inventing a greener future
Pictured (l–r) are men’s tennis coach Bob Hansen, alumnus and athletics donor Philip McLeod, women’s tennis coach Erin Ness (College Eight ’06), and scholar-athlete Brandt Bates.

“Game, Match, Love”

“I support UCSC’s tennis program because it’s an important part of the school’s excellence—talented scholar athletes and dedicated coaches who year after year achieve national success.”

—Philip McLeod (Merrill ’76)

To support UCSC athletics, please go to review.ucsc.edu/giving or contact khughes@ucsc.edu

All of UCSC’s teams help attract great students to the school and enrich campus life. Athletics deserves strong alumni support.

Philip McLeod (Merrill ’76)

To support UCSC athletics, please go to review.ucsc.edu/giving or contact khughes@ucsc.edu

“A Sustaining Vision”

The UCSC campus was planned as a marriage of academic endeavor with an extraordinary site. This visual essay paints a portrait of that dynamic relationship.

“Fiddling while the planet burns”

We have what it takes to fight global warming, says Alan Richards, professor of environmental studies.

“What if...?”

You could fill up your tank with a garden hose? Power your iPod with your shirt? These sustainable energy innovations and more are being invented by researchers at UCSC.

“Change—on a fork”

UCSC’s Dining Services—among the most cutting-edge in the nation—is cooking up new ways to serve tasty, sustainable food while aiming for zero waste.

The Spring 2009 Review contemplates the timely topic of sustaining...ourselves...the food we eat...the energy we use...our campus...our planet.
**YOUR TURN**

A sampling of reader reaction to recent issues of the UC Santa Cruz Review.

E-mail us at review@ucsc.edu.

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**SAVE THE BARN**

Is there a plan to demolish the barn at the entrance to the campus? That is what seems implied in the story of Sam the goat in the winter 2008–09 issue (“Your Turn”).

I think that historic buildings like the remains of the Cowell Ranch give a three-dimensional picture of history. By preserving them we understand better where we are and where we are going.

—Tom Eagan Porter, ’78

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**NOTES & ERRATA: REVIEW neglected to credit worldle.net of that issue’s cover design.**

**DWINDLING OIL**

I hope you were serious when you asked what we think the new president should do (“Mr. President...,” fall 2008).

I was pleased with the thoughtful advice the faculty members offered our new president, but I was dismayed that none of them mentioned the main crisis facing the new administration: What to do about waning global petroleum resources. Why is no one talking about this?

Here’s the advice I would give to the new president: Come clean with all Americans. Admit that we are in a period of declining oil resources, and technology in and of itself will not save us. Admit that our standard of living cannot be sustained, and admit that global population growth is out of control. Then start looking for alternative en-

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**REFLECTIONS ON KAPANY**

I enjoyed reading the story “Celebrating innovation, ideas, and ideals” (winter 2008–09).

I completed a course taught by Narinder Kapany during the winter quarter of 1980 at UC Santa Cruz. This economics course provided insight into the innovation and entrepreneurial processes for students contemplating careers in the business or technical sector. We also learned about “total internal reflection,” the scientific concept that made Kapany famous for his research that demonstrated light could be passed through bent optical fibers without any loss of transmission.

—Paris Everett Merriam

**YOU SAY YOU WANT A REVOLUTION**

Millions and millions of dollars... from wealthy donors to UCSC.

Why doesn’t UCSC funnel some of those millions you receive and build an Earth center on the campus? So we can save (what’s left of) our planet! It’s time for a global green revolution.

—Steve Jones

**APRIL**

**ANNUAL REUNION WEEKEND**

In today’s economy, it may well be time to do some career networking and make new contacts. At this year’s reunion, you can do both, plus see old friends and learn how you and UCSC can help shape a better world.

UCSC Reunion is April 24–26. See the complete lineup of events and register at www.review.ucsc.edu/alumni.

