silva earned his doctorate in bioengineering in 2008, from the University of Porto, Portugal; he then spent time as a post-doctoral researcher at Harvard University. He joined the College of Engineering faculty in November 2011, filling a position in BME’s translational stem cell bioengineering.

Silva’s research focuses on developing new material platforms that will enable the control of stem/progenitor cell trafficking in the body. His lab is exploring chemical and biologically inspired design principles that will produce new material platforms to negotiate biological barriers such as the endothelial walls found in vascular networks.

SHU LIN AWARDED PRESTIGIOUS NASA MEDAL

Shu Lin, a professor in the Department of Electrical and Computer Engineering, has just received NASA’s Exceptional Public Achievement Medal. The honor acknowledges Lin’s 25 years of exceptional service and his “outstanding contributions to the NASA mission,” and cites him as “a world expert in communications.”

NASA’s Interface Region Imaging Spectrograph (IRIS) Solar Observatory, launched on June 27, 2013, communicated its results via a 7/8 Low-Density Parity-Check (LDPC) code developed by Lin. The IRIS team opened the spacecraft’s telescope door on July 17, 2013, allowing scientists to view the mysterious lowest layers of the sun’s atmosphere; NASA described the data coming in as “crisp and clear, showing unprecedented detail of this little-observed region.” The information was transmitted via Lin’s 7/8 LDPC code, a linear error-correcting code capable of sending accurate messages over a noisy transmission channel.
THE COLLEGE OF ENGINEERING presented the fourth annual Engineering Design Showcase on June 5, 2014, at The Pavilion on the UC Davis campus. Students shared their senior group projects, which applied the knowledge and skills gained during their years of study at the university. The event featured 117 teams (more than 500 students), and included displays and prototypes of student engineering projects in such fields as aerospace, mechanical engineering, medical and veterinary technology, electronics and chemical engineering.

Plan now to attend the fifth annual Engineering Design Showcase on Thursday, June 4, 2015.
the University of California Office of the President (UCOP) has awarded highly coveted A-G program status to the UC Davis Center for Integrated Computing and STEM Education (C-STEM). This new standing streamlines the process by which California high schools and middle schools can add C-STEM’s innovative coursework to their own curricula, thereby greatly increasing the UC Davis center’s engagement throughout the Golden State.

Statewide schools now can add this material to their curricula without having to submit complete course content descriptions via the traditional — and much more protracted — UCOP approval process. As a result, far more students throughout California soon will enhance their math, computer and problem-solving skills by assigning small modular robots (“Mobots”) to various tasks via C++ programming commands. The C-STEM Center therefore will be better positioned to influence the future direction of K-14 computing and STEM (science, technology, engineering and math) education, thereby having a more significant impact on the nurturing of the future engineers so desperately needed by the state, the nation and the world.

C-STEM CENTER COURSEWORK GRANTED A-G PROGRAM STATUS

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The Deutsche Forschungsgemeinschaft (DFG), a German research foundation, has presented a grant to help establish a collaborative Research Training Group (RTG) between Bahram Ravani, a professor in the Department of Mechanical and Aerospace Engineering; David Dornfeld, a professor and Will C. Hall Family Chair in Engineering, in the UC Berkeley Department of Mechanical Engineering; and Jan C. Aurich, a professor at Germany’s Technical University of Kaiserslautern.

Their project, titled “Physical Modeling for Virtual Manufacturing Systems and Processes,” will replicate manufacturing environments at every level, and with every type of simulation technology, from molecular dynamics to a “virtual factory.” The goal is to improve the technologies and methods used in manufacturing systems, while also enhancing the performance of simulation systems in connection with physics-based models. Additionally, the researchers will examine the aspects of visualization and data mining: the systematic application of statistical methods to a body of data.
DAVID HORSLEY’S STARTUP CITED BY EETIMES’ “SILICON 60”

The just-published Electronic Engineering Times list of “Silicon 60: Hot Startups to Watch” includes Chirp Microsystems Inc., a company founded in late 2013 by a team that includes CTO David Horsley, a professor and vice chair for graduate studies in the UC Davis Department of Mechanical and Aerospace Engineering.

