CA&ES Outlook

SCIENCE STANDOUTS

Meet some of the faculty behind our mission-oriented research

COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES • UC DAVIS • FALL/WINTER 2010

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ROBIN DERIEUX/UC DAVIS

Swine research holds promise for understanding breast cancer risk in humans.

Cover story: Ivory tower research? Hardly.

The scientists in our college make discoveries that impact our daily lives. Page 4

COVER PHOTO:
Jorge Dubcovsky (left) and Jan Dvorak are cracking the genetic code of one of the world's most important grains, wheat.

Cover photo by John Stumbos

JOHN STUMBOS/UC DAVIS

ALUMNI SPOTLIGHT

Richard Rominger (pictured above with his wife, Evelyne) has had a profound effect on agriculture, both in California and beyond. Page 20

POP THE CORK!

The new brewery, winery, and food science labs at the Robert Mondavi Institute are now open. Page 18

WE'RE ON A MISSION

The work we do serves society with real-world results

ONE OF THE DEFINING CHARACTERISTICS of our college is the mission-oriented research of our faculty. Our problem-solving focus has produced a steady stream of applications for a vast array of challenges and opportunities.

For instance, plant scientists Jorge Dubcovsky and Jan Dvorak have made remarkable strides in deciphering the complex wheat genome. Dubcovsky, who oversees the university's wheat breeding program, has incorporated newly discovered genes into improved varieties for farmers in California and elsewhere.

Many of the world's fisheries stocks have been overharvested. Here at landlocked UC Davis, professors Louis Botsford and Alan Hastings help model marine protected areas to give resource managers better methods for sustaining fish populations. Their work is currently being put to the test in marine protected areas off the California coast and other areas.

Environmental toxicologist Ron Tjeerdema studied chemical oil dispersants for years before his expertise was suddenly in high demand to help respond to the Gulf of Mexico oil spill last spring and summer. These are just three examples of how our research meets real-world needs.

We can take pride in our impressive track record of prolific, high-quality research. Thomson Reuters ISI releases data ranking research output (number of journal papers and/or citations) by U.S. universities in agricultural sciences, agronomy, food science and technology, and soil science. In each case, UC Davis is listed as the top-ranked institution. Furthermore, in a comparison of global institutions that conduct research in plant and animal sciences, UC Davis ranks second after the USDA Agricultural Research Service and essentially tied with the French National Institute for Agricultural Research, INRA.

We can take pride in our impressive track record of prolific, high-quality research.

UC Davis agricultural economist Julian Alston has been studying public investments in agricultural research (and extension) for many years. He and colleagues recently completed an exhaustive benefit-cost analysis and published their findings in a new book, *Persistence Pays: U.S. Agricultural Productivity Growth and the Benefits from Public R&D Spending*. They find very robust returns. On average across the states, an incremental dollar invested in state research and extension would yield a benefit of $21 to the state and a further $11 in spillover benefits to other states, making a total benefit of $32 to the nation as a whole. California-specific figures are even higher: a national payoff of $43 per dollar invested, of which $33 would accrue in California.

ANN FILMER/UC DAVIS

From left, Professor Charlie Bamforth, Dean Neal Van Alfen, and Dean's Advisory Council member Doug Muhleman in the campus's new LEED Platinum Anheuser-Busch InBev Brewery.

Our cutting-edge research fosters innovation and new technology, leads to greater food security, improves human health and nutrition, provides the tools for good environmental stewardship, and returns handsome dividends to our economy. Sounds like a solid investment to me.

NEAL VAN ALFEN, DEAN
COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Story by JOHN STUMBOS,
ROBIN DERIEUX and ANN FILMER

They don't always think alike. But our faculty share a commitment to science that serves the greater good. Meet the brains behind our mission-oriented research.

Great Minds

JOHN STUMBOS/UC DAVIS

Jorge Dubcovsky and Jan Dvorak

Wizards of wheat genetics

PLANT SCIENCES PROFESSORS JAN DVORAK AND Jorge Dubcovsky are leading the way in the development of new genetic resources to make improvements in one of the most widely grown cereal crops on the planet—wheat.

Jan Dvorak is from Brno, Czechoslovakia, also the home of 19th-century genetics pioneer Gregor Mendel. In Dvorak's youth, Czechoslovakia was an Eastern-bloc country that repressed Mendelian genetics in favor of a politically influenced belief in environmentally acquired inheritance.

"Here I am at a place that was the foundation of genetics and yet I am taught something that makes no sense," Dvorak recalls. He persevered and learned about Mendel's laws, eventually moving to Canada to research salt-tolerance and becoming one of the first wheat scientists to work with DNA. In 1976 he joined the UC Davis faculty.

Jorge Dubcovsky came to UC Davis as a visiting scientist in 1992 to learn about wheat and molecular genetics with Dvorak. His research interest was in forages and grasses in

Jorge Dubcovsky (left) and Jan Dvorak

the Patagonia region of his native Argentina. He joined the faculty as a wheat geneticist in 1996. Dubcovsky also runs the university's wheat breeding program, which tests pasta and bread varieties throughout California.

Wheat evolved through the hybridization of three related grasses. One was identified in the 1940s. Through DNA analysis, Dvorak identified the other two in the 1980s. With plant sciences colleague Ming-Cheng Luo, he more recently pinpointed wheat's domestication to the Karacadag Mountains of southeastern Turkey. Today, wheat is grown extensively in many different climates.

The secret to wheat's success lies in its enormous genome—more than five times the size of the human genome. Dubcovsky and Dvorak attribute wheat's adaptability to the large number of genes it captured from its wild ancestors, polyploid nature (i.e., combination of genomes), and its ability to rapidly delete redundant genes.

Dubcovsky and colleagues have identified and cloned genes involved in disease resistance, protein content, flowering, and frost tolerance. These genes are being incorporated into breeding programs in California and throughout the world. He has released pasta and wheat varieties with increased protein content and natural pathogen resistance that minimize the need for fungicides.

Further improvements in other traits will depend on piecing together wheat's genetic blueprint with tools like molecular markers in Dubcovsky's laboratory and next-generation sequencing technology that has given Dvorak and Luo the capability to greatly accelerate DNA analysis. (Sequencing wheat's huge genome requires fragmenting it and then reassembling it into contiguous sequences.)

"We can, in fact, *do* this process on any organism with a genome of any size in a span of months rather than decades," Dvorak said. – JS

JOHN STUMBOS/UC DAVIS

Pamela Ronald

The power of a gene

Pamela Ronald, a plant pathology professor at UC Davis, has made some key discoveries in her laboratory that are making significant differences in rice, one of the world's most important food crops.

In 1995 she identified and cloned a gene that confers resistance to bacterial blight, a serious plant disease in Asia, Africa, and other places in the world. The genetic mapping technique she used to identify "Xa21" caught the attention of David Mackill, a U.S. Department of Agriculture rice breeder then based at UC Davis.

"He asked us if we would apply our genetics expertise to an unusual type of rice that could stay under water for two weeks," she recalls. Conventional breeding had failed to introduce the submergence trait into varieties grown in India and Bangladesh, where four million tons of rice can be lost annually to flooding. That's enough rice to feed 30 million people.

In 2006, after a decade of research, Ronald's and Mackill's labs identified Sub1, the "submergence tolerance" gene. Mackill, until recently at the International Rice Research Institute, bred it into new varieties for farmers in southern Asia and in the Philippines.

"A single gene can make a huge difference," Ronald says. "We need to integrate genetically engineered seed with ecologically based farming practices to feed the world and move our global agricultural system to sustainability." – JS

Eduardo Blumwald

Tough plants for tough times

RESEARCH ON PLANT CELLS can grow into solutions to feed the world. Professor Eduardo Blumwald came to the field of plant sciences via doctoral studies in bacterial bioenergetics. At the most elemental level, his laboratory conducts research on how plant cells generate energy and use energy for growth.

