

# CA&ES Outlook

Cooperative Extension weed specialists Brad Hanson (left) and emeritus Clyde Elmore at a UC Davis field day.

DIANE NELSON / UC DAVIS

## Making the CONNECTION

A century of solutions from Cooperative Extension

# CA&ES Outlook

is a publication of the College of Agricultural and Environmental Sciences, University of California, Davis

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This publication is funded partially through gifts from the James G. Boswell Foundation.

PRINTED ON RECYCLED PAPER

## Cover story

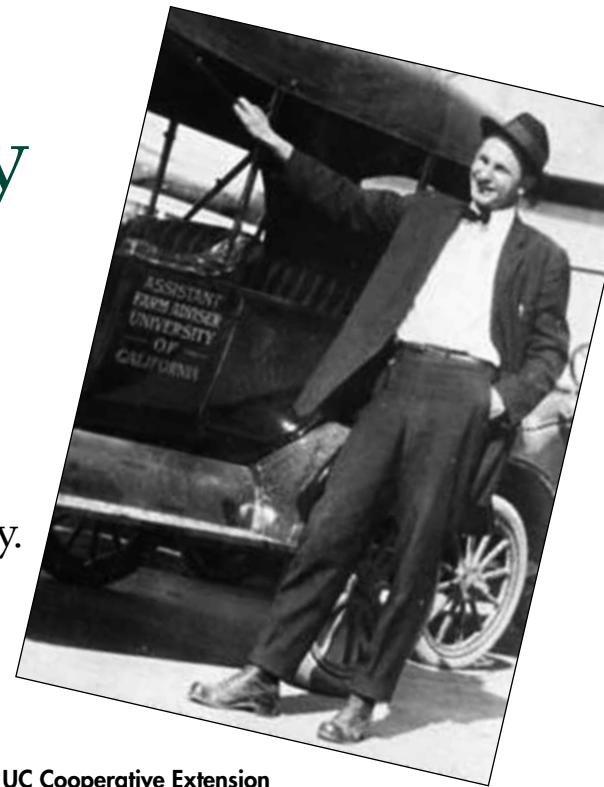
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### MAKING A DIFFERENCE

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**Biological and agricultural engineering professor Shrinivasa Upadhyaya, with development engineer Jed Roach, right, believes information technology will make California agriculture more efficient.**

# UC COOPERATIVE EXTENSION

Working together to build a better future for California

COOPERATIVE EXTENSION IS A NATIONWIDE network of land-grant university researchers and educators who solve problems in agriculture, the environment, and human and community well-being. Established 100 years ago, it enables a campus-to-community connection to better link land-grant universities to the public they serve.

Cooperative Extension (CE) has a rich history within the University of California. The system's strength is in delivering evidence- and science-based information to growers, landowners, environmental groups, consumers, and communities that assists in the development of practical solutions to real-world concerns. People across the state engage with Cooperative Extension personnel and bring pressing issues to the attention of the University of California.

In California, most CE specialists are based at UC Davis, UC Berkeley, and UC Riverside, while CE advisors are primarily based in county offices throughout the state. Cooperative Extension is headquartered in the statewide UC Agriculture and Natural Resources (ANR) division, overseen by UC vice president Barbara Allen-Diaz. CE specialists in our UC Davis college are members of both ANR and our college faculty.

People across the state engage with Cooperative Extension educators and bring pressing issues to the attention of the University of California.

As this year began, there were 169 county-based advisors across California and 112 campus-based specialists. Sixty-four of the specialists (some with partial CE appointments) are faculty members in academic departments within the College of Agricultural and Environmental Sciences at UC Davis. Statewide, these numbers are down from where they were a few decades ago, but ANR and its campus partners are committed to reinvesting in Cooperative Extension as funds become available, with new recruitments underway.

In this issue of our college magazine, we recognize and highlight Cooperative Extension in action. We feature current work to help manage water, fight weeds, protect plants from disease, and develop healthy young people. These stories are just a sampling of the diverse programs

JOHN STUMBOS/UC DAVIS



Incoming dean Helene Dillard (left) has been greeted warmly by her new UC Davis colleagues. Associate dean Mary Delany (right), who served as interim dean for 17 months, helped ensure leadership continuity and worked with Dean Dillard to guide the content of this issue of *Outlook*.

in which Cooperative Extension specialists are engaged.

Cooperative Extension is near and dear to my heart. I came to UC Davis in January 2014 from Cornell University, where I worked as a plant pathologist studying vegetable diseases, as an associate dean, and as head of Cooperative Extension.

I am excited to return to California, where I was born and raised. I am a proud alumna of UC Davis, so it is an extraordinary honor to serve as dean of the UC Davis College of Agricultural and Environmental Sciences. I look forward to working with you to build a bright future for the people of our state, our nation, and our world.

**HELENE R. DILLARD, DEAN**

COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

A photograph of a young orchard with rows of bare trees in a field. The trees are arranged in neat rows, and the ground is covered with fallen leaves. The sky is clear and blue.

**For 100 years, Californians have turned to the University of California Cooperative Extension for scientifically sound information to improve their lives. The application of research-based information to agricultural practices, environmental resource management, and human health and well-being has helped the state and its citizens cope with challenges and find new opportunities.**

# **A CENTURY OF COOPERA**



Cooperative Extension weed specialist Brad Hanson (left) consults with John Roncoroni, Cooperative Extension weed science advisor for Napa County, in a research orchard at UC Davis.

JOHN STUMBOS/UC DAVIS

# TION

Story by  
JOHN STUMBOS, ROBIN DERIEUX, and DIANE NELSON

**I**n May 1914, the Smith-Lever Act was signed into law to establish a nationwide system to diffuse “useful and practical information on subjects relating to agriculture and home economics.” This legislation mandated that the new service be located at the country’s land-grant colleges such as the University of California to extend scientific knowledge. Initially known as Agricultural Extension, it became the University of California Cooperative Extension in 1974.

Cooperative Extension (CE) today is overseen by UC systemwide Agriculture and Natural Resources (ANR), and its research and outreach address contemporary needs, including food and agriculture, environmental stewardship, healthy families, and thriving communities.

At the heart of Cooperative Extension is a time-tested partnership between its county-based advisors, the people of California, and the CE specialists and fellow scientists based predominantly on UC campuses in Davis, Berkeley, and Riverside. A crucial link in this continuum is the corps of Cooperative Extension specialists who conduct educational activities on and off campus and mission-oriented research in their areas of expertise. Specialists work closely with county advisors on a broad range of activities—helping diagnose agricultural production problems, participating in “field days” to share information about research and new technologies, and coordinating with stakeholder groups on diverse issues such as pest management, nutrition education, youth development, water and air quality, or range management.

