

CA&ES

Outlook

On a MISSION

SPECIAL REPORT: The Agricultural Experiment Station

Dairy farmer Paula de Snayer of Lodi (center) says research from AES scientists such as dairy cattle nutritionist Edward DePeters and animal welfare expert Cassandra Tucker helps her make smart management decisions on her clean, modern, free-stall dairy.

JOHN STUMBOS/UC DAVIS

CA&ES Outlook

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COVER STORY

4 Animal science professors Ed DePeters and Cassandra Tucker are among our many faculty members with appointments in the Agricultural Experiment Station, an essential catalyst for change and innovation.



JOHN STUMBOS/UC DAVIS



STUDENTS & STUDIES

23 Students learn the basics of agriculture in a hands-on course about plants for the garden, orchard, and landscape taught by lecturer Muhammad Marrush.

COLLEGE CELEBRATION



Our premier community event continues to thrive after 25 years. **14**

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THE AGRICULTURAL EXPERIMENT STATION

AES generates new knowledge that helps solve societal challenges

IN THE ALPHABET SOUP OF UNIVERSITY acronyms, AES requires some explanation.

It stands for Agricultural Experiment Station. The name was bestowed more than 100 years ago when the federal government began providing states with money to set up an experiment station to conduct research in agriculture.

That was a long time ago. Now, the Agricultural Experiment Station is no longer a “station,” or any singular facility. The mission has expanded beyond agriculture. The word “experiment” remains relevant, but “research” would probably be more accurate. In addition, AES funding is no longer exclusively federal, but includes contributions from the state as well.



JOHN STUMBOS/UC DAVIS

Dean Mary Delany (left) talks with Professor David Block, chair of the Department of Viticulture and Enology, in the fermentation room of the Robert Mondavi Institute for Wine and Food Science. UC Davis research funded by the Agricultural Experiment Station has played a vital role in the transformation of the California wine and grape industry into one of the world's top producers of premium wines.

But we still call it the Agricultural Experiment Station. And make no mistake about it, AES funding is as relevant to society today as it was a century ago.

The AES funds mission-oriented research. Research is a continuum, with basic research emphasizing theory, and applied research emphasizing the application of theory to the solution of problems. Our AES faculty search for new knowledge and technologies important to California—not only in agriculture, but

also in nutrition, food safety, human health, human and community development, wildlife, invasive species, climate change, sustainable energy, and many other areas. Disseminating that knowledge is a part of the AES mission, which is facilitated by collaboration between the AES and UC Cooperative Extension specialists and advisors.

The similarity between the acronyms AES (Agricultural Experiment Station) and CA&ES (the College of Agricultural and Environmental Sciences) is a coincidence. But the way that AES rests within CA&ES is an accurate reflection of how integral it is to our college. About 85 percent of our 350 faculty are paid in part with AES funding, while the remainder of their salaries comes from Instruction and Research funding or from Cooperative Extension monies.

This investment has borne great success. In a recent ranking of universities, UC Davis was named number one in the world for agricultural teaching and research.

Our college has also received top rankings in research output for numbers of journal papers and citations in agricultural sciences, plant and animal sciences, environment/ecology, food science and nutrition, and soil sciences. Our college's impact on California and the world stems from a long tradition of research excellence made possible in part by the Agricultural Experiment Station. Our work under the AES umbrella is one part of a bigger picture.

At UC Davis, the College of Biological Sciences and the School of Veterinary Medicine also receive AES funding. Within the UC system, the division of Agriculture and Natural Resources receives AES funding for its work, as do the UC Riverside and UC Berkeley campuses.

There are ongoing collaborative AES projects between many of these UC groups, along with our external stakeholders, including commodity boards, government agencies, nonprofits, and community groups. These partnerships are essential to the success of the AES in meeting its responsibilities.

Read on to learn how the Agricultural Experiment Station is a successful incubator for innovation.

MARY E. DELANY, INTERIM DEAN
COLLEGE OF AGRICULTURAL AND
ENVIRONMENTAL SCIENCES

SPECIAL REPORT: The Agricultural Experiment Station

By Ann Filmer,
John Stumbos,
and Robin DeRieux

On a MISSION

When fresh thinking is needed, California turns to the Agricultural Experiment Station for answers

UC Davis is a global leader in agriculture, food, nutrition, environmental sciences, and human sciences because of the long tradition of research excellence made possible by a high-impact organization known for more than a century as the Agricultural Experiment Station (AES).

“The Agricultural Experiment Station is at the heart of our research enterprise in the College of Agricultural and Environmental Sciences,” says CA&ES interim dean Mary Delany. “Most of the faculty in our college have AES appointments, which gives them the structure, support, and mandate to conduct mission-oriented research on a wide range of subjects—agricultural productivity, food security and safety, improving nutrition, environmental sustainability, and healthy families and communities.”

THE EARLY YEARS

The Agricultural Experiment Station emerged as a result of federal legislation. In 1887 the Hatch Act provided support to each state to establish an experiment station to conduct agricultural research. At the time, California’s pioneering agriculturalists were struggling to find answers for their production challenges. They turned to a small cadre of University of California scientists, based primarily at UC Berkeley.

The mission of the Agricultural Experiment Station at UC Davis is to conduct research on agricultural, environmental, and societal issues. This research cuts across the continuum of fundamental and applied research for the purpose of developing new knowledge and technologies that address specific problems. Key to this mission is the discovery of solutions and the active transfer of those solutions to the people of California.

These scientists traveled the state by rail to share their expertise in soils, entomology, chemistry, botany, dairy husbandry, and other fields.

From this tiny nucleus, the Agricultural Experiment Station grew with the addition of new faculty, buildings, and land to conduct experiments and demonstrate techniques. In the early 1900s the College of Agriculture at UC Berkeley recognized the need to establish a research farm that was more representative of California’s climate. The “University Farm”—now UC Davis—was established in 1908.