From that work in basic biology, Blumwald and his colleagues have engineered crop plants that can tolerate harsh environmental stresses such as drought and salinity. Using tobacco as a model, Blumwald's laboratory created genetically modified plants to grow with less irrigation water and survive periodic droughts. His team also created a genetically engineered tomato plant that could thrive on salty irrigation water and accumulate the salt in the foliage, improving soil quality.

"Water is scarce, the population is increasing, and the climate is changing," said Blumwald, who joined the UC Davis faculty in 2000. "There will not be enough food for the world in 50 years unless we generate crops that can produce better yields with dwindling resources. We have to combine conventional breeding with genetically modified plants, bring genetics and genomics together to solve these problems."

Blumwald first began investigating the impact of salinity and other harsh environmental

conditions on crops about 25 years ago. Through partnerships with industry and international institutes, the Blumwald lab discovered the technology to create drought- and salt-tolerant plants that is now being applied to rice, wheat, maize, canola, and other crop plants throughout the world.

Meanwhile, Blumwald and his colleagues continue investigating cell biology, searching for discoveries that can translate from the lab to crops in the field. "If you want to feel young forever, just do research," said Blumwald. "You're always learning something new. You're always catching up with new developments. It's the fun part of our job."– RD

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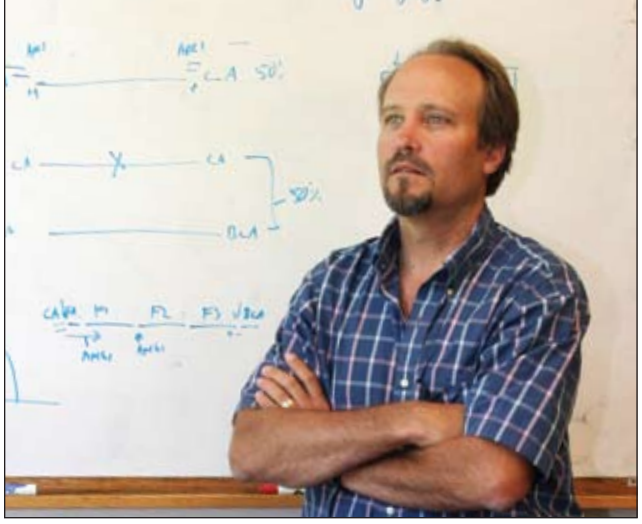

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Douglas Cook

Nature's fertilizer factory

ENHANCING NITROGEN FIXATION IN LEGUMES could have a profound impact on growing crops in the developing world. Douglas Cook, a plant geneticist and plant pathology professor at UC Davis, is working to make plants such as beans and peas more efficient at enriching the soil with nitrogen.

Legumes are important in the diet in developing countries because they are high in protein. Globally, one-third of the protein in the human diet comes from legumes. Legumes are also important in agricultural systems because the plants, in cooperation with root-associated bacteria, take atmospheric nitrogen and convert it to forms of nitrogen that help plants grow—a process called symbiotic nitrogen fixation. "In areas where people cannot afford commercial nitrogen fertilizer, legumes function like a 'free fertilizer factory'," Cook said.

Cook noted that nitrogen fixation is as important as photosynthesis: "it's essential for life on the planet." His nitrogen fixation research examines the genetic pathways in legume plants that enable a symbiotic relationship with nitrogen-fixing bacteria. Evidence suggests that nitrogen fixation in legumes has been weakened during domestication, and reversing this trend is a key objective of his current efforts.

"If we can understand these nitrogen-fixing pathways, and identify the genes involved, we may be able to go back and re-domesticate legumes so that they're more efficient in nitrogen fixation," says Cook. "This could have a real impact in helping the developing world, particularly in impoverished areas like sub-Saharan Africa, where the high cost of nitrogen fertilizer limits its use by resource-poor subsistence farmers."

By applying complex molecular biology to crop improvement, Cook and his colleagues are helping the world with much-needed food and economic opportunities. – AF

Russell Hovey (left) and Robert Cardiff

ROBIN DERIEUX/UC DAVIS

Russell Hovey and Robert Cardiff

Mammary biology research on pigs benefits humans

AS A LACTATION PHYSIOLOGIST, PROFESSOR Russ Hovey straddles the worlds of animal science and human health. Hovey has teamed with Professor Robert Cardiff, a pathologist at the UC Davis Center for Comparative Medicine and the UC Davis Cancer Center, to seek a more authentic model for human breast cancer by using pigs rather than mice as a model organism. The researchers expect that studying healthy mammary glands and tumor formation in pigs could lead to improved diagnostic imaging, drug treatment, and surgery for breast cancer in humans.

Hovey's interest in animals began in high school in his native Australia, where he participated in an agricultural club that encouraged him to raise dairy cows. As an undergraduate student, he branched out into research on lactation. After completing his graduate studies in New Zealand, Hovey did postdoctoral research on the biology of the mammary gland at the National Institutes of Health (NIH). He joined the UC Davis animal science faculty in 2007.

"I'm committed to agriculture, but I wanted to stray beyond the path of a traditional animal scientist," said Hovey. "Working at NIH as a postdoc, surrounded by 16,000 people all doing human health research, gave me a whole new toolkit."

Hovey and his team are investigating how hormones in the body regulate the mammary gland, milk synthesis, piglet growth, and milk yield. "The neat thing about our research is that what we're learning can help animals produce more milk, and producers make more money," said Hovey. "But we can take this knowledge and apply it to human health and breast cancer as well." – RD

Glenn Young

Stalking bad bacteria

Bacteria that cause foodborne illnesses can be stealthy organisms. Professor Glenn Young discovers their secrets. In the Young laboratory, researchers investigate the fundamental mechanisms of how foodborne pathogens survive, how these bacteria cause disease in humans, and what determines their virulence.

One process that Young and his colleagues are investigating is how bacteria associated with food poisoning—including *Salmonella*, *E. coli*, and *Yersinia*—wield a special weapon to infect people. This rogue's gallery of bacteria uses a "molecular syringe" (known as a Type III secretion apparatus) to inject toxic proteins into the host cell, manipulating its physiology and enhancing the survival of the bacteria.

"It's a form of molecular communication," said Young, who joined the UC Davis Department of Food Science and Technology in 1999. "The communication between the bacteria and the host is what results in many of the symptoms we experience from the infection."

Funded by the National Institutes of Health, this type of research on pathogens helps producers prevent bacteria from cycling through the food supply from farm to fork.

"Food safety is in the news all the time," said Young. "We're here to support California agriculture and industry, but we also work with universities and growers overseas to share our knowledge of foodborne illnesses because what we eat comes from all around the world. As consumers, we have a vested interest." – RD

ROBIN DERIEUX/UC DAVIS

KATHY KEATLEY GARVEY/UC DAVIS

Bruce Hammock

From entomology to human health

TRANSLATING A NEW SCIENTIFIC DISCOVERY INTO A pharmaceutical drug that benefits society is a process that can take decades.

For Bruce Hammock, the journey began in 1969 when he was a graduate student at UC Berkeley. Hammock, who is now a distinguished professor in the UC Davis Department of Entomology and also the UC Davis Cancer Center, was researching fundamental insect biology when he and colleague Sarjeet Gill discovered a novel enzyme that helps caterpillars transform into butterflies. Initially, they were interested in using this knowledge to develop endocrine controls for caterpillars, which can cause extensive crop damage.

By the mid-1970s, however, Hammock and Gill (now a professor at UC Riverside) realized that their discovery might also have applications in human health. As they learned more about the role of the s-EH enzyme, which they found to be present in insects and mammals, they hypothesized that inhibiting it could reduce blood pressure, pain, inflammation, and blood sugar. It took many years and the involvement of many laboratories throughout the world to prove this hypothesis.