Events include:

- Robert F. Kennedy Jr. speaking on “Our Environmental Destiny”
- All-alumni picnic lunch, featuring alumni-crafted wines and beers
- Young alumni party
- ’04, ’99, ’94, ’89, ’79, and ’74 class reunions, and the pioneer class 40th anniversary celebration
- A variety of campus tours
- College receptions
- Presentation of the Alumni Association’s teaching and staff awards (see page 6)
- Intellectual forum panel discussion: “Shaping Our Environmental Destiny”

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**MAY**

**GARRISON KEILLOR**

Two million Americans tune in weekly to their local NPR stations to listen to A Prairie Home Companion and are transported to Lake Wobegon through the wise reflections of radio personality Garrison Keillor and his understated commentary on human nature. The charming, witty, and always entertaining author and humorist comes to Santa Cruz in a one-man show, on Wednesday, May 13, at 7:30 p.m. at the Santa Cruz Civic Auditorium. Go to www.santacruztickets.com or call (831) 459-2159 for tickets.

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**SUMMER**

**SHAKESPEARE SANTA CRUZ**

Politics, power, truth—these are the themes explored in the three plays selected for the 2009 Shakespeare Santa Cruz season by artistic director Marco Baricelli.

SSC will present two contrasting plays by William Shakespeare in the outdoor Sinshime–Stanley Glen: the eternal, fantastical comedy A Midsummer Night’s Dream and the edgy, political tragedy Julius Caesar.

The indoor Theater Arts Mainstage will be the venue for the Bay Area premiere of the family-friendly Shippedreck’d: An Entertainment—The Amazing Adventures of Louis de Rougement (as Told by Himself) by Pulitzer-prize winning playwright Donald Margulies. Subscriptions and single tickets for the 2009 season are on sale now.

For more information, visit SSC online at the web site www.shakespearesantacruz.org or call the UC Santa Cruz Ticket Office at (831) 459-2159.
Eight Slugs win Fulbright grants

UC Santa Cruz had eight Fulbright Program grants in 2007–08—a feat it’s only accomplished twice before in the past 15 years, and a higher ratio of accepted candidates versus applicants than many prominent private universities.

The eight Fulbrighters are: Elizabeth Bastians, who is studying a threatened lizard in Mexico; Frank Black, who is measuring mercury levels in water, fish, and hair of subsistence fishermen in Botswana; James Casey, who is conducting research on early 20th century Arab newspapers in Syria; Timothy Krupnik, who is researching farming systems to improve rice production and natural resource conservation in Senegal; Michelle Ohgarg, who is investigating the sustainability of a fungus important to Chinese traditional medicine on the Tibetan Plateau; Elizabeth Ort, who is studying the impact of global warming on insect populations in Sweden; Leah Samberg, who is researching the effects of a rapidly growing population on the biodiversity and sustainability of the agro-ecosystems of the Ethiopian highlands; and Anna Zvian, who is addressing the growing trend of environmental policy and politics and being contested at the local level in Austria.

In other words, how they learn to “think like scientists,” said Callanan.

The project is a collaboration among Children’s Discovery Museum, UCSC, and the Museum of Paleontology at UC Berkeley, with funding from the National Science Foundation.

Callanan, who has collaborated with Children’s Discovery Museum for nearly a decade, is also helping designers plan the new exhibit. Scheduled to open in 2011, it will feature a life-sized model of the full mammoth, as well as some of the fossilized remains.

How kids learn to ‘think like scientists’

Thousands of years after roaming the riverbeds of what is now downtown San Jose, a juvenile mammoth will get new life inspiring a generation of young visitors to Children’s Discovery Museum of San Jose.

As the museum develops an exhibit around the remains of the mammoth, UC Santa Cruz psychology professor Maureen Callanan is gearing up for a major research project that will explore the ways children learn to use evidence and figure out answers to questions in everyday life.

The museum of paleontology at UC Berkeley, Children’s Discovery Museum, UCSC, and the Museum of Natural History at the California Academy of Sciences have been working for 15 years to prepare the mammoth. As the museum develops an exhibit around the remains of the mammoth, a juvenile mammoth will get new life.

In other words, how they learn to “think like scientists,” said Callanan.

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Cabrera, Richards, Rickford win top honors

The common thread running through the Alumni Association’s top award winners for 2008–09 is their exceptional ability to inspire. The award winners are:

Outstanding Staff Award: Rosalie (“Rosie”) Cabrera, director, El Centro Chicano Latino Student Resource Center; Distinguished Teaching Award: Alan Richards, professor, environmental studies; Alumni Achievement Award: John Rickford (Stevenson ’71), professor, linguistics. Stanford University. Cabrera and Richards, who will receive $500 each, will be honored at the new all-alumni reunion picnic on Saturday, April 25 (see page 3 for information about Reunion Weekend).