Chirp’s game-changing advancements in gesture-recognition technology came from the development of tiny chips that employ ultrasound waves to detect three-dimensional gestures. A user waving her hand above a smart watch face, left to right, triggers a particular function; waving right to left, or front to back, activates different functions. Physical contact — such as brushing an iPad screen — no longer will be necessary.

Horsley headed the UC Davis segment of a collaborative effort that included Bernhard Boser, a professor in the UC Berkeley Department of Electrical Engineering and Computer Sciences. The fully collaborative effort emanated from the Berkeley Sensor and Actuator Center, which Horsley and Boser co-direct.

IAN KENNEDY RECEIVES NIH-UC CAI GRANT

Ian Kennedy, a professor in the Department of Mechanical and Aerospace Engineering, has received a $200,000 grant from the National Heart, Lung and Blood Institute (NHLBI) for a nanophotonics proposal he submitted via the University of California Center for Accelerated Innovation (UC CAI). This marks the first time a UC Davis researcher has been awarded a NHLBI-UC CAI grant.

The funds, to be distributed for the next two years, will support Kennedy’s proposal to use a photonic device to obtain ultra-sensitive detection of the fluorescence that is a marker for the DNA of bacterial pathogens that lead to infections in humans. The desired product will be a “point-of-care” DNA diagnostic platform based on optical amplification — without requiring a polymerase chain reaction — that will allow the implementation of protein and DNA assays at a patient’s bedside, in a matter of minutes. Kennedy will be collaborating with colleagues in the UC Davis Schools of Medicine and Veterinary Medicine.

CHARLES E. HUNT RECEIVES STAIR GRANT

Charles E. Hunt, a professor in the Department of Electrical and Computer Engineering, has been awarded one of the campus’ inaugural Science Translation and Innovative Research (STAIR) grants. Hunt and his research team received the $50,000 grant for their project titled “Low-Cost, High-Quality, Energy-Efficient Light Sources Using FEL [Field-Emission Lighting Technology].”

Hunt’s proposal was one of four STAIR grant recipients, from a field of 38 submitted. The grant will help Hunt and his team format their FEL bulbs in two ways: in an “A-lamp” configuration, akin to what most users would call an ordinary light bulb for a standard fixture; and a “ceiling luminaire,” akin to the ubiquitous 2-by-4-foot fixtures that contain 4-foot fluorescent tubes. The big difference: FEL technology produces a tube-less, contiguous emissive surface that will be flush with the ceiling.
SCHOLAR AWARDS RECOGNIZE
STUDENT TALENTS

GENEROUS CORPORATE PARTNERS of the College of Engineering presented checks totaling $218,000 to some 70 undergraduate students at a ceremony on May 27. These scholar awards come from corporations including Chevron, Texas Instruments, Union Pacific, Phillips 66, Micron, Boeing, and Bushnell Outdoor Products, whose representatives welcomed the opportunity to connect with students who have the potential to be future employees. The sponsors decide how much to allocate to each scholar award, and awards average about $3,000 each.

Students applied for the awards online and had to answer short questions, such as “describe yourself in a tweet.” The applications were reviewed and winners selected by the College of Engineering. Sponsoring companies saw the students’ applications. “It allows the companies to connect with students for at least a year if they want to extend a job offer to them,” said Kelly Scott, assistant director of corporate relations at the College of Engineering. Last year, $63,000 in scholar awards was distributed to 40 students.
The National Science Foundation’s Division of Electrical, Communications and Cyber Systems (ECCS) has agreed to fund a Major Research Instrumentation (MRI) proposal from the UC Davis Department of Electrical and Computer Engineering. The $489,125 grant, along with matching funds from UC Davis, will allow the College of Engineering’s Center for Nano and Micro Manufacturing (CNM2) to obtain a Plasma Enhanced Chemical Vapor Deposition Instrument with Inductively Coupled Plasma (ICP-PECVD), which ECE professor and CNM2 director M. Saif Islam hopes to have installed in the next few months.