"I view myself as a proselytizer," said Hammock, who is originally from Arkansas. "I don't want to hold on to an idea. I want to run around and tell everybody how great it is, hoping that they'll work on it too."

The new discovery spread slowly, but the inquiry into s-EH enzyme inhibitors and their effects on human health was eventually taken up by researchers at universities, pharmaceutical companies, and medical schools, including several collaborators at UC Davis. This research holds promise for the development of a whole new class of drugs to help treat hypertension, diabetes, kidney disease, heart enlargement, and other cardiovascular problems. Clinical trials have begun, and Hammock expects these drugs to be approved for the marketplace within the next five to 10 years. – RD

Louis Botsford (left) and Alan Hastings

Louis Botsford and Alan Hastings

Modeling marine reserves

THIS LAST SPRING 21 NEWLY CREATED "MARINE protected areas" took effect off the Northern California coast to help manage fisheries and preserve biodiversity.

"Marine reserves have a long history," says fish and conservation biology professor Louis Botsford. "The Arabs in North Africa used the same idea to manage their coral fisheries in the 11th century."

These new reserves were established by the state of California. Pioneering work by Botsford and environmental sciences and policy professor Alan Hastings begun in the early 1990s bolstered the scientific rationale for strategically located marine reserves. Their mathematical modeling simulated how marine organisms ranging from rockfish to abalone fare under different scenarios. It showed the approximate equivalence in fishery yield of marine reserves and conventional fisheries management.

"This means that the spillover from these protected areas is going to have more of a benefit in an area where a fishery is already down, not as much in an area where a fishery is healthy," Botsford said.

Botsford traces his interest in marine fisheries to his youth near Fort Bragg, Calif., where his father worked in a fish-processing plant and his uncles were fishermen. He spent the first 10 years of his academic career studying the population dynamics of Dungeness crabs and documented the source of their predictable—yet dramatic—swings in abundance. He joined the UC Davis faculty in 1980.

Hastings grew up on Long Island, N.Y., where his curiosity about marine life and skill in mathematics led to a career as a leading theoretical ecologist. He joined the faculty in 1979, and is a distinguished professor. "My interest in marine reserves came partly from my focus on spatial population dynamics, because marine reserves *are* a form of spatial

JOHN STUMBOS/UC DAVIS

management," he said. "The impetus for marine reserves was the fact that many harvested fish species were in trouble, combined with concerns about maintenance of biodiversity in the oceans."

A key to the success of marine protected areas is monitoring and comparing "real world" results with predicted results. So, Hastings, Botsford, and fellow environmental sciences professor Marissa Baskett are developing new computer models to evaluate the performance of marine protected areas on California's central coast for species such as blue rockfish, black rockfish, lingcod, and cabezon.

"If it's working out the way we predicted, then that's fine," Botsford said. "If it's not, then we fine tune and make some changes."

That's the ebb and flow of what resource scientists call adaptive management. "People sometimes want a very simple answer," Hastings says. "But these are complex systems, so you need to continue taking data and then updating models and changing management." – JS

JOHN STUMBOS/UC DAVIS

Dietmar Kueltz

How a fish copes

A lifelong curiosity about aquatic organisms led Dietmar Kueltz into a career investigating how fish respond to environmental stress.

Among the species the UC Davis animal sciences professor studies are sturgeon and tilapia, fish important for aquaculture, and three-spine stickleback, a small native fish with many marine and freshwater cousins throughout the Northern Hemisphere. Tilapia and some sticklebacks are tolerant of salinity changes, water pollution, and temperature extremes. Kueltz studies their proteins to better understand the physiological mechanisms that give these fish their resiliency.

Kueltz first became intrigued with the stickleback's and tilapia's ability to thrive in brackish water while a marine biology student in Germany. "The amazing thing is that these fish can live in seawater and in freshwater," he said. "Not many fish can do that. I wondered why some organisms can tolerate dramatic environmental changes—or stress, in general—and most of them can't."

Organisms tolerant to one type of stress frequently display tolerance to other stressors—pesticides and heavy metals, for instance. The reason for this "cross tolerance" is revealed at the molecular level, Kueltz says. No matter what the source of the stress, it damages proteins, and DNA. The body counteracts with a system designed to repair the proteins and DNA.

Knowledge about how these repair systems function could be applied to improve stress tolerance in aquaculture operations and also to help minimize human impacts on ecosystems. It also could lead to a variety of biomedical, agricultural, and other applications—therapeutics for surgery, for instance, or tools for managing farm animals.

"We have to find out how life works," he says. "There will always be a future application if we do good science." – JS

ROBIN DERIEUX/UC DAVIS

Fumio Matsumura

Targeting cancer cells

Professor Fumio Matsumura has studied the effects of contaminants on living organisms for decades. Recently, the environmental toxicologist made an unexpected discovery about one molecule (the Ah receptor) that could lead to better cancer treatments.

When Matsumura came to UC Davis in 1987 from Michigan State University, he had been examining the effect of dioxins on fish in the Great Lakes. Dioxins are persistent environmental pollutants formed primarily through industrial processes, and are known to cause cancer and other adverse health effects.

Gradually, Matsumura's interests shifted to the effect of dioxins on human health and to a protein molecule called the aryl hydrocarbon receptor (Ah receptor). Receptors are like little doors on cells that allow chemical messengers, such as hormones, to deliver a signal to the cell. The Ah receptor allows dioxins to deliver a toxic message to cells.

Matsumura wondered why the Ah receptor persevered through evolution if its presence threatens the organism, and hypothesized that it must have some additional function. "At the beginning, we're purely interested in the mechanisms,"said Matsumura, a distinguished professor in the Department of Environmental Toxicology and the UC Davis Cancer Center.

The Matsumura team discovered that cells that overexpress Ah receptors are more difficult to kill, giving them a survival advantage. They also found that some malignant types of breast cancer cells produce extra Ah receptors, helping them to grow more aggressively. This discovery means the Ah receptor could possibly be a target for therapeutic approaches to cancer. The Matsumura laboratory has begun investigating natural compounds that will effectively block the Ah receptor in breast cancer cells, making them easier to kill.

"Breakthroughs in science usually come from people who can find the simplest way to attack a complex problem," said Matsumura. "Sometimes you have no idea that something might lead to a cancer cure." – RD

Valerie Eviner

A range of opportunities

RANGELAND ECOLOGY PROFESSOR VALERIE EVINER first discovered the power of plants while growing up in New Jersey.

"We had this big rock in our backyard and a tree seedling eventually broke the rock apart and started its own little environment," she recalls. "I became fascinated with the concept that plants aren't just responding to their environment. Plants help create their environment."

That seed of curiosity about the plant world took full root in graduate school at UC Berkeley, where Eviner studied grassland ecology. Her thesis research developed a new approach to understanding how different plant species affect soil processes such as water infiltration and storage, and nutrient and carbon cycling.

After a few years with the Institute of Ecosystems Studies in New York, Eviner joined the UC Davis Department of Plant Sciences faculty in 2006. Her research continues to focus on how plants interact to modify their environment, information useful to land managers trying to promote biodiversity, manage invasive weeds, manage ecosystem services, or improve livestock forage.

JOHN STUMBOS/UC DAVIS

Current field experiments at UC Davis and on remote California rangelands are examining the ecosystem impacts and competitive dynamics of invasive species such as yellow starthistle, medusahead, and barbed goatgrass with native plants and "naturalized" non-natives such as wild oats, soft chess, and annual ryegrass.

Her research has also shed new light on plant nutrient supply. California rangeland plants produce massive amounts of seeds each year, but anywhere between 50 and 90 percent of sprouted seedlings can't compete with bigger, healthier sibling plants. "What we found is that those dying seedlings are where plants are getting a huge proportion of their nutrients," she says. "This sets up the perfect slow-release fertilizer system."