CRUCIAL TO CALIFORNIA AGRICULTURE

Today, California agriculture is a \$43.5 billion annual industry producing more than 400 different



Geneticist Roger Chetelat, a researcher in the Agricultural Experiment Station, conducts pollination studies on tomatoes. By studying hybridization in wild species, Chetelat hopes to allow breeders to obtain hybrids between cultivated tomatoes and wild relatives that harbor valuable genes for crop improvement.



In March 1928 the College of Agriculture revived its “demonstration train” to provide information for troubled farmers in 24 rural communities throughout the Central Valley. From the platform of the “California Agriculture Special” college faculty and staff explained basic economic outlook data for more than a dozen crops, stressing the need for realism and efficiency in farm management. (Excerpted from “Science and Service” by Ann Foley Scheuring)

types of crops and livestock products. The state grows nearly half the nation’s fruits, nuts, and vegetables. There are many reasons for this success, including California’s Mediterranean climate, the industriousness of farmers and ranchers, and the availability of high-quality land, labor, and water. But the story isn’t complete without factoring in the inventions, innovations, management strategies, and other problem-solving advances that have been produced by the Agricultural Experiment Station.

The early days of the University Farm included experimental plots,

orchards, and vineyards, which would become demonstration sites for new crop varieties and improved techniques in planting and cultivation. In the 1920s postharvest handling studies on packing and shipping techniques became increasingly important as producers sought creative ways to market their agricultural bounty. William Cruess, a pioneer in food science, developed innovative products such as fruit cocktail, fruit nectars, and bottled prune juice.

Mechanization is another area where AES scientists have had a huge impact. In the 1930s agricultural engineers developed

Where exactly is this station?

IT'S EVERYWHERE

The Agricultural Experiment Station is not a singular facility but is a composite of programs, projects, people, and facilities. The “station” is anywhere our faculty work—laboratories, classrooms, fields, livestock operations, and communities throughout California.

a mechanized direct combine and drying technology that improved harvest efficiency and rice quality. One of the most familiar examples is the mechanical tomato harvester, which was commercialized in the 1960s.

But there are many other examples of agricultural innovation that have changed the face of agriculture in California. Forced-air cooling—the most widely used method of cooling nearly all harvested and packaged tree fruit, berries, melons, tomatoes and other fruits, vegetables, and flowers—was developed in the UC Davis Department of Agricultural Engineering in 1954. In the 1960s, agricultural engineers developed tree shakers for nuts and many tree fruits.

California growers have also turned to Agricultural Experiment Station scientists to deal with agricultural pests and diseases. The university's first plant pathologist, Ralph E. Smith, helped save the asparagus industry from a devastating rust disease. More recent research has created integrated pest management techniques that have reduced pesticide use and made pest control safer.

In the animal sciences, UC Davis researchers revolutionized beef cattle nutrition, enhanced milk quality and flavor, improved poultry production, and developed creative solutions for the management of livestock waste.

One of the signature achievements of UC Davis research is the strawberry. Selective breeding of new strawberry varieties and research into the production system of raised beds, plastic mulch, and drip irrigation transformed this industry into one of California's top 10 crops. UC Davis scientists have developed dozens of other new varieties of fruits, nuts, vegetables, melons, forages, grains, and field crops

using traditional plant breeding techniques and newer tools of molecular biology.

“The increasing value of the agriculture industry in California is easily traced to UC Davis research,” says plant pathology professor Neal Van Alfen, former CA&ES dean. “There are multiple industries with annual incomes of more than \$1 billion per year in California that owe their existence to research of the UC Davis Agricultural Experiment Station.”

ENVIRONMENTAL IMPACT

The Agricultural Experiment Station was conceived at a time when the vast majority of Americans lived in rural areas and the concerns of the day were dominated by agricultural production. As society changed, so has the Agricultural Experiment Station. The AES mandate has been amended many times to expand into natural resources, fisheries, and other areas of national concern.

In the 1930s scientists in agronomy, forestry, and animal science conducted research on the long-term effects of brush-burning in rangeland areas to shed light on the controversial practice, resulting in a change in state policies. Today, studies of rangeland ecology continue to provide land managers with the information necessary to manage invasive weeds, maintain water quality, and improve livestock forage.

California's rich biological diversity is also the focus of much Agricultural Experiment Station research. Environmental scientist Susan Harrison conducts research on rare plants that grow on harsh serpentine soil. Herpetologist Brian Todd studies the threatened Mojave desert tortoise, whose population has declined due to habitat loss and other factors.

Research by environmental scientists helped design marine-

Seeking solutions

CA&ES faculty with Agricultural Experiment Station appointments conduct research that addresses societal needs. Our researchers seek new discoveries in food, nutrition, health, agriculture, the environment, and energy.



DD LEVINE

THE SECRETS OF MOTHER'S MILK

Human breast milk contains complex sugars that are indigestible to infants. Why? Food scientist David Mills and a multidisciplinary team of UC Davis scientists who are part of the Foods for Health Institute discovered that these complex sugars feed beneficial bacteria that live in infants' intestines and protect babies from intestinal infections. This discovery may lead to medical treatments for premature infants, the elderly, and others with compromised immune systems.

GIVING CHILDREN A CHANCE

CA&ES nutritionist Christine Stewart conducts research on maternal and child nutrition among low-income populations, measuring the impact of nutritional intervention during the critical “window of opportunity” from conception to age two.

NEW TREATMENTS FOR DIABETES

One out of 10 adults in California has diabetes, and nearly a quarter are obese. CA&ES nutritionist Fawaz Haj studies the molecular mechanisms underlying these metabolic diseases, research that could ultimately lead to new medical treatments.

DISCOVERING LINKS BETWEEN POLLUTANTS AND HEALTH

A UC Davis scientist has linked prenatal exposure to the pesticide DDT to hypertension in adults. DDT was used widely in the United States in the 1950s and is still used today in some developing countries to fight malaria. Environmental toxicologist Michele La Merrill is exploring the connection between adult metabolic disorders and early exposure to persistent organic pollutants.