In the pages that follow we highlight four UC Davis-based Cooperative Extension specialists working in different disciplines. Samuel Sandoval works with agencies and individuals to develop strategies for water management. Kali Trzesniewski conducts research to help the statewide 4-H program stay on the cutting edge of positive youth development. Brad Hanson helps farmers, ranchers, and others learn effective strategies for dealing with weed management. And Deborah Golino heads a program that provides clean planting stock for agricultural producers.

Cooperative Extension is an integral part of the University of California and has played a vital role in helping the state adapt and thrive for the last century. Read on to see how this innovative program stays on top of important issues to make a real difference in the lives of Californians.

A farmer and extension advisor work together on the running board of a historic Agricultural Extension vehicle.



ROBIN DEREUX/UC DAVIS



## Science-based solutions that hold water

California depends on water.

And Californians can depend on water management expert Samuel Sandoval Solis to help conserve this vital natural resource. Sandoval, a Cooperative Extension specialist and UC Davis professor in the Department of Land, Air and Water Resources, provides technical advice on water conservation to farmers and to water management agencies, big and small.

“I help design strategies for water resource challenges, trying to balance the needs of agriculture, industry, the environment, and cities,” said Sandoval, who joined the UC Davis faculty in 2011. “Back in the 1950s or ‘60s, if you had a water supply problem, you just built a reservoir or dug a well. That was the silver

UNIVERSITY OF CALIFORNIA HISTORIC PHOTO



Sam Sandoval provides technical support to water engineers at the State Water Resources Control Board. From left, Scott Ligare, Sandoval, Will Anderson, and Eleanor Bartolomeo.

bullet. Now there are no silver bullets. We have to create integrated strategies to stretch a water system that was originally built to meet a completely different set of objectives.”

As part of his Cooperative Extension duties, Sandoval teaches a seminar called “Climate Change and Hydrology 101” that helps farmers and ranchers in various regions of the state understand how changing water resources in their area will affect local crops. A native of Mexico, Sandoval is able to deliver talks in English or Spanish, depending on the audience.

Sandoval also provides technical advice to water management agencies. He recently helped a small agricultural region in Monterey County—the Pajaro Valley—determine how to conserve water in an area where groundwater overdrafts are causing sea-

water to intrude into freshwater aquifers. Sandoval relishes the complexity of solving water problems. “It’s like putting a puzzle together,” he said. “There are the people using the water, the water agencies, regulations, the politics, the water supply—everything is related. What you do in one area has an impact elsewhere.”

One challenge in making water management recommendations to stakeholders is gaining access to reliable data sets on land and water use. Sandoval and others have begun developing a documented database accessible to anyone doing water planning analysis. Funded by the UC Davis Center for Watershed Sciences, the database will contain information from the California Department of Water Resources, the Federal Bureau of Reclamation, and other sources. This project, which Sandoval considers to be at least a

decade ahead of current practices, should be completed within two years.

“When you think about how California has developed, it’s always been through science, through innovation,” said Sandoval. “Having the correct technical advice at hand really helps the state move forward.” — R.D.

## A 4-H program on the cutting edge

Kali Trzesniewski wants to see young people thrive and reach their full potential.

The Cooperative Extension specialist in the Department of Human Ecology is trained in developmental psychology and serves as the associate director of research for the ANR statewide 4-H Youth Development Program. One of her projects is examining a new curriculum delivered to youth in 4-H clubs and after-school programs. It’s called “4-H Thrive!”

“My task is to help evaluate this program to make sure 4-H stays on the cutting edge of positive youth development,” she says. “We’re testing whether the 4-H Thrive! curriculum is better than what we have been using.”

The 4-H program has been helping youth become caring, contributing members of their communities for more than 100 years. When young people join 4-H, they choose from a list of projects that will teach them life skills and expose them to new knowledge. Livestock projects are a good example—and a familiar one to anybody who has been to



Kali Trzesniewski (standing, right), CE specialist and associate director of research for the 4-H Youth Development Program, tests out a new curriculum with the help of staff, volunteers, and youth at an afterschool program in Lathrop (San Joaquin County).

the fairgrounds to see youth compete and show their animals.

One version of the 4-H Thrive! program is currently being delivered to youth between the ages of 13 and 18 who are engaged in leadership projects. What's different about this curriculum is its emphasis on positive youth development concepts. It helps youth identify a "spark," something they are passionate about; learn how to develop a "growth" mindset that focuses on learning rather than outcomes; and cultivates goal-management skills.

"Our hypothesis is that you can take the standard curriculum for a leadership project and you'll get good results," Trzesniewski says. "But you'll get even better results if you combine the core leadership messages with positive youth development concepts."

The 4-H Thrive! project involves Trzesniewski's research, 4-H state office staff who create the curriculum materials, county Cooperative Extension advisors and program representatives who manage activities locally, and trained 4-H volunteer leaders and afterschool staff who are the

curriculum teachers. The project is supported by a gift from the Thrive Foundation, while Trzesniewski's evaluation of the program is funded by a grant from UC Agriculture and Natural Resources.

One of the principal ideas the curriculum teaches is that the brain is like a muscle. The more you work it, the stronger it gets. The important thing is to challenge the mind, not whether you succeed or fail. "Failure is really scary if you think you can't change," Trzesniewski said. "But if you feel that you can change, you can get smarter and gain new abilities, then a challenge can be fun." —J.S.

## Working to battle agricultural bullies

Don't let their names fool you. Weeds like "hairy fleabane," "junglerice," and "three-spike goose grass" might not sound like tough guys. But left unchecked, they cripple crop production in California, consuming the water, light, and nutrients other plants need to grow.

"Weeds are bullies," said Brad

Hanson, UC Cooperative Extension (CE) weed specialist with ANR and the UC Davis Department of Plant Sciences. "You don't have agriculture if you can't find safe, effective ways to fight weeds."

Hanson is a pivotal player on a UC weed-fighting team that helps keep California agriculture strong. As a Cooperative Extension specialist, he conducts cutting-edge research and disseminates information pest control advisers, UC farm advisors, and growers need to fight agricultural bullies.

"Brad is our point man, our last line of defense," said David Doll, CE pomology farm advisor in Merced County. "What treatment should growers use on certain weeds in specific situations? Brad Hanson helps answer those questions and more."

Hanson specializes in weeds that affect woody perennials—virtually any crop that grows in an orchard or vineyard. He and his team test herbicides and other treatments in controlled settings, providing unbiased information on their strengths and weaknesses.