While Eviner's research is meticulously teasing apart the dynamics of rangeland ecology, she hasn't lost sight of the big picture. "We spend a lot of time working with different restoration groups and rancher groups to get their input on what are the most important things for them," she said. "And we spend a lot of time training students how to link research and cutting-edge theoretical work with on-the-ground management."

That comprehensive approach helped earn Eviner a trip to the White House in 2008 to receive a Presidential Early Career Award for Scientists and Engineers. At 36, she was the youngest person ever nominated for the award by the U.S. Department of Agriculture. – JS

ROBIN DERIEUX/UC DAVIS

Ron Tjeerdema

Oil spill expertise

WHEN THE WORST OIL SPILL IN U.S. history began in April with an explosion and a fire on a BP drilling rig in the Gulf of Mexico, government and industry sought the advice of experts to determine the best response. Media also sought academic expertise to help explain the crisis.

The Deepwater Horizon oil spill thrust Professor Ron Tjeerdema, chair of the Department of Environmental Toxicology at UC Davis, into the spotlight. An internationally recognized expert on chemical dispersants and the environmental fate and toxicity of petroleum hydrocarbons, Tjeerdema was one of 50 scientists called to an emergency response meeting in Louisiana organized by the National Oceanic and Atmospheric Administration.

"I worked on oil spills for 25 years in relative obscurity," said Tjeerdema. "Then during the past several months, there were times I got so many calls from the media that I could hardly get any work done."

The Gulf oil disaster illustrates the need to continue research on chemical dispersants and petroleum—particularly to investigate how they degrade and their impacts on the ecology of the Gulf of Mexico—so that this knowledge can help inform decision makers in future emergencies.

"We need reliable research funding to do ongoing studies in this area," said Tjeerdema. "Given the oil traffic on ships out of Alaska, the possibility of an accident is not 'if,' but 'when.' We *will* need the science." – RD

Kate Scow

Soil sleuth

PROFESSOR KATE SCOW FIRST DISCOVERED CLUES to her future as a soil microbiologist when she was 15.

"I mysteriously felt compelled to collect a sample of soil representing each country on my family's European road trip," she said.

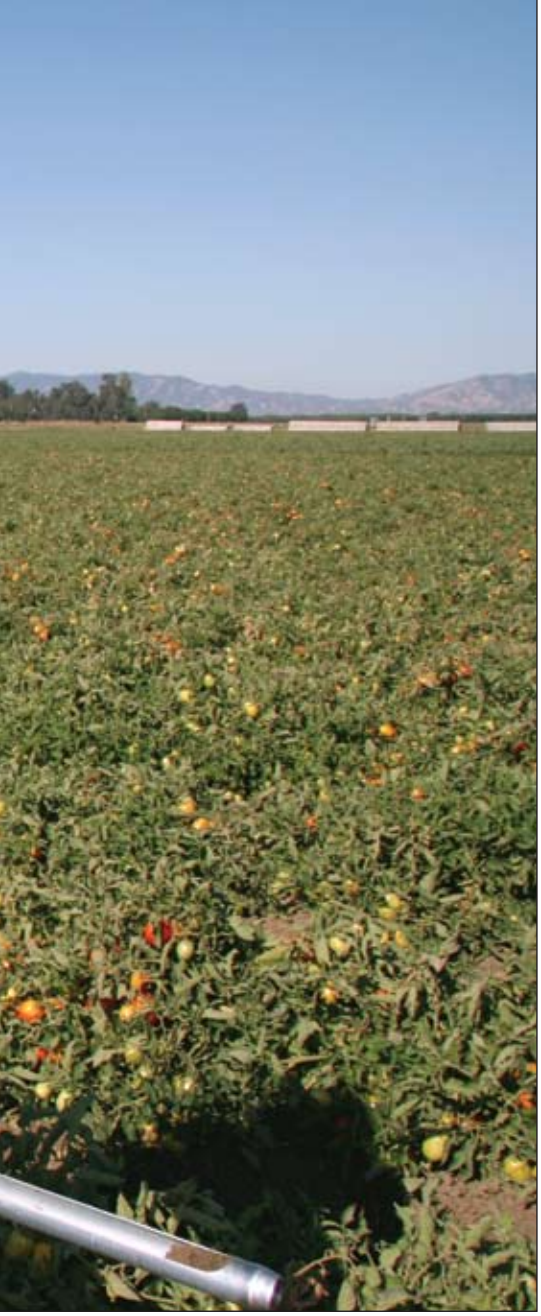
A decade later, while conducting risk assessments for the Environmental Protection Agency, she came to an inescapable conclusion. "All roads seemed to be leading to soil, and I was inspired to start walking down one," she said.

Scow entered graduate school at Cornell University to study interactions between microbial and physical processes in soil and their influence on the persistence of pollutants in the environment. Since joining the UC Davis Department of Land, Air and Water Resources faculty in 1989, she's been digging into the mechanisms of soil microorganisms that contribute to ecosystem health.

"Soil is essential for the functioning of terrestrial ecosystems—natural or managed ones—as a reservoir of nutrients and water, as a reactor transforming organic and inorganic chemicals, and as habitat for a staggering amount of biodiversity," she says.

In 1998 Scow's lab discovered a bacterium capable of destroying the gasoline additive MTBE, a groundwater contaminant. She and colleagues developed a biological reactor that stimulated the activity of the bacterium and used the technology to clean up an important drinking-water aquifer in Southern California.

More recently, Scow and her research team have discovered some surprising effects of biofuels on microbial communities in groundwater. For instance, the microbial degradation of ethanol can trigger changes that slow the degradation of



JOHN STUMBOS/UC DAVIS

benzene, a carcinogen in gasoline, and thus causing it to migrate farther downstream than it would otherwise.

Scow directed the UC Kearney Foundation of Soil Science from 2001 to 2006 to coordinate and fund research projects on soil carbon in terrestrial ecosystems. Currently, she has key roles in the university's sustainable farming programs—as deputy director of the Agricultural Sustainability Institute at UC Davis and as director of the Russell Ranch long-term sustainable agriculture facility. Her goal in this work is to tap the power of soil microbes to perform ecosystem services that are often overshadowed by use of synthetic fertilizers and pesticides.

"Can we better harness natural processes and create more energy-efficient, less polluting, and more sustainable agriculture practices?" she asks. "We aim to develop new tools and practices that encourage beneficial—and discourage detrimental—microbial processes to provide new alternatives for farmers." – JS

David Neale

Creating healthy forests

Plant sciences professor David Neale has never had a problem seeing the forest—or the trees.

"My love of trees began at an early age with family trips to national parks and national forests, a forestry merit badge in the Boy Scouts, and a course in forest ecology at Yale while still in high school," he said. "I've been doing this my whole life, really."

Early on, Neale focused on forest genetics. After 19 years with the Institute of Forest Genetics in Berkeley, the New England native joined the UC Davis faculty about five years ago. The Neale lab website—http://dendrome.ucdavis.edu—reveals a wide range of projects investigating the genetic code of pines, redwoods, poplars, and other tree species of economic and ecological significance.

"On the surface, my research in tree genomics looks very basic, but actually it's very applied," Neale says. "We are developing the tools that will help breeders breed improved trees for a variety of important characteristics—growth, wood quality, disease resistance, and energy potential. Just as importantly, these tools will help forest land managers maintain healthy forests and create future forest trees that can adapt to climate change."