Islam is listed as PI on the original NSF proposal, titled “Acquisition of a Low Temperature, Thin Film Deposition Tool (PECVD) for Semiconductor Optoelectronics, Bioelectronics, Energy Harvesting and Storage Applications.” His co-PIs are fellow ECE professors Xiaoguang Liu and Neville Luhmann; Subhash Mahajan, a distinguished professor in the Department of Chemical Engineering and Materials Science; and David Horsley, a professor in the Department of Mechanical and Aerospace Engineering.

The ICP-PECVD can produce high-quality, highly conformal thin films — such as diamond or silica — on nano- to macroscale structures, with controlled thickness and material properties that can enable the coating of conventional substrates, such as semiconductors, metals and ceramics; as well as flexible substrates, such as plastics and polymers. The technologies developed as a result of this new equipment could revolutionize our quality of life in a wide range of applications, including ultra-reliable systems for communication, transportation and information technology; security response based on radiation detection; sustainable energy harvesting; and sensing and bioengineering systems.

“The technologies developed as a result of this new equipment could revolutionize our quality of life in a wide range of applications.”

– M. Saif Islam

Q. Jane Gu, an assistant professor in the Department of Electrical and Computer Engineering, has been named co-PI on a project to be led by Brian Drouin, of the Jet Propulsion Laboratory (JPL). The three-year project, titled “Spectrometer on a Chip,” will be funded by a $941,000 grant from NASA. Erich Schlect and Adrian Tang, both of JPL, also are co-investigators.

The various scientific goals outlined by the National Academy of Sciences’ “Planetary Decadal Survey” — exploratory expectations for the decade 2013-2022 — include the enhanced detection of small molecular tracers and their interactions with millimeter and sub-millimeter radiation. Until now, such research has been limited by the large equipment traditionally required for the generation and detection of this radiation. To address this challenge, Gu’s lab and the JPL scientists have proposed a “spectrometer on a chip” by leveraging recent advancements in complementary metal-oxide semiconductor (CMOS) technologies. The goal is to enable an entirely new class of high-resolution spectroscopy without massive increases in the required spacecraft resources.
ALUM MIKE COFFEY SUPPORTS RESOURCES TO AID ENGINEERING UNDERGRADUATES

WHEN HE ATTENDED UC DAVIS in the early 1980s, MIKE COFFEY could have used something like the College of Engineering’s Leadership in Engineering Advancement Diversity and Retention (LEADR) Student Center.

“I was the only one, in my family of five, who went to college,” he recalls. “I didn’t have any role models, who could explain what the college experience was like. I didn’t have a path to follow; I didn’t know what school to attend, or what degree to get.

“But I do remember having a great discussion with the UC Davis recruiters who came to my high school.”

Inevitably, the teenager was asked about his intended major. Young Mike knew enough not to respond with “undeclared,” but...

Insightful advice from his father led him to consider engineering, and eventual enrollment at UC Davis. He adapted quickly, and not merely to life as an engineering major. “My roommate was an ag-econ major, so I tried an economics class, and I loved it. I wound up fulfilling my entire humanities requirement with econ classes, so I gained an appreciation for business on top of a great engineering education.”

Coffey well remembers those early feelings of indecision, and he wants to help ensure that today’s undergraduates can enjoy access to advantageous resources such as the LEADR Center. He and his wife Jody have presented the LEADR Student Center with its first major gift: a five-year endowment designed to further its mission to improve the retention of a diverse pool of undergraduate engineering majors.

Coffey is quick to cite the most significant takeaway from his UC Davis years: “The ability to solve problems. My engineering education taught me how to logically approach problems, sift through all the available information, find the key relevant data, and then solve the problem. That has been essential to my life ever since, whether in engineering, marketing, finance – even my personal life.”