"That's invaluable," said John Roncoroni, CE weed science advisor in Napa County.

Even when growers find products that work, Hanson helps design alternative treatments to keep weeds from developing resistance. He also helps producers deal with herbicide drift, which can happen when sprays drift and damage nearby crops.

"We make field calls, sometimes with a pathologist and entomologist, trying to determine the source of crop injury," Hanson said. "Symptoms can be confusing. Are they caused by disease? Insects? Herbicide drift? Frost? Drought?"

Some members of the weed-fighting team spend most of their



time in the lab, conducting basic science needed to solve applied problems in the field. Specialists like Hanson help disseminate the findings and let them know what issues to address.

“We’re translators,” Hanson said. “We’re the folks in the system who can translate what the molecular geneticists and physiologists discover to the folks who drive the tractors, and vice versa. We span the boundary, from field to lab.”

And specialists couldn’t bridge that gap without Cooperative Extension farm advisors, Hanson said. “They’re our eyes and ears in the field,” he said. “They tell me what’s going on out there, which helps us design our research.”

Roncoroni said bullies like hairy fleabane face a worthy foe in Hanson.

“He’s knowledgeable and fantastic to work with,” Roncoroni said. “Growers love him. Brad collaborates well, which is what Cooperative Extension is all about—working together to meet society’s needs.” — D.N.

## One specialist, one crucial industry aid

About a year ago, UC Davis’ Foundation Plant Services (FPS) announced to the winegrape industry that a virus called “red blotch” had been discovered in the Napa Valley. UC Davis scientists immediately went to work on it, cloning the virus with the latest technology and developing diagnostics to distinguish the pathogen from other plant viruses.

“It’s been a frantic year of people looking everywhere for the virus and worrying about vineyards that have been infected and whether their grapes were going to be okay,” said Deborah Golino, a Cooperative Extension plant pathologist and FPS director. “Anything that affects the sugar, aromatics, and pigmentation of the winegrapes is going to worry winemakers.”

Foundation Plant Services, which is the source of all California’s certified grape nursery stock, has taken steps to ensure its vines remain free of red blotch. “New technology will allow us to do an even better job of

providing healthy material to our nurseries and growers,” she said.

When Golino was hired to run Foundation Plant Services in 1994, the program had a staff of eight. The self-supporting center in the College of Agricultural and Environmental Sciences now has 35 employees and grosses about \$3.5 million annually, mostly from the sale of plant materials, user fees, and industry contributions.

While grapes are the largest commodity handled by Foundation Plant Services, the program also distributes other disease- and identity-tested planting stock. FPS has the largest public clean-stock rose collection in the world. California’s sweet potato growers rely on FPS to produce thousands of disease-free rooted cuttings each year. The university’s strawberry breeding program depends on FPS to virus test stock before distribution to UC licensees. And the foundation orchard includes clean varieties of almond, apricot, cherry, nectarine, peach, and plum.

Foundation Plant Services houses the only dedicated grape importation facility in the U.S. Grape varieties from foreign sources must pass through quarantine, which involves a lengthy process of inspection, propagation, lab testing, tissue culture, varietal identification, and regulatory approval—typically more than five years before registered material becomes available.

Research demonstrates the value of disease-free grapevines. UC Davis economists determined that if all winegrape growers in the North Coast region used certified planting stock it would translate to a benefit of more than \$60 million annually.

“By investing in us, the nurseries are helping growers who may not even be aware of virus issues because they’ve been protected from virus issues by the program for so long,” Golino says. —J.S.

JOHN STUMBOS/UC DAVIS



Every commercial California sweet potato is derived from planting stock grown in this Foundation Plant Services greenhouse. CE specialist Deborah Golino (right), who leads the program, talks with production manager Michael Cunningham.

# Reinvesting in an essential program

UC COOPERATIVE EXTENSION is experiencing a renewal, with a wave of new campus specialists and county advisors being hired by UC Agriculture and Natural Resources. Nine of the new Cooperative Extension specialists hired since 2009 are based in this college, with additional recruitments underway. **Story by ROBIN DERIEUX**



## Martin Smith ►

Smith, an associate Cooperative Extension specialist with a split appointment in the Department of Human Ecology and the UC Davis School of Veterinary Medicine, specializes in youth scientific literacy and science education outreach.



Research interests: Advancing youth scientific literacy, effective curriculum implementation and dissemination strategies, effective professional development methods for science educators, assessing needs for the California 4-H Science, Engineering and Technology (SET) Initiative.

## ▲ Daniele Zaccaria

Zaccaria, an assistant Cooperative Extension specialist in the Department of Land, Air and Water Resources, specializes in agricultural water management and irrigation.

Research interests: Devising modern agricultural water management solutions to improve resource efficiency in irrigated agriculture, enabling growers to enhance economic profits from farming activities without generating adverse environmental effects.

**NOTE:** Additional CE specialists profiled in the feature story are Samuel Sandoval, Kali Trzesniewski, Brad Hanson, and Deborah Golino.



## ◀ Roger Baldwin

Baldwin, an assistant Cooperative Extension specialist in the Department of Wildlife, Fish and Conservation Biology, specializes in pest management.

Research interests: Identifying techniques to mitigate human-wildlife conflict and to educate the public on mitigation/remediation approaches, emphasizing development of integrated pest management programs because of their increased efficacy and lowered environmental risk.



### ◀ Anita Oberholster

Oberholster, an assistant Cooperative Extension specialist in the Department of Viticulture and Enology, specializes in wine chemistry.

Research interests: Phenolic content and mouthfeel in wine, examining new technologies in vineyard practices and winemaking and how they influence wine composition and quality, exploring alternatives to enhance sustainability of viticulture and enology.

### ▼ Bruce Linquist

Linquist, an assistant Cooperative Extension specialist in the Department of Plant Sciences, specializes in rice systems.

Research interests: Developing efficient nutrient management practices that maintain or increase yields with limited nutrient loss to the environment, devising crop development models, reducing water use, ensuring quality of water leaving rice fields, evaluating heavy metals, and quantifying greenhouse gas emissions from rice fields.



### ◀ Kassim Al-Khatib

Kassim Al-Khatib, a professor and Cooperative Extension specialist in the Department of Plant Sciences, specializes in weed science. He serves as the director of the statewide UC Integrated Pest Management program (IPM).

Research interests: Reducing weed risks by increasing the adoption of integrated pest management strategies, including biologically based weed management systems, weed monitoring, threshold-based decision-making, biological and cultural controls, and use of reduced-risk herbicides.