VINTAGE RESEARCH ON WINE

California's international reputation for grape and wine quality has deep roots in the work of AES scientists. A landmark study in 1944 by professors Albert Winkler and Maynard Amerine helped set the stage for vast improvements by analyzing the relationship between grape variety, climate, and location and then categorizing grape-growing regions by heat summation. In the 1950s and '60s Professor Harold Olmo developed 30 wine and table grape varieties. Others studied sterile filtration techniques, phenolic assays, the impact of volatiles in wine aroma, the distillation and oak aging of brandies. Experiment station scientists have been the leaders in research, authors of major texts, and mentors to generations of California's (and the world's) winemakers.

protected areas to sustain fisheries and preserve biodiversity. UC Davis scientists conduct research on some of California's most imperiled fish species, such as the delta smelt. Other work has led to the restoration of habitat for salmon and steelhead trout.

HUMAN WELL-BEING

Advances in human health and well-being are another area where Agricultural Experiment Station scientists have made great strides. For instance, Professor Russ Hovey's research on pigs is shedding new light on cancer

formation that could lead to improved diagnostic imaging and drug treatments for humans.

Professor Glenn Young studies the fundamental mechanisms of foodborne pathogens such as *E. coli* and salmonella to learn how these bacteria cause human illness. As is frequently the case with research today, Young's research is supported by a grant—the National Institutes of Health, in this case.

While conducting fundamental research on insect biology, entomologist Bruce Hammock discovered a novel enzyme that helps caterpillars transform into

butterflies. These enzymes are being developed into new drugs to treat hypertension, diabetes, heart problems, and kidney disease.

Nutrition research by Fawaz Haj, Peter Havel, and Judith Stern is also providing a better understanding of the factors controlling food intake and genetic factors contributing to obesity and diabetes, leading to new therapeutic approaches for this serious public health problem.

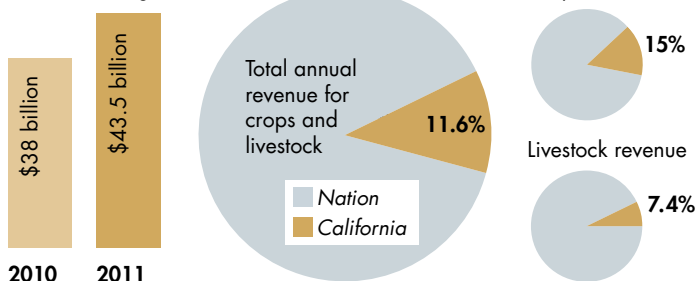
Recent work has also shown that the development and progression of numerous diseases, including diabetes, cardiovascular disease, and certain cancers, may be reduced, in part, by eating foods rich in phytochemicals.

In addition to advances in health, AES scientists conduct research to improve the well-being of Californians in other ways. For instance, researchers in the Department of Human Ecology study different aspects of human and community development in an effort to improve social conditions. Professor Jonathan London has conducted research on environmental and social hazards faced by residents of the Sacramento, San Joaquin, and Coachella valleys. This work has

KEEPING CALIFORNIA'S AGRICULTURE ON TOP

California agriculture, including 81,500 farms, is one of the most important drivers of the state's economy. Agriculture's continued vitality can be attributed to the industry being highly efficient and on the cutting edge of technology. This advantage is supported by research from the UC Davis Agricultural Experiment Station.

Record earnings:



California's agricultural abundance includes more than 400 commodities, the top 10 of which are each worth more than \$1 billion annually.

Milk and cream	\$7.68 billion
Almonds	\$3.87 billion
Grapes	\$3.86 billion
Cattle and calves	\$2.83 billion
Nursery	\$2.68 billion
Strawberries	\$1.95 billion
Hay	\$1.73 billion
Lettuce	\$1.51 billion
Walnuts	\$1.32 billion
Tomatoes	\$1.26 billion

SOURCE: CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

FACULTY APPOINTMENTS

Faculty appointments in the Agricultural Experiment Station specifically support AES mission-oriented research and outreach. This distinguishes them from I&R (instruction and research) faculty appointments, which support academic instruction and disciplinary research. Most faculty with AES appointments also possess partial I&R appointments.

The AES appointment allows for a greater percentage of time devoted toward mission-oriented research—a significant factor affecting California’s economy and in obtaining competitive grant support.

While most AES faculty at UC Davis are located in the College of Agricultural and Environmental Sciences, some appointments are in the College of Biological Sciences and the School of Veterinary Medicine.

helped provide a clear understanding of the challenges faced by some residents so that policy makers, advocates, and businesses can help communities thrive.

A COMPETITIVE ADVANTAGE

The Agricultural Experiment Station at UC Davis has become one of the most productive research organizations in the world. In a recent ranking of universities, CA&ES is No. 1 in the world for agricultural teaching and research. Because the major issues facing the world coincide with the strengths of UC Davis, the college has unparalleled opportunities to continue using the Agricultural Experiment

Station to find solutions for regional and global issues, while building California’s economy.

AES faculty have also shown extraordinary success in nationally competitive grants programs, particularly in agriculture. In the area of plant genomics, for instance, UC Davis captured about 10 percent of total national funding from the National Science Foundation.

“This level of grant success is highly unusual for a single university,” Delany says. “The strength of research in the UC Davis Agricultural Experiment Station has brought global prominence to the campus in the fields of agriculture and natural resources.”

The Agricultural Experiment Station gives UC Davis a competitive advantage in agriculture, the environment, and human sciences that spills over into its student education, public outreach, and partnerships with industry, agencies, and communities.

One benefit of the Agricultural Experiment Station is that UC Davis has significantly more tenured faculty engaged in mission-oriented research than would be possible on student enrollments alone. Additionally, the partnership between AES faculty and UC Cooperative Extension’s campus-based specialists and county-based advisors greatly amplifies the impact of collaborative research in California.