Rickford will be honored at the campus’s Founders Day celebration in October.

Cabrera has worked at UCSC for 24 years in a variety of positions, including as a counselor at the Educational Opportunity Program.

Richards has taught for 32 years, first in the Economics Department and more recently in Environmental Studies. His experience living in the Middle East and working at the World Bank, the United Nations, and the Agency for International Development informs his teaching, as does his interdisciplinary approach to scholarship. (To read excerpts from an interview with Richards, see page 8.)

READ THESE STORIES AND OTHERS ONLINE. Elephant seals: Stelephant Colbert and Jon Sealwart reveal lives, loves on Facebook pages. . . . Jack Baskin School of Engineering to establish Keck Center for Nanoscale Optofludics . . . $2.2 million grant approved for program to train stem cell scientists . . . Alums win 2009 Sundance directing award for first feature film . . . Medical robotics expert explores the human-machine interface . . . As super-predators, humans reshape their prey at super-speeds . . . Undergraduate Danielle Soto elected to Pomona City Council . . . UCSC receives $150,000 grant for Jewish Studies program . . . Renowned conductor and UCSC alumnus Kent Nagano receives prestigious award from Japanese government . . . Study of disease risk suggests ways to avoid slaughter of Yellowstone bison. review.ucsc.edu/news

In Memoriam

Donald Coyne, ’71, an adjunct professor of physics at the Santa Cruz Institute for Particle Physics from 1965 until his retirement in 2002, died October 1 in Santa Cruz. Coyne’s career spanned particle physics from hadron spectroscopy, through the first decades of electron-position storage rings, to the present collaborations of physicists building very large experimental facilities at colliders.

Noel King, ’86, a professor of history and comparative religion at UCSC from 1968 until his retirement in 1991, died February 1 after a lengthy illness. An extraordinarily popular teacher, King was instrumental in providing foundation courses and a comparative framework for religious studies majors as well as others interested in learning about religion in an academic setting.

Genealogies of Orientalism: History, Theory, Politics (University of Nebraska Press, 2008), edited by history professor Edmund Burke III and David Prochaska at the University of Illinois at Urbana-Champaign, presents essays that respond critically to the phenomenon of Orientalism. The collection looks at the multifaceted ways in which modern cultures have drawn on Orientalist images and indigenous self-representations.

Food, Medicine, and the Quest for Good Health (Columbia University Press, 2009), by anthropologist professor Nancy Chen, draws on medical texts and food therapy practices from around the world and throughout history to identify intersections between food and medicine.

The Leftmost City: Power and Progressive Politics in Santa Cruz (Westview Press, 2009), by G. William Domhoff, research professor of sociology, and Richard Gendron at Assumption College, utilizes an extended case study of the city of Santa Cruz to critique major theories of urban power.

The Minsk Ghetto 1941–1943: Jewish Resistance and Soviet Internationalism (University of California Press, 2008), by history of consciousness professor Barbara Epstein, recounts a heroic yet little-known chapter in Holocaust history. Drawing from survivors’ accounts, Epstein chronicles the history of a Communist-led resistance movement inside the Minsk ghetto, which enabled thousands of ghetto Jews to flee to the surrounding forests.

Race and Entrepreneurial Success: Black-, Asian-, and White-owned Businesses in the United States (MIT Press, 2008), by economics professor Robert Fairlie and Alicia Robb, research associate in economics, provides a comprehensive analysis of racial disparities and the determinants of entrepreneurial performance.

Branding New York: How a City in Crisis Was Sold to the World (Routledge, 2008), by Miriam Greenberg, assistant professor of sociology, traces the origins of the modern-day branding of New York City. Focusing on the 1970s, the book describes the city’s image crisis and the highly successful marketing campaign that transformed New York into a hip, tourist- and business-friendly destination.