“CA&ES has been a terrific partner with the Division of Agriculture and Natural Resources, housing Cooperative Extension specialists, strengthening the Agricultural Experiment Station–Cooperative Extension network, and working together with the division to solve some of the most vexing issues in agriculture and natural resources. It is this kind of partnership that brings the power of the UC system to help ensure a healthy California.”

UC vice president Barbara Allen-Diaz, who oversees ANR



**For additional information, visit the CA&ES webpage at [www.caes.ucdavis.edu](http://www.caes.ucdavis.edu) and click on “New Faculty Profiles.”**

# FILLING A VITAL NEED

Course provides hands-on learning in tree fruit and nut production

AS FRUIT AND NUT PRODUCTION GROWS throughout California, growers clamor for a vital element to that growth: education in fruit- and nut-tree biology.

“It’s a big issue,” said John Warmerdam, a fruit tree grower and packer from Hanford. “Cooperative Extension farm advisors are stretched so thin. It’s not easy to get good pomology information.”

“The instructors are amazing—some of the top minds in the industry.”

To address that issue, UC Davis faculty, including UC Cooperative Extension specialists, designed a two-week, hands-on course in pomology, the science of tree fruit and nut production. The Pomology Short Course debuted in spring 2013, and a waiting list quickly formed for 2014. So now it’s offered twice a year, and there’s still a waiting list.

“That doesn’t surprise me,” said Jon Parnagian, a fruit and nut grower from Fresno. “I attended the first course and it’s fantastic. They keep the class size small—only 50 people—so you have plenty of one-on-one time with instructors. It helped me understand the science behind why we do what we do.”

Courses are led by a team of experts, including

## UPCOMING COURSES

The next Pomology Short Course will begin Nov. 10 at UC Davis. The 2015 courses will be held in February and November. For details, contact the UC Davis Fruit and Nut Research and Information Center at <http://fruitsandnuts.ucdavis.edu>.

Ted DeJong, Cooperative Extension specialist and longtime plant physiology professor in the UC Davis Department of Plant Sciences.

“Most courses like this focus on tree-crop management practices, telling you what to do and when to do it,” DeJong said. “I like to start by developing an integrated understanding of how trees grow and function, and then growers understand why they do what they do when they do it. When they understand what causes plant stress, for example, they make decisions accordingly. They’re better able to diagnose problems.”

Farmers, orchard managers, and students could all benefit from the course, said Warmerdam, who attended the 2013 session.

“The instructors are amazing—some of the top minds in the industry,” he said.

In addition to DeJong, instructors include Carlos Crisosto, Cooperative Extension specialist and director of the Fruit and Nut Research and Information Center; Ken Shackel and Patrick Brown, professors with the Department of Plant Sciences; and Brooke Jacobs, associate specialist with the Fruit and Nut Research and Information Center.

The first week includes lectures, hands-on exercises, and field demonstrations. Week two features a four-day field tour of orchards and processing facilities throughout Northern and Central California. The cost is \$2,850 for two weeks or \$1,850 for the first week only. Scholarships are available for new growers and for growers transitioning from one crop to another.

—Diane Nelson



JACK KELLY CLARK/UC DAVIS

Ted DeJong, Cooperative Extension specialist and plant physiology professor, is one of a team of experts who teach the Pomology Short Course. He emphasizes an integrated understanding of how trees grow and function for better decision-making.



AUBREY WHITE/UC DAVIS

Professor Shrinivasa Upadhyaya (right) and visiting scholar Han Changie demonstrate a digital irrigation sensor developed by Upadhyaya at UC Davis.

## FARMING FRONTIER

### Field day harnesses new information tech for growers

A SIMPLE TEXT MESSAGE CAN IMPROVE irrigation efficiency. Shrinivasa Upadhyaya, a UC Davis professor of biological and agricultural engineering, demonstrated the technology in a tomato field, gathered with 125 growers of varied vegetable and fruit crops, UC Cooperative Extension farm advisors, and UC Davis researchers. Upadhyaya's development engineer, Jed Roach, places a pen-sized metal probe affixed to a PVC pipe into a bucket of water. Moments later, an audience member's mobile phone chimes with a brief text message: "Water arrived at Sensor 1."

For a farmer using a monitoring probe, the text message is a notification to turn off irrigation, saving considerably on water and the time it takes to physically monitor the field. Known water savings are still preliminary, but farmers testing the sensors have saved upward of \$12 per acre. With system costs currently at \$2,400, a 200-acre farm could recover equipment costs in a single year.

Upadhyaya's presentation was part of the annual field day held at the Russell Ranch Sustainable Agriculture Facility at UC Davis. The research facility is a testing ground for the long-term sustainability of different farming practices. Every year Russell Ranch

hosts day-long farm tours and workshops for faculty, including Cooperative Extension specialists, to share up-to-date research with the Sacramento Valley's agricultural community.

"We always strive for field day to meet the needs of the region's agriculture," says Russell Ranch director Kate Scow, a professor in the Department of Land, Air and Water Resources. "We saw the 2013 field day as a platform to show the potential benefits of these new technologies, but also to critically examine how these technologies can be developed to bring the most benefit to farmers."

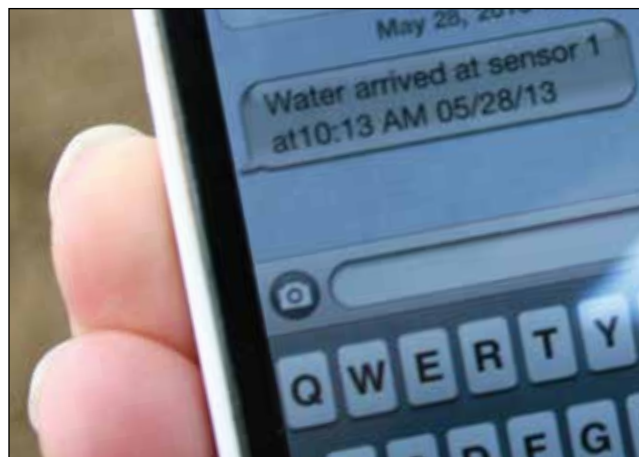
The 2013 theme, "Harnessing technology for agriculture," focused on how smartphone apps, real-time information gathering, and other technology resources can improve how farmers monitor and manage their fields.

"Information technology is resulting in a lot of information for agriculture, and can be very confusing," says Upadhyaya. "We are bombarded by it in the modern age, but we need to use the information generated by the technology to make useful decisions."

The irrigation monitoring application is among many UC Davis efforts to incorporate information technology into farm-level decision-making. Other examples include SoilWeb, an interactive map of soil characteristics helpful for land-use decisions, and drones, which fly above farm fields to measure vegetation and moisture levels.