“The Agricultural Experiment Station is an essential part of what makes the College of Agricultural and Environmental Sciences a transformative engine of progress for our state,” Delany adds. “Our research is driven by and vital to the needs of California agriculture, our natural resources, and the health and well-being of our communities.”

MAKING ENERGY FROM WASTE

Waste-to-energy technology invented at UC Davis turns organic waste such as food scraps and agricultural byproducts into natural gas. The high-rate anaerobic digester technology fostered for more than a decade by agricultural engineer Ruihong Zhang moved from laboratory to pilot plant to commercial use in 2012.



KRISTIN AQUILINO/BODEGA MARINE LABORATORY

BREEDING WHITE ABALONE BACK FROM THE BRINK

Aquatic toxicologist Gary Cherr and other scientists at the UC Davis Bodega Marine Laboratory have begun a captive breeding program to help bring endangered white abalone (above) back from the brink of extinction.



CHRISTOPHER MALLER/UC DAVIS

RESTORING NATIVE GRASSLANDS

UC Davis restoration ecologist Kevin Rice conducts field experiments to help restore native grasslands and combat invasive species in California on highly degraded landscapes such as former mining sites.

REDUCING DAIRIES’ IMPACT ON THE ENVIRONMENT

Dairy products are California’s top agricultural commodity. Animal scientist Ermias Kebreab is developing mathematical models that represent a dairy cow’s digestion and metabolism to predict her energy and nutrient requirements. This helps producers formulate diets for cattle that meet nutritional requirements without overfeeding, minimizing the industry’s environmental impact.

Helping grow the California TOMATO



ROBIN DERIEUX/UC DAVIS

Advising growers

"UC Davis researchers have helped with pesticides, insect control, weed management, water quality, you name it," said Triad Farms' Rick Martinez (left, with grower Dustin Timothy), who grows processing tomatoes and other crops. "UC Davis has been a wonderful resource, improving both yield and quality of processing tomatoes throughout the state."

From seed to plate, the state's \$900 million processing tomato industry is one example of a crop that benefits from AES research.

Testing technology



SAM MATOBA/UC DAVIS

The California Processing Tomato Industry Pilot Plant, built with funds donated by the processing tomato industry, provides hands-on experience to UC Davis food science students like Mailyne Nguyen (above). The state-of-the-art, energy-efficient facility also helps transfer new technology from research to industry and allows industrial partners to try out new concepts on a small scale.



96%

California is the leading producer of processing tomatoes in the nation, growing 96 percent of the tomatoes used to make spaghetti and pizza sauce, ketchup, and other canned tomato products.

Modernizing inspection



JOHN STUMBOS/UC DAVIS

Technology under development by UC Davis engineers is helping modernize processing tomato assessment techniques. Biological and agricultural engineering professor David Slaughter (right, with inspector Tom Rammle), has spent more than a decade developing a biosensor inspection kit that detects and quantifies mold, one of the factors that determines the quality grade in truckloads of tomatoes.

500 tons

of tomatoes are grown each year at UC Davis Russell Ranch as part of a 100-year experiment to measure the effects of different farming systems, crop rotations, water, and nitrogen inputs.

Breeding disease resistance

Wild species of tomato safeguarded at the C.M. Rick Tomato Genetics Resource Center are sources of genetic resistance to at least 44 major tomato diseases and 20 insect pests. Breeders have used wild varieties to combat devastating tomato diseases such as late blight fungus and tomato yellow leaf curl virus.

Cooperative Extension faculty and county-based advisors serve as a bridge between tomato producers, tomato processors, and AES faculty. "Cooperative Extension faculty are able to help connect our AES faculty to industry partners," said UC Davis Cooperative Extension specialist Diane Barrett, an international expert in processing tomatoes.



JOHN STUMBOS/UC DAVIS

Banking on it

UC Davis hosts the world's most comprehensive tomato gene bank, the C.M. Rick Tomato Genetics Resource Center (TGRC). The seed repository of more than 3,600 lines of tomato varieties includes 1,200 wild relatives of the tomato gathered in South America.

"We're preserving the genetic diversity needed to improve tomatoes in the future," said Roger Chetelat, director of the TGRC. At right is gene bank student employee Christine Nguyen.



ROBIN DERIEUX/UC DAVIS

Revolutionizing postharvest

In the 1960s, UC Davis helped revolutionize the processing tomato industry in California by mechanizing the harvest, which previously relied on hand labor. UC Davis vegetable crops breeder Jack Hanna developed firm varieties suited to machine harvest, and worked with UC Davis agricultural engineer Coby Lorenzen to develop the mechanical tomato harvesting system.

"The mechanical harvester saved the industry," said Rick Martinez, who farms 800 acres of processing tomatoes in Yolo and Solano counties. "We wouldn't be here without that."

UC Davis agricultural engineers also helped automate the postharvest inspection process, which begins with the insertion of a mechanized probe developed by Professor Michael O'Brien into the tomato truck to randomly select a sample and feed it onto a conveyor belt for quality assessment.

SPECIAL REPORT: The Agricultural Experiment Station



COURTESY

Research that cracked an industry wide open

Almonds are California's No. 2 agricultural commodity, producing \$3.9 billion in farm gate value in 2011. UC Davis research is a big part of this success story.

Forty years ago a crisis was brewing in California's almond orchards. An insect pest called the navel orangeworm was causing serious kernel damage, and growers needed help figuring out what to do about it. The Almond Board of California began funding research into pest control and other production issues. Unmarketable kernels from navel orangeworm damage dropped from 8.8 percent in 1978 to 1 percent or less today.

The key was the advent of integrated pest management strategies developed by UC Davis Agricultural Experiment Station (AES) scientists working in tandem with UC Cooperative Extension

specialists and farm advisors, and scientists with USDA's Agricultural Research Service. The almond board now spends about \$2 million a year on research, covering a wide range of production and environmental stewardship issues.