A 30-year veteran with AT&T, Inc., Coffey recently was named president of Inflight Connectivity, based in Dallas. In this role he’ll oversee the establishment of an innovative air-to-ground network for airline passengers. Coffey also will return to UC Davis several times each year, to represent his company in terms of campus relations, executive support for sales and service, and recruiting. UC Davis is one of roughly 30 campuses honored by AT&T as a critical source of talent to support the company’s long term growth.

Each visit also will give him a chance to catch up with events at the LEADR Center.

“I still remember what it was like for me, upon arrival at UC Davis, and I know there are plenty of students trying to figure things out. The LEADR Student Center helps people succeed in the often challenging engineering major.

“I also support the center’s mission of retaining diverse students in the engineering majors. I feel very strongly that all people should have the opportunity to succeed in their careers. In making this gift, Jody and I hope to assist the LEADR Student Center in assuring that everybody has a chance to realize the type of career opportunities I’ve had.”

“It’s worth every penny of that contribution.”

Helping STUDENTS ACHIEVE SUCCESS

By Derrick Bang
The UC Davis Space Engineering Research and Graduate Program (SpaceED) team, dubbed Eclipse, took fourth place during the International Inspiration Mars Student Design Contest. The event challenged the student teams to present workable design proposals for a two-person Mars flyby mission. Competition results were announced at the 17th annual International Mars Society Convention, which took place Aug. 7-10 in League City, Texas, near NASA’s Johnson Space Center.

Thirty-eight teams, representing 56 universities from the United States and countries as wide-ranging as India, Japan, Russia and Bangladesh, competed to develop a proposal that would send two astronauts to Mars in 2018, as cheaply, safely and simply as possible. The 21-member UC Davis team’s fourth-place win included a cash prize of $2,000. Team Eclipse gathered freshmen through senior engineering students, along with recent CoE graduates and UC Davis graduate students in other fields. They spent a year on this competition, receiving help from professors Brad Henderson, Steve Robinson and Marti Sarigul-Klijn. SpaceED participants also have close ties with industry partner Aerojet, a GenCorp Inc. company that is a major space and defense contractor specializing in missile and space propulsion, defense and armaments.

Aggie Engineers Recognized at Mars Society Competition

Thirty-Eight Teams Competed To Develop A Proposal That Would Send Two Astronauts To Mars In 2018.
Entrepreneurial students at the UC Davis College of Engineering have a dedicated on-campus space to prototype their ideas and collaborate on technology ventures. Located in Room 2060 of the Academic Surge building on the university campus, the Engineering Student Startup Center (ESSC) unleashes the creative potential of engineering students by facilitating ideation, prototyping, collaboration, and ultimately, the formation of student-led technology startups.

This year, I participated in a college competition to see who could make the longest spinning gyroscope. It was a challenge I didn’t expect to take to. But once I got invested in it, I was hooked! It turned into a challenge I had to win. And I did—with a spinning time of 7 minutes and 20 seconds.

Challenging the next generation of great engineering innovators is no easy task. That is why the College of Engineering needs your help.

By giving to the College of Engineering, you can strengthen the college’s ability to provide a top-quality academic experience to all students. And that will help advance engineering achievement more than you can imagine.

Make a difference you can feel good about. Please give online today at giving.ucdavis.edu.

– Kelsey Johnson ’14

P.S. I feel good about the education I am getting at the UC Davis College of Engineering! Please continue to support their important work today by giving back!

Thank you again for your support!
Using LinkedIn’s new education search utility, which sorts through career histories to find trends in employment, Business Insider figured out which schools have the most alumni working at tech leaders **APPLE, FACEBOOK** and **GOOGLE**.

UC Davis ranks 9th among the top 20 schools for Apple employees; ranks 14th among the top 20 schools for Facebook; and ranks 16th among the top 20 schools for Google.

Photo: UC Davis Engineering students visiting Google, Spring 2014