"The tools farmers use are rapidly evolving," says Scow. "Field day is an opportunity to discuss that evolution and understand its effect on the sustainability of our farming systems."

— Aubrey White, Agricultural Sustainability Institute



AUBREY WHITE/UC DAVIS

Growers can receive wireless alerts when it's time to turn off an irrigation pump—regardless of where they are on the farm. Digital technologies can save farmers time and money, and decrease runoff from farms.

## Brewing up a great summer internship

When food science student Katy Benson landed an internship at the Anheuser-Busch Brewery in Fairfield, Calif., it had all the right ingredients. The summer job included good mentoring, good pay, an opportunity to manage people, and hands-on experience with brewing processes that Benson had previously only read about in textbooks.

“It was an amazing experience,” said Benson, who is working toward a master’s degree in beer and brewing at UC Davis. “I’ve studied the brewing process, so I know it by heart, but it was incredible to see it actually happening.”

Benson, who majored in biochemistry as an undergraduate, became interested in beer and brewing while visiting craft breweries in her home state of Colorado. Shortly after arriving at UC Davis for graduate studies, she began pursuing a summer internship. Benson met with UC Davis alumnus Scott Ungermann (M.S., '97, food science), who is currently brewmaster at the Anheuser-Busch Brewery in Fairfield. After several interviews, she got the job.

Ungermann supervised Benson at the brewery. Two additional UC Davis students had summer internships in other departments of the Fairfield facility. “The ideal project is one that gets the intern out on the floor with the brewers,” said Ungermann. “They begin to understand what it’s like to manage in a production facility where you’re managing the process, but you’re also managing people.”



# Summertime

Students swap vacation for valuable experience

JOHN STUMBOS/UC DAVIS



Alyssa Obester downloads temperature data from Butte Creek to take back to a laboratory at UC Davis.

## Up a creek with Chinook salmon

Alyssa Obester, a senior majoring in environmental science and management, spent her 2013 summer gathering vital information to help a threatened strain of Chinook salmon.

She worked as a field assistant to Cooperative Extension specialist Lisa Thompson, who has been studying the habitat of spring-run Chinook salmon in Butte Creek. Water diversions and other environmental factors have reduced the Central Valley spring-run Chinook population, which numbered 1 million historically, to about 10,000. The Sierra Nevada creek near Chico, Calif., is home to the largest remaining stock of the fish, receiving about 6,000 spawners each year.

Getting to the field site meant negotiating tough terrain in a wet suit on hot summer days, then walking and swimming a mile up Butte Creek to deep pools where data loggers record information about water temperature and the aquatic environment. The study



Katy Benson (left), food science graduate student, and brewmaster Scott Ungermann, a UC Davis alumnus, at the Anheuser-Busch Brewery in Fairfield.

JOHN STUMBOS/UC DAVIS

# dues

Profiles by  
Robin DeRieux,  
Diane Nelson,  
John Stumbos

results could help improve survival for spring-run Chinook salmon in the warming waters of a changing climate.

“It was a valuable experience because I had the opportunity to apply skills from various classes in a real-life experience,” Obester said. “It definitely gave me insight into how much work goes into one study, and an appreciation of the effort that goes into every paper that I read.”

“Students need to consider a job or internship to try out their perceived career of choice—or to try something that they had not considered before. They may discover other ways to use their degrees.

Lili Bynes, co-director of CA&ES Undergraduate Academic Programs

## In almond board internship, students shadow farm advisors

Thanks to internships offered by UC Cooperative Extension and the Almond Board of California, students can work alongside CE farm advisors and with farmers, helping troubleshoot problems and conducting cutting-edge agricultural science.

“It’s a fantastic opportunity,” said Becky Wheeler (M.S. ’12, entomology), who participated in the program in 2009 while an undergraduate at UC Davis. She is now a research associate for DuPont Pioneer in Hayward, working in its insect bioassay lab. “I got paid to meet with growers and find solutions to real-world problems.”

Wheeler shadowed Butte County farm advisor Joe Connell (M.S. ’77, horticulture), who participated in a similar program in 1977, fresh out of graduate school.

“It was the best thing that ever happened to me,” he said. “I gained a wealth of knowledge and experience in that one-year internship.”

The internships are open to undergraduate, graduate, and recent alumni in agricultural and biological sciences. Interns help with research, education, and outreach in areas like tree crop production, sustainable agriculture, integrated pest management, and soil and water sciences. Duration, location, and other details change from year to year.

Along with UC Cooperative Extension and the Almond Board, the California Dried Plum Board is co-sponsoring a nine-month internship currently underway in the Sacramento Valley. For more details, see <http://ucanr.edu/sites/almondinternship/>.



Becky Wheeler (left) gained valuable experience while shadowing Butte County Cooperative Extension farm advisor Joe Connell.



JOHN STUMBOS/UC DAVIS

Among his accomplishments as dean, Charley Hess (right) gave enterprising students permission to establish the Student Farm on the western edge of campus in 1977. The farm has flourished as a place for students to get hands-on training and learn about sustainable agriculture. Pictured with Charley is Breanne Wroughton, harvest coordinator for the Market Garden.

## CHAMPIONS FOR AGRICULTURE

### Hess donation supports students in production agriculture

**CHARLES AND EVA HESS WANT TO HELP** young people pursue a career in farming. The CA&ES dean emeritus, and his wife, Eva Hess, a physician and UC Davis alumna (Ph.D., '85; M.D., '89), recently endowed a student scholarship in production agriculture for undergraduates. They hope to support promising UC Davis students who are interested in keeping California agriculture viable.

"The population of people in agriculture is aging," said Charley, whose first exposure to farming was as a youngster pulling weeds out of seedlings for his father, a nurseryman who immigrated to New Jersey from Holland. "We need to do everything we can to get young people interested in a career in food production."

Charley points out that the way we grow food in California diminishes concerns about food safety and food security for the whole nation. "Agriculture isn't an easy industry to work in," said Charley. "There are the regulations to deal with, and the weather. It's a risky business. But we need to attract good minds to go into agriculture for California, the nation, and for UC Davis."

Eva concurs, adding that part of their interest in supporting production agriculture is to bolster student interest in big-picture science. "Most of the emphasis in science these days is at the molecular level," said Eva. "I feel it's also important to support study of the whole organism."