"The beauty of our system in California is that the AES doesn't operate in a vacuum," says Bob Curtis of the Almond Board of California. "We have an integrated, unified system—a continuum from the Agricultural Experiment Station down to and including the growers—that has totally transformed the almond industry."

Almond orchards average 2,400 to 2,600 kernel pounds per acre, about double what they were 20 years ago. Top yields can range between 3,000 and 4,000 pounds per acre. Curtis attributes yield increases to advances in pest

control, improvements in irrigation technology and scheduling, research-inspired changes in pruning and tree spacing, development of new varieties, and improved fertilizer management.

"In the old days we would just dump a big slug of nitrogen on during the dormant season," he said. "Now, we're basically spoon-feeding the crop throughout the crop development cycle. It's much more efficient, and it's much more environmentally friendly."

Today, California almond growers produce two billion pounds of the tasty nuts each year. "There's no doubt that the partnership between the UC Davis Agricultural Experiment Station and the almond industry has been very productive," Curtis says. "It has definitely contributed to our success and growth."

COURTESY



Dan Flynn (left), executive director of the UC Davis Olive Center, discusses olive oil quality with television's Dr. Oz. The center has gained notice in the *New York Times*, *Washington Post*, *Los Angeles Times*, *CNN*, *National Public Radio*, *Marketplace*, and more than 1,000 additional media outlets.

PURE GOLD

Olive oil gets a boost from UC Davis center

DO YOU KNOW THE difference between “pure” and “extra virgin” olive oil? Most Americans don't understand olive oil grades. That was just one of the findings in a survey conducted by the UC Davis Olive Center.

To learn more about olive research and programs, visit the UC Davis Olive Center website at olivecenter.ucdavis.edu.

More than 2,200 individuals shared their perceptions and attitudes about olive oil in the survey conducted in 2012. In general, people are enthusiastic about the flavor and potential health benefits of olive oil but are uncertain how to select, evaluate, and describe this versatile food product that has been gaining in popularity.

“The survey revealed that

consumers clearly need more information that will help them understand the choices in olive oil that are available to them,” said Dan Flynn, the center's executive director and a co-author of the study. “With the olive oil industry in the United States now experiencing a renaissance, this is the perfect time for producers to help consumers better appreciate the flavor contrasts between fresh extra virgin olive oil and substandard oils.”

Other studies have shown that much of the imported olive oils sold at retail stores and wholesale to restaurants is substandard. As a result of that research, the Olive Center began a new olive oil testing program in 2013 to provide sensory and chemical evaluation of oil samples to help retailers and wholesalers better ensure the quality of olive oil available to consumers.

— Outlook staff

IN BRIEF:

Search for new dean of college continues

Throughout the summer, the two recruitment advisory committees—one internal, the other external—continued the outreach and selection process for a new dean for the College of Agricultural and Environmental Sciences.

Formal campus visits of candidates are set for early to mid-October and will include broad participation from students, faculty, staff, and the public. The recruitment advisory committee is screening all nominated candidates.

Approximately 10 to 12 individuals will be invited for first-round video interviews, followed by campus invitations to three to five finalists.

On-campus interviews will include public forums, and attendance is strongly encouraged. The dates for the public forums will be advertised on the recruitment website: <http://chancellor.ucdavis.edu/initiatives/dean-college-of-ag/index.html>.

Dean's Circle event coming Nov. 7

CA&ES Dean's Circle members are invited to spend an evening at the Harold Cole Facility on Nov. 7 with Interim Dean Mary Delany to learn the latest about animal welfare from professors Joy Mench and Cassandra Tucker. Contact Chris Akins at crakins@ucdavis.edu or (530) 752-2120 for details.

FILE PHOTO



THE BIG EVENT TURNS 25

Bringing alumni together and honoring the college since 1988

FILE PHOTO



Above: Attendees taste olive oil at the UC Davis Olive Center table. In addition to offering guests a variety of hors d'oeuvres, the event allows university affiliates and sponsors to provide product samples and tastings.

Top: CA&ES alumna Cheryl Harrison (B.S. '79 design) shares in the College Celebration festivities with Professor Tom Tomich, director of the Agricultural Sustainability Institute.

COLLEGE CELEBRATION, OUR BIGGEST EVENT of the year, passed a major milestone this fall.

For 25 years we've gathered at harvest time to celebrate the accomplishments of our college and its impact on California and the world. On Friday, October 11, friends, family, and colleagues gathered in Freeborn Hall to honor seven deserving individuals who received the Award of Distinction. This is the highest honor the College of Agricultural and Environmental Sciences bestows, reserved for people whose work has enriched the image and reputation of the college and its capacity for public service.

The award ceremony was followed by a festive reception, where attendees treated themselves to delightful hors d'oeuvres, excellent wines, beer, and other beverages. And, continuing a tradition, people went home with farmers market bags packed full of California fresh produce and grains from the farmers market welcome display.

— John Stumbos

FILE PHOTO



The farmers market offers an array of California foods.



Professors Linda Bisson and John Yoder sample College Celebration fare.

FILE PHOTO



2013 HONOREES

Award of Distinction winners

OUTSTANDING ALUMNUS



Willison "Will" Crites earned his B.S. and M.S. in entomology and has been the driving force behind several reunions with fellow entomology graduates from multiple years.

OUTSTANDING ALUMNA



Glenda Humiston earned her M.S. in international agricultural development and built a career advancing sustainability in policy development and program implementation.

FRIEND OF THE COLLEGE



Almond industry leader Robert "Bob" Curtis helped bring support for research and extension programs that have improved production and environmental stewardship.

OUTSTANDING STAFF



Janet Brown-Simmons, chief administrative officer for five academic departments in CA&ES, is noted for extraordinary leadership abilities by faculty and staff alike.

OUTSTANDING FACULTY



Department of Nutrition professor Kathryn "Kay" Dewey's research and international efforts helped change global policies for infant feeding and assessment of child growth.

COLLEGE LEADER



Neal Van Alfen, plant pathology professor and former CA&ES dean for 13 years, is receiving special recognition for outstanding contributions to the college.