By its nature, progress in this type of research takes a measured pace. "One must be very patient working on forest trees, so it's incremental by design," Neale says. "After 30 years of doing this, it's adding up to something important." – JS

COURTESY

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Google, Inc.
Häagen-Dazs®
Institute of Food Technologists
International Zinc Association
Craig ('76) and Julie (M.S. '79) McNamara
The Morning Star Company*
Nor Cal United Growers Association
David and Lucile Packard Foundation*
Rohm and Haas Company
Scotts Company, LLC
Beverly and Charles Summers

$25,000–$49,999

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American Phytopathological Society
Anheuser-Busch InBev*
Patricia and Stephen Berger
BioStar Systems, LLC
California Deer Association
Duarte Nursery, Inc.
Donis and Erwin Eichhorn—Eichhorn Trust
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FMC Corporation APG
G. Kirk Swingle Foundation
Garden Rose Council, Inc.
Beverly McFarland (Ph.D. '83) and Thomas Gordon (Ph.D.'81)
Heritage Technologies, LLC
Mark J. Herthel
HMC Marketing
Gail and Thomas Hollingsworth
Josie Hugie
International Plant Nutrition Institute
Intervet, Inc.
Barbara Banke and Jess Jackson—Jackson Family Wines, Inc.
JEFO Nutrition, Inc.
Joseph H. Hill Memorial Foundation
Micronutrients
Marilyn and Peter Moyle
MPT Mustard Products Technologies, Inc.
National Association of State Universities and Land-grant Universities
Otsuka Pharmaceutical Company, Ltd.
Oxion, Inc.
Pacific Coast Producers
Paramount Farming Company, Inc.
Pearlstein Family Foundation
Pharmavite
Platinum Performance, Inc.
Reiter Affliated Companies, LLC
Richard H. Salz
Stuart Scott
Seminis Vegetable Seeds, Inc.
Sierra Health Foundation*
Society for Advancement
Unilever Research Laboratory
United Phosphorus, Inc.
Steve Wallace—Wally's Wine & Spirits
Patricia and Paul Yeretzian
Ronald M. Yoshiyama
Zinfandel Advocates & Producers

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American Malting Barley Association, Inc.
Amigos del Lago de Atitlan
Amplicon Express
Arcadia Biosciences, Inc.
Arcadia Vineyards, LLC
Biomedical Technologies, Inc.
Gary A. Braness
Ruth and A. Lloyd Brown
Mary Louise and Timothy ('86) Bucher*
Campbell Soup Company
Clif Bar Family Foundation
Eric E. Conn
Conservation International Foundation
Darrell F. Corti
Vibha ('66) and Bhalchandra (M.S. '62, Ph.D. '68) Dave
David E. Gallo Foundation
Peter O. DeChant
Dole Fresh Vegetables, Inc.
E & J Gallo Winery
Lawrence M. Elbroch
Evonik Degussa GmbH
Ewing Marion Kauffman Foundation
Ferrer Bobet SL
Floratine Biosciences, Inc.
Angela ('96) and Theodore Foin
Fuji Flavor Company, Ltd.
Georgia-Pacific Financial Management, LLC
Gimbal Brothers, Inc.
Global Alliance for Livestock Veterinary Medicine
Great Salt Lake Minerals Corporation
Growers Transplanting, Inc.
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Helen Keller International
Herbst Foundation, Inc.
Isagro USA, Inc.
ISK Biosciences Corporation
JMS Flower Farms, Inc.
Keithly-Williams Seeds
Land O'Lakes, Inc.
Lehigh Agricultural and Biological Services, Inc.
Maruchan, Inc.
Kenny D. Melton
Min-Ad, Inc.
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National Restaurant Association
National Council of Commercial Plant Breeders
Novozymes, Inc.
Nunhems USA, Inc.
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Roderic and Catherine Park—Rockpile Vineyard
Penta Water Company, Inc.
PhytoGen Seed Company, LLC
Plant Pathology Agency Account
Point Reyes National Seashore Association
Processing Tomato Advisory Board
Prophyta
Rijk Zwaan Breeding BV
Rosen Tantau
Rotem BKG, LLC
Eugenia and David Ruegg—Ruegg & Ellsworth
Constance and Norbert Rupp
Barbara ('70) and Paul (M.S. '86) Schneeman
Sight and Life
Jeffrey D. Smith
Stuart Products, Inc.
Sub-Zero Freezer Company, Inc.
Takii & Company, Ltd.
George D. Tibbitts ('80, M.S. '87)
Transagricola, S.A.
U.S. Civilian Research and Development Foundation
United Genetics Seeds Company
Vilmorin
WestBred, LLC
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Western Development and Storage

$5,000–$9,999

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Mary and Vernon Altman
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AMVAC Chemical Corporation
Arysta LifeScience North America
Baglietto Seeds
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Frances L. Bennion—Silicon Valley Community Foundation
Linda F. Bisson
Mary and Fredrick Bliss
Deborah Lyon and Kris Bonner ('74)
Brandt Consolidated, Inc.
Brewers Supply Group
California Landscape Contractors Association
California Poultry Federation
Cal/West Seeds
California Olive Ranch, Inc.
Certis USA, LLC
Chevron Corporation*
CMVCA Research Foundation
Cramer Fish Sciences
Dairyland Seed Company, Inc.
Davis Farmers Market Foundation
Farm Foundation
Flamingo Holland, Inc.
Food and Agriculture Organization
Food Machinery International, LLC
Forage Genetics International
Anyisha and Lynn Fritz
Christine Fry ('81) and Isao Fujimoto
General Hydroponics
Nancy and William Gilbert
Emily Griswold ('98) and Nikhil Joshi ('97, M.A. '02)
Georgette and Louis (Ph.D. '76) Grivetti
H. J. Heinz Company, LP
Ladislas and Ted Hall
Harborchem
Deborah N. Pinkerton ('77) and Bret Hewitt ('76, M.A. '83)

International Livestock Research Institute, Ethiopia

Lallemand, Inc.

Martin D. Lemon

Siming Liu

Livermore Valley Winegrowers

Nilah M. MacDonald

Makhteshim-Agan of North America, Inc.

Marrone Organic Innovations, Inc.

Ellie and Jack (Ph.D. '65) Maze

Steve McCall—McCall's Nurseries, Inc.

Mendocino County Blacktail Association

Miguel Torres SA

MillerCoors

Mission Ventures, Inc.

Mosquito and Vector Control Association of California

Peter and Merle Mullin

National Farmers Organization

Sally and Robert Nicholson

Sarah ('77) and John ('75) Nitta—High Ranch Nursery, Inc.

James Nocek—Spruce Haven Farm, LLC

North American Instruments, LLC

Darice and Jeffrey O'Neill

Orange County Wine Society

ORO Agri, Inc.

Pace International

Scott Park—Park Farming

Young Do Park ('06)

Pebble Beach Company

Produce Marketing Association, Inc.

Puroast Coffee Company, Inc.—Kerry M. Sachs ('83) James M. Sachs ('99)

Rio Farms, LLC

William and Nancy Roe

Margaret and Robert Rucker

Sand County Foundation

Shauna ('78) and Phillip ('78) Schneider

Rita and James Seiber

Seth Sprague Educational Foundation

Stoller Enterprises, Inc.

Strachan Apiaries, Inc.

Stuart Foundation

Tessenderlo Kerley, Inc.

Mary and William Traverso

TriCal, Inc.

Cheryl A. Scott (D.V.M. '94) and Dirk Van Vuren

Western Candy Conference

Western Farm Service, Inc.

XPEDX National Shared Service Center

$2,500–$4,999

American Seed Trade Association

Jacqueline and James Ames

John Anderson—Hedgerow Farms

James D. Atwood

Jacque ('64) and Wayne ('64, J.D. '71) Bartholomew

Bay Area Bottling, LLC

Jeremy Benson—Benson Marketing Group, LLC

Angela ('93) and Robert Biggar

Bohart Museum Society

Shih M. Chung

Community Foundation of Riverside

Davis Sensory Science Foundation

Ann and Joe Di Anna

EnviroLogix, Inc.

Kelleye Eversole

Kristen ('89) and James ('89) Finch

Food Industry Foundation

Julius M. Hastings

Gladys and Alan ('55) Hoefer—Hoefer Family Foundation

IMMVAC, Inc.