The Woman in the Zoot Suit: Gender, Nationalism, and the Cultural Politics of Memory (Duke University Press, 2009), by Catherine Rumière, associate professor of American studies, focuses on las pachucas, Mexican American women zoot suiters who came of age in Los Angeles in the 1940s.

Ain’t I a Feminist? African American Men Speak Out on Fatherhood, Friendship, Forgiveness, and Freedom (State University of New York Press, 2008), by Aaronette White, associate professor of psychology, presents the life stories of 20 African American men who identify themselves as feminists, centering on the turning points in their lives that shaped and strengthened their commitment to feminism.

All featured books are available at the Bay Tree Bookstore on campus or at slugstore.ucsc.edu
CLIMATE CHANGE: The Problem

Yet it would be unreasonable to think that we can turn it off. We are already too far along, and we have more at stake now than ever before. The economic growth that we have come to expect has been built on the back of a rapidly growing population and ever-increasing demand for energy. And it gets worse, because emissions build up cumulatively, manifestly unsustainable. These emissions are growing at a rate of about 3 percent a year. This is the way change happens. The bottom line is that we have already done irreversible damage. The scariest part of this is what people have started talking about now. They say it’s our fault, and we say it’s their fault. Both sides are right. The consequences of large-scale climate change include, according to the CIA, very scary impacts in international politics. For example, if the glaciers that sustain the major Asian rivers dry up and the water supplies of Northern India and Central China are seriously challenged, the governments of those countries—both of which have nuclear weapons—will face enormous pressures. Similarly, there could be large-scale im-migration, literally floods of very poor people, moving from North Africa to Western Europe. History suggests that people make deep changes only in a severe crisis. But with climate change, by the time the crisis hits, it’s too late.

ALAN RICHARDS, professor of environmental studies, is the recipient of the Alumni Association’s 2008-09 Distinguished Teaching Award. An economist and an expert on energy politics and the Middle East, Richards created the class Blood and Oil: Energy, the Middle East, and War, to give students a historically based understanding of current events. We asked Richards to discuss climate change and the role educators can play in meeting the challenge. Excerpts from the interview follow.

I am deeply troubled by the disconnect between what public policymakers and natural scientists are saying about climate change. Leading scientists say we have three years to reverse the rate of carbon emissions and avert serious consequences.

So that’s the bad news: Nobody in the public policy world is talking about actions that could do that. Instead, emissions are growing at a rate of about 3 percent a year. This is manifestly unsustainable. These emissions build up cumulatively, which is important. It’s like piling on blankets. You may get too warm, but once you stop adding blankets, you’re still hot.

And it gets worse, because everywhere in the world for the past 250 years, increasing standards of living have been accompanied by large-scale increases in the use of energy per person, especially in the relatively early phases of economic growth. Yet it would be unreasonable and politically unfair for rich western countries to tell poor countries that they shouldn’t become better off. So the big problem is how to make room in the atmosphere for the emissions that are going to come from poorer countries, without doing irreversible damage.

International impacts

But the good news is the United States finally has a government that appears to understand this. Having a less belligerent administration is good because we need to make international deals. The United States and the Chinese have been locked in a suicide pact; they say it’s our fault, and we say it’s their fault. Both sides are right. The consequences of large-scale climate change include, according to the CIA, very scary impacts on international politics. For example, if the glaciers that sustain the major Asian rivers dry up and the water supplies of Northern India and Central China are seriously challenged, the governments of those countries—both of which have nuclear weapons—will face enormous pressures. Similarly, there could be large-scale immigration, literally floods of very poor people, moving from North Africa to Western Europe.

Devil’s in the details

In the short term, this is a political problem, not a technological one, because the technology to reduce emissions already exists. There’s an emerging consensus, led by people like Al Gore, that we need to electrify the economy and build a smart grid to generate electricity from renewable resources. We need serious, public investment in changing the nature of the energy system, and we need incentives like a carbon tax, which people have been talking about for 20 years. But, as always, the devil is in the details. Are there enough votes in Congress to pass legislation to implement the changes we need? What about the millions of Americans who continue to disbelieve in climate change? They appear to be turning into a minority force, but we’ve seen before that minority forces can still block important legislation.

As a social scientist, I think the scariest part of this is what I’ve learned from history. My reading of history suggests that people make deep, wrenching changes only in a severe crisis. But with climate change, by the time the crisis hits, it’s too late.