COLLEGE LEADER



James "Jim" MacDonald, professor emeritus and former CA&ES executive associate dean, is receiving special recognition for outstanding contributions to the college.

A FAMILY AFFAIR

Muller family roots run deep and wide in UC Davis history

TWO THINGS YOU ARE LIKELY TO FIND AT A Muller family picnic at their ranch near Denair in the San Joaquin Valley—good home cooking and UC Davis graduates, lots of them.

David Muller (B.S. '57, plant science; M.S. '61, agricultural economics) and son Barton “Bart” Muller (B.S. '83, agricultural and managerial economics) together grow almonds, primarily, on land that’s been in the family since the Depression. The pair can quickly count nearly a dozen aunts, uncles, brothers, sisters, nieces, and nephews who attended UC Davis, including one currently studying electrical engineering.

Altogether, four generations of Mullers have attended college at UC Davis, including the family patriarch, Carl, who came to the University Farm in 1922 for a two-week short course in fruit tree production. “Dad was hooked,” David says. “And even though he was a high-school dropout, he eventually conned the registrar into enrolling him. He earned a two-year degree at Davis in 1925.”

“This research comes down from Davis and we just try to scale it and apply it to our circumstances. I find it kind of neat that 30 years after I graduated I’m still learning. Davis has the pool of talent, the institutional knowledge, and organizational structure—all those things that you need to tackle big issues.”

Thus was born a long-time Aggie booster and “education pusher.” After working as foreman of the Wye Ranch in Denair, Carl bought the 400-acre property in 1937 for \$35,000. Initially, the ranch had 180 acres of peaches and apricots with another 200 acres dry-farmed in barley and oats. He and his

JOHN STUMBOS/UC DAVIS



Bart Muller (seated left) farms almonds near Turlock with his father David (seated right). Bart’s nephews Blake and Grant Phillips (back, center) and family friend Eric Stark (right) worked on the family ranch in summer 2013.

brother-in-law, George, formed a partnership after World War II and planted 75 acres of boysenberries that they sold to Knott’s Berry Farm, Sara Lee, and other food processors. Berry acreage peaked at 125 acres in 1958. Eventually, the high cost of labor-intensive boysenberries forced the Mullers to shift to other commodities.

Today, almonds are their bread-and-butter crop. The father-and-son team continue to innovate, just as “Grandpa Carl” did before them. As of last year, their orchard is entirely on drip irrigation, something that allows them to not only utilize water more efficiently but also allows for more precise fertilizer applications. The Mullers credit the work of UC Davis Cooperative Extension irrigation specialists Larry Schwankl and Blaine Hanson with providing the information they needed to design a system for their orchards.

“This research comes down from Davis and we just try to scale it and apply it to our circumstances,” Bart says. “I find it kind of neat that 30 years after I graduated I’m still learning. Davis has the pool of talent, the institutional knowledge, and organizational structure—all those things that you need to tackle big issues.”

— John Stumbos

A PERFECT FIT

An early career in cut flowers blossoms into agricultural leadership

AS A YOUTH IN DALY CITY, CHRIS ZANOBINI (B.S. '88, plant science; MBA '00) got his first exposure to agriculture hanging around his grandparents' cut flower business.

"I guess there was always a little bit of this in my blood," he said. "Early on I had my heart set on UC Davis. I definitely wanted to be involved in agriculture."

As a UC Davis undergraduate, Zanobini followed his passion for plants and flowers, spending many hours identifying specimens in the campus arboretum and participating on the flower judging team. After graduation, he purchased a flower shop in San Francisco and learned the retail flower trade. He later worked the wholesale side of the business with a large supermarket chain in the Midwest.

In the mid-1990s Zanobini decided to get involved in public policy. "An opportunity came up with the California Pear Advisory Board," he said. "It was a perfect fit. They were looking for somebody with an agriculture background who also had retail experience."

Zanobini started working with the cherry board, as well, doing marketing and promotions. "Over time we started getting involved with other boards and organizations and building a bigger relationship with the California Grain and Feed Association," he said.

"Whether it be the seed industry or the grain and feed industry or the pear industry or cherries or nursery, a lot of the practices we're doing today wouldn't be there without the work that's been done at UC Davis."

Gradually, a new business came into being: Ag Association Management Services. Zanobini is president and CEO. With a staff of 15, the company provides management and operational services for more than 20 agricultural associations, foundations, commissions, and marketing orders. The shared staff of the company enables client organizations to put their limited financial resources toward other goals.



PHOTOS BY JOHN STUMBOS/UC DAVIS



Above: As president of the California Pear Advisory Board, Chris Zanobini (left) represents growers like Robert Arceo (right) on a range of issues. California is the nation's No. 2 producer of pears, growing about 25 percent of the total.

Left: Bartlett pears comprise 75 percent of the pear acreage in California.

"We do everything from planning board meetings and taking care of financial matters to working on regulatory or legislative issues," Zanobini says. "We bring a lot of things to the table, which allows these organizations to have staff people when they need them but don't pay for them when they don't."

A number of these agricultural organizations also sponsor UC Davis research, something Zanobini has developed a deep appreciation for. One recent project on pear ripening, for instance, has enabled the industry to ship fruit successfully to Brazil, Russia, Hong Kong, and India—something they couldn't do five years ago.

"Whether it be the seed industry or the grain and feed industry or the pear industry or cherries or nursery," Zanobini says, "a lot of the practices we're doing today wouldn't be there without the work that's been done at UC Davis."

— John Stumbos

COMMUNITY CONNECTIONS

Farm Credit links new farmers with produce distributors

IT'S NOT EASY TO FIND MARKETS FOR YOUR produce when you're an immigrant farmer or someone new to farming. You can sell your crops at fruit stands or farmers markets, but you may not have the contacts or even the language skills and cultural customs to connect with large-scale produce distributors.