Institute of European Studies—UC Berkeley

Integrated Environmental Restoration

James C. Horgan—California Community Foundation

Kim and Albert Katz—Katz and Company

Carol A. Knight ('72)

Susan ('68) and Bruce Larock

Richard C. Larock ('67)

Marion and Peter London

Maine Audubon Society

Marin Rod and Gun Club

Shirley Maus

Karen ('82) and John Medford

Miller Chemical & Fertilizer Corporation

Todd Minzlaff

Money/Arenz Foundation, Inc.

Brenda and William Murphy

Kenneth A. Murray ('95)

Musco Olive Products, Inc.

NBC News Bureaus, Inc.

Northwest Agricultural Products

Nurstech, Inc.

P.E.O. Foundation

Pasolivo Olive Oil

PlantSense

Vinette and Beatty Ramsay

Resource Seeds, Inc.

Resources Legacy Fund Foundation*

T.J. and Valeta Rodgers—Clos de la Tech, LLC

Saltonstall Estate, LLC

Sambazon, Inc.

Carol ('04) and Hal ('52) Sconyers

Nancy, Sedra and Howard Shapiro

Claudia and Richard ('68) Smith

James Solomon

Marjorie and Herbert Stone

Target

Valmont Industries, Inc.

Rosalie and Larry Vanderhoef

Vineyard and Winery Management

Eleanor and Harry ('47, M.S. '50) Walker

Washington Hop Commission

Wilbur-Ellis Company

World Wide Wheat, LLC

gayle yamada and David Hosley—yamada-Hosley Fund

$1,000–$2,499

A. Lang and L. Kennedy Revocable Trust

Agdia, Inc.

Mitzi S. Aguirre

Diane and Shawn Alexander

Deladier ('90) and Roberta ('88, M.S. '90) Almeida

Annual Reviews

Karen ('71) and Larry ('69, Ph.D. '74) Bellinger

Berlin High School

BHN Research

Donna Billick ('73, MFA '76)

Brian and Kim Billick

black & light co., LLC

Marcia and Karl ('78) Blackmun

Blommer Chocolate Company

Judith Blum

Brandywine Foundation

Madeline Brattesani

Brewers Association, Inc.

Victor Bucher

Cafe Press

Capital Group Companies Charitable Foundation

Catalytic Generators, Inc.

Bill Cervenka

Gale and Jack Chapman

Civic Garden Club of San Carlos

Mary Lou Cockcroft

Community Foundation of Louisville, Inc.

Cooks Collision

Copper Hill Olive Oil Company

Corto Olive, LP

Jacqueline and Richard Cotta

Crop Production Services, Inc.

Nancy and Donald Crosby

Lois and John Crowe

Rayanne D. Cupps (Ed. Cred. '68)

Vivianne and Normand Davy

Josephine and John De Luca

Harriett and Richard Deamer

Joyce and Daryl Deering

Diablo Valley Fly Fishermen

Far Niente Winery

Margie L. Gallagher ('76)

Sandra ('71) and Tracy Gardner

Gargiulo, Inc.

Kay and Robert ('57) Gaskill

Gayle ('81) and Stephen ('79, M.A. '83) Ghiglieri

David and Judy Gilchrist

Gilchrist & Soames

Gills Onions, LLC

Glenn-Tehama Pure Seed League

Golden West Women Flyfishers Foundation

Karol ('73) and Michael ('73) Gottfredson

Patricia and James Grieshop

Edward E. Grissell ('67, M.A.'69, Ph.D.'73)

Thomas Griswold

Alice and Dieter Gruenwedel

Vivienne Haggerty Residual Trust

Kelly Stewart and Alexander H. Harcourt

Linda Harris

Gerald Hillier

Iowa Honey Producers Association

Lise and Robert Jones

Aileen ('66) and Adel ('62, Ph.D. '66) Kader

Linda M. Kennedy

Knights of the Vine Brotherhood

Ira J. Kreft

John E. Krogsrud

Jean Landeen ('66)

Landis International, Inc.

Andrew S. Lang ('84)

Lazy Q Fish Ranch LLC

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Mary Ann and Ernie Lewis

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Jennifer R. Lubin ('91)

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Robert Mazalewski ('75, M.S. '77)

McEvoy Ranch

Merrill Lynch & Company Foundation

Constance ('82) and Jon ('82) Moramarco

Yong Cha and Walter Morris

Keiko and Kenji Murata

Native Sons Wholesale Nursery, Inc.

John Natsoulas

Nutrient Technologies, Inc.

The Olive Oil Source

Beatrice ('71, M.A. '74, Ed. Cred. '75) and Kevin ('77) Olsen

Oregon State University Foundation

Diane Phaff and Jerry DeCamp

Placer County Wine and Grape Association

PMS Instrument Company

Regional Water Authority

Carla W. Reiter

Warren G. Roberts ('64, M.A. '69)

Roll Giving

Janet F. Roser (M.A. '78, Ph.D. '82)

Sacramento Area Beekeepers Association

Sakata Seed America, Inc.

Sartec Corporation

Lucy Scarlett ('01) and Matt Williams

Maxine L. Schmalenberger

Kathleen (Ed. Cred. '92) and Norman ('67) Schoening

Laurel ('61, Ed. Cred. '62) and Ronald ('60) Schuler

Harold Schultz

Nick Sciabica and Sons

Dorris ('48) and Richard ('47) Sciaroni

Dixie and Daniel ('81, D.V.M. '86) Senestraro

Christine ('82, D.V.M. '86) and Frank (D.V.M. '86) Sherer

Chenhsuan E. Shih

Sierra Foothills Rose Society

Robert Gregoire and Kathleen Socolofsky

Marion and Esther Socolofsky

Judy and Richard (Ph.D. '89) Standiford

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Claire and John Steigerwald

Tim G. Stewart ('06)

Brian (J.D. '73) and Karen ('76, TC '77) Swift

Flora Tanji

Daniel C. Thomas

Kathryn Tolin ('78) and Bruce Bailey ('75)

Sarah Elizabeth True

Anthony T. Tse ('71, M.A. '72, Ph.D. '75)

Shirley (Ph.D. '56) and Kenneth (Ph.D. '57) Tucker

Turtle Island Restoration Network

Jean-Marc Leininger ('87) and Diane Ullman (Ph.D. '85)

Deborah Ullman

Valco Enterprises, LLC

Claire and D. Michael ('85) Van Konynenburg

Marian Ver Wey (M.S. '88)

Laura and John ('84) Weubbe

Louise and Richard Wiesner

W-L Research

Rick L. Wood

Lin L. Wu

Ellen (M.S. '81) and Devon Zagory—Zagory & Associates, LLC

**Chancellor's Laureates, a campuswide giving club comprised of individuals and corporations who have each cumulatively donated $1 million or more to UC Davis.*

POPPING THE CORK ON A GREEN VINTAGE

Eco-conscious brewery, winery, and food science facilities now open

LESS THAN TWO YEARS AFTER A CEREMONIAL groundbreaking, the doors are now open at the campus's new Teaching and Research Winery and the August A. Busch III Brewing and Food Science Laboratory.

The facility and its equipment, part of the Robert Mondavi Institute for Wine and Food Science, were funded entirely by private donations. Many partners contributed to ensure teaching and research needs will be met for decades to come. The only LEED Platinum building on campus includes a food and tomato processing facility, a brewery, a winery, and a milk processing laboratory.

JOHN STUMBOS/UC DAVIS

In the new winery with Cypress Semiconductor CEO T.J. Rodgers (center) are (clockwise from top) Tom Lorincz (Therma Corporation), Max Kingsbury (Cypress), UC Davis viticulture and enology professors Roger Boulton and David Block, and UC Davis winemaker Chik Brenneman.

CALIFORNIA PROCESSING TOMATO INDUSTRY PILOT PLANT

Adding to the support of The Morning Star Packing Company and other tomato processing leaders, Pacific Coast Producers, J.G. Boswell Company, Del Monte Foods, and Campbell Soup Company helped equip the pilot plant. Additionally, the Southern California Institute of Food Technologists Section provided a second gift to the project.