For Charley, endowing a student scholarship is just



one example of a lifetime of dedication to agriculture. A horticulture professor, Hess led the college as dean from 1975 to 1989. He stepped down to become USDA assistant secretary of science and education, a presidential appointment. In 1990, Hess helped garner White House and Congressional support to increase USDA research funding through the National Research Initiative (NRI). The NRI is a competitive grants program that has benefitted agriculture by awarding hundreds of millions of research dollars since then, much of it to California.

After his work with the USDA, Charley Hess returned to UC Davis to lead International Programs. Although he officially retired in 1994, Hess has been recalled to service three times to lead offices in transition, and he remains busy with a host of advisory roles on campus.

Educating the next generation in agriculture remains an important mission for Charley and Eva. "UC Davis provides the industry with quality students," said Charley. "I want to see our graduates continue to become national and international leaders in agriculture."

— Robin DeRieux

## DAIRY INDUSTRY ALUMNUS

### Fond memories of the 'University Farm' lead to scholarship

ROBERT B. WILSON HAS MANY FOND memories of a time long ago when he attended UC Davis as a dairy industry student. So he has made provisions in his estate plans for a new undergraduate scholarship in animal science.

"I arrived at the 'University Farm' in the fall of 1939 with great expectations," he said. "The school always equaled my expectations and sometimes exceeded them."

Dormitory life for a freshman in North Hall entailed a little hazing. "We could not wear Levis and had to wear a 'dink'—a small blue cap with a yellow bill. My friend Jack De Lancey and I routinely disregarded these rules and routinely received swats at the Monday-night hall meeting."

Sixty-five years ago there was no tuition, but a student body card cost \$18 and included access to athletic events. "Pop" Norris was in charge of the dining hall and had a friendly greeting at every meal.

Wilson raised kid goats in a barn north of campus, but had to rescue them in the winter of 1940 when Putah Creek overflowed. "I took them to the basement of North Hall, where it was warm," he said. "No one complained."

After his freshman year, he got a job at a Los Angeles butter plant with help from one of his professors, Chester Roadhouse. Wilson returned in fall 1940 but, as one of only a few black students, became homesick and transferred to UCLA. World War II was brewing, though, and Wilson got drafted into the segregated Air Force, where he served as an airplane mechanic.

In fall 1946, Wilson resumed his education at UC Davis on the GI Bill. "I took classes like milk production" he said. "I learned how to test a cow



MONNE WILSON

Alumnus Robert Wilson, once a trustee for the Los Angeles County Museum of Art, galvanized support for the purchase of a new museum sculpture, "Extended Forms" by Richard Hunt.

for pregnancy, how to select a cow for her ability to produce milk, and also how to milk her. These skills I have retained."

He studied dairy chemistry and learned how to flash pasteurize milk and make cheese and butter. Wilson was among six dairy industry students who graduated in spring 1948. He briefly chose to enter the poultry business with his brothers before going to night school to study finance.

Wilson worked in the financial industry until 2000, when he retired from Morgan Stanley. He was a trustee for the Los Angeles County Museum of Art for 12 years. "I greatly enjoyed my service there," he said. "However, the most happy and rewarding period of my life was at UC Davis."

— John Stumbos

# DIGGING DEEP

Soil science expertise helps natural areas recover from wildfire

WHILE THE LARGEST WILDFIRE IN THE recorded history of the Sierra Nevada raged on, Brad Rust (B.S. '84, range management; M.S. '89, soil science) was already on location sizing up the damage.

Rust, a soil scientist, and a team of specialists—hydrologists, foresters, engineers, archaeologists, wildlife biologists, and others—are part of a “Burned Area Emergency Response Team” with the U.S. Forest Service. Their assignment was to examine the damage caused by last summer’s Rim Fire in the mountains west of Yosemite National Park.

“We go to a fire as it’s being contained and assess the situation,” Rust says. “How much damage has the fire caused to infrastructure, to roads, to houses, to facilities? How much damage has it done to the ecosystem, to the watershed, to wildlife, to rare endemic plants, to archaeological sites?”

The incident commanders at the Rim Fire allowed Rust’s team into the charred forest in early September 2013 while the mammoth fire, which eventually burned more than 257,000 acres, was 60 percent contained. The vegetation in many areas was severely burned. However, the damage to soils was no more severe than what Rust has observed on any other fire. With satellite imagery and on-the-ground inspection, he estimated severely damaged soils at about 7 percent of the area burned in the Rim Fire.

“Folks come out here and see all the trees gone and say it’s all destroyed. ... What they don’t see is that the soil down below is waiting to respond with new vegetation.”

“Folks come out here and see all the trees gone and say it’s all destroyed,” Rust said during a follow-up visit in December. “But you don’t know until you get out there and dig it out with a shovel and take some measurements. What they don’t see is that the soil down below is waiting to respond with new vegetation.”

The team prescribed treatments for about 4,000 acres to reduce the threat of soil erosion from winter



JOHN STUMBOS/JC DAVIS

Alumnus Brad Rust at the site of the Rim Fire near Yosemite.

storms. Protective mulches created from chopped vegetation and rice straw covered many damaged mountainsides. Numerous roads were graded. New culverts and debris catchers were installed. Altogether, emergency stabilization costs totaled \$8.5 million.

Rust travels throughout the western United States each year to help natural areas recover from wildfires, averaging about five fires a season. Back at his home base in the Shasta-Trinity National Forest, he also works to ensure soil health on salvage operations, fuel thinning, grazing allotments, and watershed restoration projects. “Any land-disturbing activity on the forest, I get involved with,” he says.

Rust is optimistic about the prospects for the land burned in the Rim Fire to recover. “A lot of those areas will rise out of the ash and new life will come right up. We can see that in the soil.”

– John Stumbos

# RELENTLESS

## Napa winemaker knows vineyards from the roots up

ELIAS FERNANDEZ' (B.S. '84, FERMENTATION science) first job was picking prunes and walnuts in Napa Valley with his migrant farm-working parents. His first job ambition was to stop picking prunes and walnuts.

He succeeded—he's a premier winemaker in Napa—thanks to a trumpet, his agricultural roots, and his UC Davis education.

"It all came together when I studied winemaking at UC Davis," Fernandez says from Shafer Vineyards in Napa where he's been making wine for 29 years.

Fernandez knows vineyards from the roots up. As a baby, he played in orchards while his parents picked produce, working alongside them as he got older. In junior high, Fernandez tended vineyards with his father, driving tractors and pruning vines in cold, predawn light.

Fernandez' mother advocated for a good education, which started by urging him to play trumpet in his elementary school band. Fernandez developed into such an accomplished musician that he landed a Fulbright scholarship to study jazz at the University of Nevada, Reno.

"The faculty, the science, the history—everything just clicked. It even engaged my musical side, because in winemaking, as in jazz, you often go with your gut instinct."