Pang Eng Chang grows jujubes, guavas, papayas, and citrus on 15 acres of orchards and greenhouses near Fresno. He participated in a recent farmer market tour.

Meanwhile, in restaurants, grocery stores, schools, hospitals, and corporate lunchrooms across the state, buyers are clamoring for locally grown food.

“The demand for local, sustainable food is large and increasing,” said Gail Feenstra, food systems coordinator for the UC Sustainable Agriculture Research and Education Program and the Agricultural Sustainability Institute at UC Davis. “Distributors can’t find enough locally grown produce to meet the need.”

But that’s changing, thanks to a new Small and Ethnic Farmer Market Tour Project that introduces small farmers to conventional distributors interested in offering a line of locally grown food. The project, run by the UC Davis Agricultural Sustainability Institute, is funded by CoBank, a national cooperative bank serving rural America, and three farm credit associations: Farm Credit West, American AgCredit, and Farm Credit

Services of Colusa-Glenn.

“Local food initiatives prove that the food we eat can do more than nourish our bodies,” said Leili Ghazi, western region president of CoBank. “They can strengthen and support our communities and create tremendous economic opportunities. The challenge has always been connecting the right people and businesses at the right time. CoBank and our farm credit partners are pleased to support UC Davis in its efforts to introduce small farmers to those who can help them grow.”

The tours work like this: UC Cooperative Extension farm advisors and specialists identify the small, specialty-crop growers in their areas, many of whom are Hmong, Mien, and Latino. The growers climb aboard a bus along with tour leaders like Feenstra and David Visser, an analyst with the UC Sustainable Agriculture Research and Education Program.

“We have translators on board, too, if needed,” Feenstra said. “We drive to terminal markets, produce houses, or processing facilities where growers meet face-to-face with distributors who explain their produce needs.”

The program also helps farmers create an action plan for selling their crops and prepare a farm profile—a flyer that explains who they are and what they grow.

“Workshops and field days are great education tools, but nothing makes markets happen as well as simply introducing a willing seller to a willing buyer and then stepping out of the way,” Visser said.

—Diane Nelson

“Local food initiatives prove that the food we eat can do more than nourish our bodies. They can strengthen and support our communities and create tremendous economic opportunities. The challenge has always been connecting the right people and businesses at the right time.”

DEGREES OF SUCCESS

Agribusiness management alumnus creates undergraduate scholarship

WHEN JOHN “ANDY” O’DONNELL (AGRIBUSINESS management, ’70) attended UC Davis, no one bothered to lock bicycles, professors invited students over for milk and cookies, and his fraternity, Theta Chi, won the best float in the Picnic Day parade three years in a row.

Now a top oil industry executive, O’Donnell wants to show his gratitude for the skills he learned at UC Davis. With a match from his employer, Baker Hughes, Inc., he is creating the O’Donnell Family Scholarship for undergraduate students in the Department of Agricultural and Resource Economics (ARE).

“I think the most important thing is for people to get a bachelor’s degree,” he said. “It prepares you and shapes your mind so you can compete intellectually. You can reason. You can analyze. You can debate. You can support your points. That becomes so critical to success in business.”

“For me UC Davis was a place where professors cared a lot about students and wanted them to be successful in life. It’s nice to be in a position to give something back.”

O’Donnell’s studies equipped him with “the sound fundamental base” to understand the principles and concepts in disciplines necessary for a successful business career—accounting, statistics, marketing, and other coursework. The Picnic Day float-building experience he describes as an exercise in teamwork: “It was so much fun seeing 50 guys pull together to accomplish something like that.”

Upon graduation, O’Donnell enlisted in the U.S. Marine Corps, spending the next six years as an officer and a pilot. He then moved to Houston, where he joined oilfield service company Baker Hughes as a systems analyst.

O’Donnell learned all aspects of the business, became a plant manager, and was hand-picked by the CEO to oversee a company-wide efficiency project that led to new system application products for business accounting and control. Over the past 38 years he also has overseen different parts of the company—drilling



COURTESY

Alumnus Andy O’Donnell is a firm believer in the power of an undergraduate education. “One of the key things for students is to really take advantage of the opportunity to learn how to learn,” he says.

fluids, chemicals, and western hemisphere operations. His title now is Vice President, Office of the CEO. “I’m senior adviser, trouble shooter, and fix-it guy,” he says.

“We are very grateful to Mr. O’Donnell for his generous gift to our undergraduate program,” said agricultural and resource economics department chair Richard Sexton. “It will enable many students over the coming years to attend Davis and focus on their studies instead of worrying about finances. We are very proud of the many highly successful graduates from our program such as Andy O’Donnell.”

“For me UC Davis was a place where professors cared a lot about students and wanted them to be successful in life,” O’Donnell said. “It’s nice to be in a position to give something back.”

— John Stumbos

Back-to-School SHOPPING LIST

In the previous issue we profiled our new faculty. Help them succeed by supporting some of their startup costs. Your contribution toward any of these items will help them and their students.

Plants

MATTHEW GILBERT, a plant scientist, is working to minimize water use by crops. Matthew needs:

- 25 lysimeters for crop screening - \$2,000 each (\$50,000 total)

STAVROS VOUGIOUKAS, a biological and agricultural engineer, works on mechanizing specialty crop production with labor-aiding machines. Stavros needs:

- Robotic arm integrated on a drive-by-wire vehicle - \$10,000

IOANNIS STERGIPOULOS, a plant pathologist, studies plant-microbe interactions and practical field work with fungal pathogens. Ioannis needs:

- Single module protein purification system - \$46,000
- Incubator shaker with refrigerator - \$16,000
- Cell culture centrifuge package - \$8,000

MACIEJ ZWIENIECKI, a plant scientist, examines how trees respond to water, nutrients, and temperature. Maciej needs:

- Camera-ready drone, to collect data above the treetops - \$4,000

Food

DANIELA BARILE isolates milk sugars (from commercial cheese-making byproducts) to improve human health. Daniela needs:

- Graduate student support - \$50,000

Environmental Toxins

MICHELE LA MERRILL studies how exposure of women to pesticides increases diabetes and obesity risks in their offspring. Michele needs:

- Integrated heart rate, physical activity, and body temperature monitors - \$7,250
- Insulin tests to diagnose diabetes - \$1,500
- Scale to measure newborn mice - \$300

Donor Profile

James "Jim" Clare ('73, biological sciences), owner of Pacific SouthWest Irrigation in Stockton, responded to our Opportunity Knocks story in last fall's CA&ES Outlook. He is currently working with the Department of Plant Pathology on designing and donating a much-needed new irrigation system for the research farm.