ANHEUSER-BUSCH INBEV BREWERY

The Anheuser-Busch Foundation provided funds to move the campus's modern, pilot-scale brewery from Cruess Hall into the newly named Anheuser-Busch InBev Brewery so it was ready for fall quarter.

MILK PROCESSING LABORATORY

Hilmar Cheese Company made the first major contribution from the California dairy industry to support the Milk Processing Laboratory and has challenged others to support the project. "Innovations in dairy products and processing are critical to meet the needs of customers worldwide and to keep the United States competitive," said John Jeter, Hilmar Cheese Company chief executive officer and president.

TEACHING AND RESEARCH WINERY

The J. Lohr Fermentation Hall contains 152 small research fermentation tanks, thanks to T.J. Rodgers, CEO of Cypress Semiconductor. Rodgers and his team designed, fabricated, and installed the research fermenters, as well as a temperature control system and wireless data network. Design work continues on 14 large teaching fermenters with support from vintners Jerry Lohr and Bart and Daphne Araujo.

The Jess Jackson and Barbara Banke Special Collection Room stores wines donated for special occasions. Additionally, the Jackson Family Wines Clean-in-Place Room will provide automated cleaning of all fermenters, with spent solutions recaptured rather than drained.

The Cooperage 1912 Napa Barrel Room contains 40 barrels for aging student-made wines in a temperature- and humidity-controlled space.

A sorting table, crusher, and two presses were provided primarily by Bucher Vaslin.

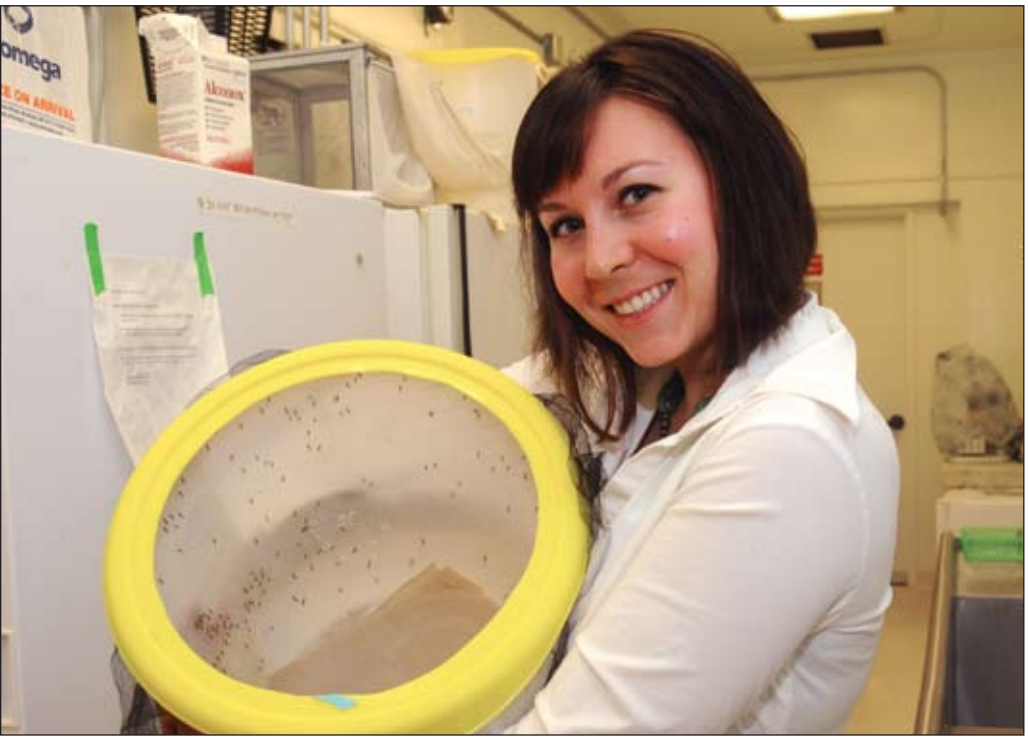
Thermo Labs made a gift of analytical laboratory equipment for routine analyses and automated composition panels for grapes and wine.

The LEED Platinum rating certifies the building's high thermal efficiency, low energy consumption, use of rainwater in toilets and landscaping, and other "green building" features. Learn more at greenrmi.ucdavis.edu.

— Melissa Haworth

GRAND OPENING

The grand opening of the new LEED Platinum facility is Friday, January 28, 2011, at 10 a.m. The event is open to the public.



KATHY KEATLEY GARVEY/UC DAVIS

Financial support provided by the Arthur J. and Dorothy D. Palm Agricultural Scholarship is helping Ashley Horton conduct research on how mosquitoes transmit malaria.

'SKEETER STUDY BITES BACK

Alum's generosity helps student fight malaria

THE COLLEGE OF Agricultural and Environmental Sciences (CA&ES) has numerous friends who help keep our college vibrant. Some show their commitment to the college through annual gifts that support the programs they care about. Many also choose to leave a gift to the college through their estate plans.

The generosity of one alumnus continues to make a difference for our students. Arthur J. Palm received his bachelor's degree in agricultural economics in 1939. As a testament to his formative experience here, he and his wife established a testamentary gift to CA&ES.

The Arthur J. and Dorothy D. Palm Agricultural Scholarship Fund is an endowed (permanent) fund that supports undergraduate and graduate students. The fortunate student who benefitted this year is Ashley Horton, whose cutting-edge research is examining how the mosquito's immune system affects transmission of the malaria parasite. This research has resulted in the first published report on naturally occurring, malaria-associated mutations (SNPs) in *Anopheles gambiae* immune genes.

"There are nearly 500 million cases of malaria annually, leading to more than one million deaths every year," Horton says. "My research focuses on understanding transmission and also aims to identify mutations that could be utilized in the design of mosquitoes resistant to malaria. Ultimately, we would like to decrease malaria worldwide."

— Christine Schmidt

MANY WAYS TO GIVE

Not only did the Palm Scholarship fund provide funding to allow Ashley Horton to devote more time to her research, it helped meet a required match for a grant from the National Institutes of Health. Thus, the Palms' generosity helped leverage the NIH grant to support Horton's graduate training.

The University of California is committed to keeping the doors to higher education open. UC Davis is a participant in the systemwide Project You Can effort, whose goal is to raise $1 billion for student support over the next four years—double the amount raised during the past five years.

If you would like to help make a difference in the lives of bright, dedicated students like Ashley, consider making UC Davis part of your legacy. We are available to discuss your giving plans to help accomplish your philanthropic goals. Contact:

Christine Schmidt,
Assistant Dean, Advancement,
(530) 752-6414
cmschmidt@ucdavis.edu
http://caes.ucdavis.edu/giving

JOHN STUMBOS/UC DAVIS

A FAMILY FARMING TRADITION

Richard Rominger has spent a lifetime in public service to agriculture

FEW PEOPLE CAPTURE THE spirit and history of UC Davis better than Richard Rominger ('49, agronomy) and his family.

A fourth-generation Yolo County family farmer, Rominger entered the then-named College of Agriculture in the fall of 1946. Among the 1,500 or so students was a majorette named Evelyne Rowe who arrived in the fall of 1947 and thought Richard, a trombone player, was the best-looking guy in the Aggie band. She also became editor of the student newspaper. Rich and Evelyne married in 1951 and raised four children—Rick, Charlie, Ruth, and Bruce. All attended UC Davis and all became involved in the family farm.

Rominger sought a better grounding in the science of agriculture and took classes from memorable professors like W.W. Robbins (botany), Lyle Leach (plant pathology), Fred Briggs (agronomy), and Bob Allard (agronomy). "At one point during my college career I was debating whether I wanted to go back and farm or pursue an academic life," he said. "But the farm won out."

It's a good thing, too. Farmers in California, and throughout the country, have benefited from Rominger's lifetime of public service to agriculture.