Fernandez liked music, but something was missing.

"I went home and realized how beautiful Napa Valley was and wondered if I could make a living in agriculture. I thought, 'What about winemaking?'"

It was 1980, before the Napa wine industry really took off. People didn't see a big future in winemaking, but he enrolled in viticulture and enology at UC Davis, nonetheless.

"I fell in love with the program," he said. "The faculty, the science, the history—everything just clicked. It even engaged my musical side, because in winemaking, as in jazz, you often go with your gut instinct."

COURTESY OF SHAFER VINEYARDS



In 1983, Elias Fernandez was the first recipient of a scholarship set up by Louise, Ray, and Jeanne Rossi for Napa Valley students studying viticulture and enology at UC Davis. "I had to support myself through school, so receiving a scholarship from the Rossi family was a great honor."

Three weeks before he graduated in 1984, Fernandez was hired by John and Doug Shafer at their new venture, Shafer Vineyards.

"We were still learning how a winery works—how to crush, how to get juice into the tank," Fernandez said. "Thank God we were young because we worked ourselves to death."

It paid off. In 2002, Fernandez was named Winemaker of the Year by both *Quarterly Review of Wines* and *Food & Wine* magazine. That same year he accepted a prestigious "Hall of Fame" award from the Hispanic Scholarship Fund in Washington D.C. at the White House.

The Shafers named a label after Fernandez called "Relentless," a nod to his relentless pursuit of perfection. It's a blend of Syrah and Petite Sirah and, in 2012, *Wine Spectator* named it Wine of the Year.

"I have a lot to be grateful for, and right up there is my UC Davis education. It allowed me to be who I am."

—Diane Nelson

# BRIGHT LIGHTS

CA&ES welcomes this year's stellar newcomers

JOINING THE CA&ES FACULTY IN 2013 WERE 11 assistant professors and three assistant Cooperative Extension specialists. More searches are underway.

– Robin DeRieux

## Gwen Arnold



Department of Environmental Science and Policy, specializes in environmental policy. Arnold completed a Ph.D. in public policy at Indiana University. She joined UC Davis from the Department of Political Science at the University of Cincinnati.

Overview: Examining how various factors affect the way science is applied (or is not applied) to difficult real-world environmental policy problems such as hydraulic fracturing (fracking) or preservation of wetlands.

## Helen Dahlke



Department of Land, Air and Water Resources, specializes in hydrology. Dahlke completed her Ph.D. at Cornell University in environmental engineering, and was a postdoctoral researcher at Stockholm University in Sweden before joining UC Davis.

Overview: Improving understanding of the water cycle and its links to climate and biogeochemical cycling (nitrogen, phosphorus, carbon) in agricultural and mountainous landscapes in California and across the globe.

For more information, visit [www.caes.ucdavis.edu](http://www.caes.ucdavis.edu) and click on "New Faculty Profiles." New Cooperative Extension specialists are highlighted on pages 8–9.

## David de la Peña



Department of Human Ecology, is an architect and urban designer who specializes in participatory urbanism (how citizens and designers collaborate in the making of cities). De la Peña completed his Ph.D. in landscape architecture and environmental planning at UC Berkeley before joining UC Davis.

Overview: Fostering sustainable and equitable urban design practices in which community engagement empowers citizens and improves urban life.

## Dalia Ghanem



Department of Agricultural and Resource Economics, specializes in statistical methods to analyze economic data. Ghanem completed her Ph.D. in economics at UC San Diego before joining UC Davis.

Overview: Developing statistical methods to analyze large sets of data so that economists and policymakers can better understand cause-and-effect relationships, especially in environmental economics.

## Leah Hibel



Department of Human Ecology, specializes in mother-child relationships and physiological regulation. Hibel completed her Ph.D. in biobehavioral health with a minor in human development and family studies at the Pennsylvania State University and was on the faculty at Purdue University before joining UC Davis.

Overview: Studying how stressors impact the behavioral and physiological reactions of mothers and children.

## Michele La Merrill



Department of Environmental Toxicology, specializes in developmental toxicology. La Merrill completed her Ph.D. in toxicology at the University of North Carolina, School of Medicine. She joined UC Davis after a

postdoctoral fellowship in environmental pediatrics at Mt. Sinai School of Medicine.

Overview: Exploring how developmental exposure to persistent organic pollutants increases risk of metabolic disorders in adults.

## Sheryl-Ann Simpson



Department of Human Ecology, specializes in urban studies. Simpson completed her Ph.D. in city and regional planning at Cornell University before joining UC Davis.

Overview: Examining methods for broader engagement of disenfranchised individuals and communities in urban development and design, including community organizing, as well as technical tools such as GIS and participatory mapping technologies.

## Brett Milligan



Department of Human Ecology, is a landscape architect who specializes in sustainable urban design and environmental planning. Milligan completed his M.S. in landscape architecture at the University of New Mexico. He joined UC Davis after working in private practice and as a design instructor.

Overview: Designing regenerative infrastructure to retrofit the nation's aging industrial legacies, focusing primarily on water systems to facilitate the recovery of landscape ecological function.

## Astrid Volder



Department of Plant Sciences, specializes in how plant roots respond to stresses such as extreme heat or drought. Volder completed her Ph.D. in physiological ecology at Utrecht University in The Netherlands, and worked at the Pennsylvania State University, CSIRO Plant Industry (Australia), and Texas A&M University before joining UC Davis.

Overview: Gaining a better understanding of the role that root systems play in how plants adapt to environmental stresses (particularly heat and drought) in order to make more efficient use of resources such as water and nutrients.

## Christopher Simmons



Department of Food Science and Technology, specializes in energy and water efficiency in food processing. Simmons completed his Ph.D. in biological systems engineering at UC Davis and worked as a postdoctoral scholar and at the Department of Energy's Joint BioEnergy Institute before joining the CA&ES faculty.

Overview: Improving energy and water-use efficiency in food processing, converting leftover food residue from food processing into biofuels that can offset energy used during processing.

## Angela Zivkovic



Department of Nutrition, specializes in the development of tools and strategies to personalize health. Zivkovic completed her Ph.D. in nutritional biology at UC Davis. Prior to joining the faculty, Zivkovic was a research scientist at Lipomics Technologies, Inc., and associate director of scientific development and translation at the UC Davis Foods for Health Institute.

Overview: Developing ways of measuring phenotype (the observable characteristics of an individual, as determined by both genetics and environment) in order to personalize diet, improve health, and prevent disease.