Thank you, Jim, for partnering with us in this meaningful way.

Landscapes

BRETT MILLIGAN is pioneering new ways to image landscapes and large infrastructural projects, such as delta landscapes, water infrastructure, and urban forests. Brett needs:

- Microcopter and digital camera - \$10,000

Wildlife

ANDREA TOWNSEND explores land use, disease, and social behavior in wild birds. She is working to minimize disease transmission in birds. Andrea needs:

- 2 aviaries - \$200 each (\$400 total)

Human Well-being

M. ANNE VISSER focuses on economic opportunity and the impact of labor force participation and mobility across societies. For field surveys and data analysis, Anne needs:

- 5 Sony tablets with network capability - \$700 each (\$3,500 total)
- 2 laptop computers with field network connection - \$2,500 each (\$5,000 total)
- 5 iPod touches, with network connection - \$300 each (\$1,500 total)

SIWEI LIU examines how everyday behaviors affect health and family well-being. To collect real-time data such as eating behaviors, exercise, and stressors, Siwei needs:

- 40 smart phones - \$500 each (\$20,000 total)

Student Scholarship Support

You can contribute any amount to the CA&ES Annual Fund to provide unrestricted support for undergraduate and graduate students in the college.

Give to various projects:

<http://caes.ucdavis.edu/giving>

Donor Profile

Howard-Yana and Nancy Shapiro, longtime friends and supporters of UC Davis, saw the need for support at the Russell Ranch Sustainable Agriculture Facility and responded by "adopting" other "adopters," will be added to the Russell Ranch Sustainable Agriculture endowment to support the facility and its research activities in perpetuity.

Thank you, Howard and Nancy.

MORE INFO, CONTACT

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Undergraduate Kaya Mac Millen gathers data about grasses in the Cosumnes River Preserve as part of a research project on floodplain restoration.

RESTORING NATURE

Student enriches classroom learning with field experience

SENIOR KAYA MAC MILLEN studies restoration ecology—the science of renewing and rehabilitating grasslands, waterways, forests, and other natural areas altered by humans.

“In California, we’re lucky to have such rich diversity in landscapes, plants, and animals,” said Mac Millen, a transfer student from San Francisco City College. “I think we have a duty to conserve that for future generations.”

A nontraditional student who pursued college after several years of work and travel, Mac Millen chose UC Davis because it was one of the few universities to offer an ecology program for those interested in restoration. He sought more

than just a classroom experience; he wanted a college that offered hands-on opportunities to apply academic knowledge.

As an ecological management and restoration major, Mac Millen has taken classes in habitat conservation, plant geography, and river management that devote significant time to outdoor study. Of Native American descent, Mac Millen has also sampled courses in the UC Davis Native American studies department, and is active in the college chapter of the American Indian Science and Engineering Society.

In addition, his part-time job with the UC Davis Center for Watershed Sciences allows him to

participate in a research study on floodplain restoration of former agricultural lands in the Cosumnes River Preserve, south of Sacramento. Researchers are gathering baseline data on plants, soil, groundwater, and other aspects of the local ecology on a 1,000-acre tract that will be returned to a floodplain when a levee is removed.

“Wetlands and floodplains are the kidneys of the earth,” said Mac Millen. “They filter pollutants. They recharge the groundwater. They help store carbon. Because the Cosumnes River is one of the last undammed rivers in the Central Valley, I think it’s a great spot to focus restoration efforts.”

—Robin DeRieux



PHOTOS BY BRAD HOOKER/UC DAVIS

DIGGING IN

A hands-on course in plant sciences introduces students to agriculture

PLANT SCIENCES 5, “PLANTS FOR GARDEN, Orchard and Landscape,” gives UC Davis students a chance to get their hands dirty. Plant sciences lecturer Muhammad Marrush introduces students to the basics of agriculture.

“They work with their hands, and they plant in the field,” said Marrush, who has taught the course for nearly two decades. “All the crops they plant in the field or in the greenhouse they take home. My main objective is to lay down the foundation of plant growth to students who have never been exposed to growing plants. I encourage them to find solutions to problems they face when growing plants based on principles they have learned in class.”

— Brad Hooker

Clockwise from top left: Plant sciences lecturer Muhammad Marrush demonstrates potting techniques. Senior Lilly Miller works with soil. Undergraduates train high-yielding cucumber plants onto strings under yellow strips of fly paper. Marrush gathers PLS 5 students for a demonstration. For more photos, view a slideshow at www.youtube.com/user/UCDavisPlants.



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ADVANCING PUBLIC SERVICE

Marisol Gonzalez has a clear path of possibility because of philanthropy.

Wildlife, fish and conservation biology major Marisol Gonzalez is blazing trails at UC Davis by being part of the first generation of her family to attend college—a path that she's able to pursue because of philanthropic support. Gonzalez is the recipient of the Tracy and Ruth Storer Scholarship, the Steven D. Mendivil Memorial Scholarship, the Reno and Margaret Cruz Scholarship, the Lloyd W. Swift Student Support Scholarship, and the Frank M. Yeatman Memorial Scholarship.

“The scholarships have had a tremendous impact on my life,” said Gonzalez, who is also minoring in landscape restoration and Native American studies at UC Davis. “They have allowed me to avoid having the gray cloud of financial worries and loans loom over me, and instead have allowed me to focus on my studies.”



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