Soon after graduation, he joined the California Farm Bureau's young farmers program, becoming its president in 1954. He also chaired the local water board and the local extension service advisory committee. In 1974 he became president of the Yolo County Farm Bureau.

In 1975 a mutual friend introduced Rominger to Gov. Edmund "Jerry" Brown, Jr., who asked him to lead the state's agriculture department. Rominger turned the governor down and the job went to Tim Wallace, an agricultural economist at UC Berkeley. Two years later Wallace returned to Berkeley and the governor came calling again. "I said I'd take the job under one condition: that they make it a separate department reporting directly to the governor."

AT THE HELM OF CDFA

The governor agreed and Rominger became Secretary of the

California Department of Food and Agriculture (CDFA) in 1977. Guiding CDFA, with its many competing interests, was a perpetual balancing act. At one point the state attorney general ruled that pesticide use came under the California Environmental Quality Act, which meant that every time a farmer wanted to use a pesticide he or she would have to file an environmental impact report—"unworkable," Rominger said. The solution was a "functional equivalent," a pesticide-use reporting system that is still in place today.

"We told farmers, 'Look, this is a sales tool,'" he said. "'You can tell consumers—your customers—that you're operating under the strictest pesticide regulations in the country. Your food is safer than anybody else's.'"

His team also fostered the state's first certified farmers markets.

Rominger's diplomacy and open-mindedness earned him the endorsement of both the Farm Bureau and the Sierra Club. "I didn't have any trouble talking to environmentalists," he said. "Some farmers felt like environmentalists were the enemy. I could see there were areas of common interest and common ground."

SUSTAINABILITY AND FARM POLICY

After six years at CDFA, Rominger returned to the family farm. But in 1992, as Bill Clinton was about to become president, local congressman Vic Fazio called Rominger and said, "Hey, we need you in Washington." With broad backing from farmer organizations and environmental groups, Rominger was recommended by U.S. Secretary of Agriculture Mike Espy and nominated by President Clinton for the No. 2 job at the U.S. Department of Agriculture. He had only to pass muster with the Senate Agriculture Committee.

ANN FLMER/UC DAVIS

Richard and Evelyne Rominger at the topping-off ceremony for the Robert Mondavi Institute for Wine and Food Science at UC Davis.

"I went in to see Senator Bob Dole from Kansas," Rominger recalls. "His first question was, 'Can you spell wheat?' and I told him, 'I not only can spell wheat, I grow wheat.' Dole thumped his fist on his desk and declared, 'You're in!'"

As deputy secretary of agriculture, Rominger helped shepherd the development of conservation programs to protect soil and water, and he implemented a policy directive

> "I think future generations would not forgive us if we pave over this agricultural productive capacity that we have here."

to foster sustainable development in agriculture, forestry, and rural communities. It's a commitment the Romingers have made on their own farm, where the family continues to work with university researchers on sustainable farming practices.

PRESERVING A WAY OF LIFE

Rominger is an ardent supporter of efforts to preserve farmland and open space. He's been on the board of the American Farmland Trust for 16 years and co-founded the Yolo Land Trust in 1988.

"The Central Valley of California is the last great mediterranean agricultural production area in the world," he emphasizes. "I think future generations would not forgive us if we pave over this agricultural productive capacity that we have here. It's important that we preserve this. People are starting to realize this is a national security issue to have local food production and support for local farmers."

Rominger also recognizes that the future of family farms lies in the hands of a well-educated populace. As a former UC Regent, he has had a front-row seat witnessing withering support for the university. "It's just hard to understand how we could be, as a state, so short-sighted in funding education," he said. "It's really sad and I think it's jeopardizing the future of California."

— John Stumbos

SCIENCE BEYOND THE TEXTBOOK

UC Davis brings biotechnology to high school students

BIOTECHNOLOGY IS ON THE FRONTIER OF 21st century science, and UC Davis is helping to educate its young pioneers. Every summer, outstanding high school biology students in the Sacramento area compete for the opportunity to do a biotech research internship on campus. Tina Huynh-Pham, one of seven 2010 summer interns, helped investigate a bacterium that infects walnuts during her UC Davis experience.

"I learned a lot about genetics," said Huynh-Pham, who recently began her freshman year at the University of the Pacific. "I learned lab techniques and how to use the equipment. Since we were working with walnuts, I also became much more aware of the importance of agriculture in California."

Summer internships are just one of multiple outreach efforts organized by the Partnership for Biotechnology and Genomics Education, a campus program that gives high school students exposure to research in molecular and cellular biology. The program impacts thousands of high school biology students every year through classroom laboratory loan kits and interactive software.

ROBIN DEREUX/UC DAVIS

As a summer intern, Brandi Tacdol of Rodriguez High School learned about biotechnology by doing hands-on research in the laboratory of Professor David Gilchrist.

"We're introducing students to the many facets of biotechnology using cutting-edge materials," said David Gilchrist, program director and a professor of plant pathology.

BIOTECHNOLOGY IN THE CLASSROOM

UC Davis circulates about a dozen laboratory kits each year to more than 30 Sacramento-area secondary schools. The $25,000 kits, funded by industry partners such as Novozymes, Monsanto, and Genentech, contain all the equipment needed for students to carry out biotechnology experiments in high school laboratories. More than 40,000 Northern California students have used the kits since the loan program began in 1996.

"This equipment is something most high schools simply couldn't afford on their own," said Barbara Soots, education coordinator. The loan program also provides curriculum and training for the high school biology teachers who oversee the biotech labs.

EDUCATIONAL SOFTWARE

Meeting high school students on their own ground, the Partnership for Biotechnology and Genomics Education also has pioneered state-of-the-art computer games to teach young people about biotechnology. Software developed since 1994 has been downloaded for free off the Internet in every U.S. state and in 16 foreign countries (http://www-ceprap.ucdavis.edu/), and several thousand copies have been handed out on CD-ROMs at workshops and conferences.

The latest software under development is "Zombie Plague," funded by a $1 million grant from the National Science Foundation. The game will allow students to explore a 3-D world where they're responsible for identifying a microorganism that is causing a deadly outbreak and finding a cure.

— Robin DeRieux

"We're introducing students to the many facets of biotechnology using cutting-edge materials."

ALL IN THE FAMILY

College honors its best and brightest

Friends, families, and colleagues gathered October 8 in Freeborn Hall for the 22nd annual College Celebration. As always, the festive gathering is occasion to reflect on CA&ES accomplishments and to honor Award of Distinction recipients (photographed at left with CA&ES dean Neal Van Alfen and Aggie Ambassador student hosts). Award winners include viticulture and enology professor Roger Boulton, student farm director Mark Van Horn, former Davis mayor Ruth Uy Asmundson, rice breeder David Mackill, conservation pioneer Sarah Otterstrom, child development professor Claire Vallotton, University of Hawaii president M.R.C. Greenwood, and Jackson Family Wines proprietors Jess Jackson and Barbara Banke.

Visit http://collegecelebration.ucdavis.edu for a complete photo gallery of the event.

PHOTOS BY
THOMAS USHING/UC DAVIS

CA&ES Outlook

College of Agricultural and
Environmental Sciences #986H
University of California
One Shields Avenue
Davis, CA 95616-8571

UCDAVIS
COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

THE CAMPAIGN FOR UC DAVIS

ADVANCING OPPORTUNITY

Thanks to philanthropy, Grace Cun pursued her dreams.

GRACE CUN was the first in her family to attend a four-year college, but she had to convince her parents she could cover the costs. And she did. Through a combination of scholarships, grants, work-study, and loans, Grace financed four years of college and graduated in June 2010 with a degree in animal science and management.

"They say money isn't everything, but money is something," said Grace. "I couldn't have attended college without financial help."

THE CAMPAIGN FOR UCDAVIS

caes.ucdavis.edu/giving