# MEET THE DEAN

UC Davis alumna Helene Dillard comes home to lead the college

**HELENE DILLARD, A UC DAVIS ALUMNA, PLANT pathologist, and former associate dean and head of Cooperative Extension at Cornell University, assumed responsibilities as the new dean of the UC Davis College of Agricultural and Environmental Sciences (CA&ES) in January.**

## About Helene Dillard

**Born:** San Francisco Bay Area

**Bachelor's degree:** Biology of natural resources, UC Berkeley

**Master's degree:** Soil science, UC Davis

**Doctoral degree:** Plant pathology, UC Davis

**Experience:** Professor, Cornell University's New York State Agricultural Experiment Station; Director, Cornell Cooperative Extension; Associate Dean, Cornell College of Agriculture and Life Sciences, and Cornell College of Human Ecology.

Dillard becomes the chief academic and administrative leader for CA&ES, home to 15 academic departments and many institutes and centers focusing on the agricultural, environmental, and human and social sciences. The college includes 330 faculty members, 800 staff, 5,800 undergraduate students in 29 majors, and 1,000 graduate students in 45 graduate groups and programs.

Born and raised in the San Francisco Bay Area, Dillard received her bachelor's degree from UC Berkeley in 1977. She earned a master's degree in 1979 and a doctoral degree in 1984, both at UC Davis. As a graduate student, she worked with Salinas Valley growers and Cooperative Extension specialists on reducing losses in lettuce plants to a disease known as lettuce drop.

Upon graduating from UC Davis, she joined the plant pathology faculty at Cornell University's New York State Agricultural Experiment Station in Geneva, N.Y., a position that allowed her to devote time to both research and extension responsibilities for vegetable crops. She was named director of Cornell Cooperative Extension in 2002. At Cornell, Dillard



"The opportunity to serve as dean of the College of Agricultural and Environmental Sciences is an honor, and I look forward to working with our broad community of stakeholders."

Helene R. Dillard

also served as associate dean of both the College of Agriculture and Life Sciences and the College of Human Ecology.

Throughout her administrative career, Dillard continued her research on fungal diseases in vegetable crops. Her major projects examined fungal diseases of beans, tomatoes, and corn, as well as cabbage and other cruciferous vegetables.

# THIRST QUENCHER

## UC helps California battle the drought

WITH CALIFORNIA'S SEVERE drought challenging the state as never before, it is imperative that we make every drop of water count. University of California scientists have been helping the state's citizens do just that for many years.

UC professors, specialists, and county advisors study a variety of water-saving technologies and strategies to stretch limited water resources. Research and outreach are helping improve irrigation efficiency, conserve water in food processing, and develop drought-tolerant landscapes, to name a few areas. Scientists also are monitoring how the lack of water is affecting the environment.

Four websites where you can learn more about what the university is doing to address the drought and water-related research and outreach include:

- The College of Agricultural and Environmental Sciences "Making Every Drop Count" page features faculty spotlights. <http://caes.ucdavis.edu/drought>
- The Center for Watershed Sciences at UC Davis features the California WaterBlog. [watershed.ucdavis.edu](http://watershed.ucdavis.edu)
- The center also maintains a campus drought page. [drought.ucdavis.edu](http://drought.ucdavis.edu)
- The California Institute for Water Resources, a program of UC Agriculture and Natural Resources, features many drought resources. [ciwr.ucanr.edu](http://ciwr.ucanr.edu)



JOHN STUMBOS/UC DAVIS

## SAVING EVERY RAINY DAY

### Tanks help the teaching and research winery better meet its sustainability goals

THANKS TO THE "GREEN TECH" DIVISION OF JOHN DEERE Landscapes, UC Davis' landmark teaching and research facilities for winemaking have taken another step toward the goal of self-sustainability.

Last fall the company engineered and installed six steel tanks, each with a 40,000-gallon capacity, to collect rainwater from the roofs of buildings in the Robert Mondavi Institute. The tanks are located adjacent to the Jess S. Jackson Sustainable Winery Building, which was designed to house equipment and systems for capturing and sequestering carbon dioxide from wine fermentation, and for recirculating filtered rainwater for wine, beer, and food processing.

"The work was done at the company's cost—a favorable discount—with contributions to the design, layout, and installation management" said viticulture and enology professor Roger Boulton.

"This unique project enabled John Deere Green Tech to leverage our water-harvesting experience and is aligned with our commitment to water conservation and to serving our customers—those linked to the land," said Green Tech's district sales manager Jim Weller. "The Jess S. Jackson Sustainable Winery Building is a perfect example of where we were able to provide a water-harvesting solution."

Rainwater captured on-site will eventually become the sole source of water for the winery. Reverse osmosis filtration will be used to remove all dust, molds, bacteria, viruses, and toxins, leaving it clean and free of salts that would deposit on the stainless steel equipment and research fermentors in the Teaching and Research Winery. Cleaning solutions will be captured and returned to the Jackson facility, and recovered through nanofilter membranes for subsequent use.

"In this way the winery will be self-sustainable in water, using about one-fifth the normal water volume and one-fifth the usual cleaning chemistry," Boulton said. "This demonstrates how wine and food businesses can operate on a fraction of the usual water volume—an expectation, if not a requirement, in California in the near future. This will be the first public building in the United States to operate in this way."

—John Stumbos



## THE CAMPAIGN FOR UC DAVIS

### THANKS A BILLION

CA&ES donors have helped UC Davis reach its fundraising goal

Supporters of the College of Agricultural and Environmental Sciences stepped up in a big way to help UC Davis achieve the goal of raising more than \$1 billion in its first comprehensive fundraising campaign.

Through March 2014, CA&ES raised more than \$222.6 million. The support is vital to help students and faculty in scholarship, research, and instruction.

Our thanks go to many people like Bill and Linda Sullivan, who show their ongoing support for UC Davis students with the William and Linda Sullivan Environmental Sciences Scholarship Fund.

“For decades, UC Davis has been the unquestioned leader in environmental and agricultural research and teaching, and is uniquely qualified to address tomorrow’s challenges in this area,” Bill Sullivan said. “It is an honor for us to support undergraduate and graduate students who will be the leaders of the future.”

The Campaign for UC Davis counts all gifts and pledges to every college, school, department, and program across the university. It also includes grants awarded by philanthropic organizations and

CHENG SAECIAO/UC DAVIS



Bill Sullivan

nonprofit foundations.

“Bill and Linda’s gift was transformative to the environmental sciences and the students who will benefit every year,” said CA&ES dean Helene Dillard. “Their generosity—along with more than 8,500 donors who have given to our college during this campaign—is deeply appreciated and will have a lasting impact on California for generations to come.”