This is the way change happens

The bottom line is that we had better get started. The nature of this problem is so large that everybody has to do what they can, as journalists, teachers, researchers, artists, and private citizens. I believe we can avert the worst, but education will be critical. Sixty-nine percent of voters aged 29 and younger went for Obama. The youth get it. A lot of UCSC students are very engaged, and so is the chancellor. Our researchers are developing technological advances that could make this transition easier. This is an institution that collectively understands that we must do something, even in the midst of collapsing budgets and exploding enrollments.

This is the way change happens. The analogy I prefer is race relations. When I graduated from a segregated high school in Dallas in 1964, there was open, virulent racism. But last November, 57 percent of Dallas County voted for Obama. So I know change is possible.

Who pioneered that change? It was the Civil Rights Movement. But universities and educators helped foster the necessary cultural shift that delegitimized racism. Is racism gone? No, it’s not. But it has been delegitimized, and there’s no reason the same thing can’t happen with respect to the environment. Deeply destructive environmental behaviors can be delegitimized. Universities are hubs of innovation, and they are incubators for social change. We have enough scientific knowledge to make a big dent in global warming. But there has been a great deal of fiddling while the planet burns.

Fiddling while the planet burns

Edited by Jennifer McNulty

Environmental studies professor Alan Richards
inventing a greener future

These and other energy scenarios could become reality in the not-so-distant future, as a result of research now under way at UC Santa Cruz.

Sobering new reports from global climate experts paint an increasingly grim picture. "Current choices regarding carbon dioxide emissions will have legacies that irrevocably change the planet," says Susan Solomon, lead author of a 2009 National Oceanic and Atmospheric Administration (NOAA) study on rising CO2 levels. Former vice president and climate change activist Al Gore is cautiously optimistic that we can still successfully address climate change if we take immediate and decisive action. "It is retrievable and solvable—if we start now on a bold program," said Gore.

UCSC scientists are helping to meet the challenge by pioneering innovative alternatives to fossil fuels—from super-thin solar energy materials to renewable or recharge your iPod with solar power from your T-shirt? or use the carbon dioxide spewed by power plants to help heal the ocean?

what if you could fuel your car with a garden hose?

what if we could make cars more fuel-efficient by capturing the heat they waste?
many of these advances draw on UCSC’s leadership in nanotechnology, which provides a treasure chest of new tools to address tough energy challenges.

hydrogen. And because humans won’t stop burning oil and gas anytime soon, research teams are also exploring ways to make fossil fuels cleaner and more efficient. Many of these advances draw on UCSC’s leadership in nanotechnology, which provides a treasure chest of new tools to address tough energy challenges. And the campus’s longstanding partnerships with Silicon Valley are helping to put much-needed new technologies into practical use.

However, warns UCSC’s Ali Shakouri, professor of electrical engineering, “Engineering solutions alone won’t be enough to address the world’s environmental and energy problems. We also need to make societal changes in the ways we use energy, and that will be far more difficult.”

GETTING MORE SUN

Solar energy is widely seen as the cornerstone of a green revolution that can revitalize the U.S. economy while saving the planet. Unfortunately, the solar industry’s reliance on traditional silicon panels (the ones we see on rooftops) greatly limits its potential. The problem is that refining silicon is expensive, energy intensive, and fairly toxic—plus the cells and panels themselves are difficult to mass produce.

“We need a paradigm shift—a complete change in the way we manufacture photovoltaics,” said UCSC’s Sue Carter, professor of physics and a leading solar energy researcher. “Silicon-based solar panels are relatively efficient at generating electricity, but there is no way we can produce enough of them in the near term to put a dent in fossil fuel.”

Carter’s research team is creating the next generation of solar energy—liquid materials that can be applied in very thin layers much like paint from a newspaper. Carter’s approach is cheaper because it uses far less material and energy to produce than do silicon panels. It is also safer and can be applied to just about anything, including flexible materials like thin plastic and fabric.

“With print-based manufacturing, all of a sudden you can produce large areas of solar-generating material quite cheaply,” added Carter.

Carter’s research is already having an impact on the industrial landscape. She proudly lists former graduate students who play key roles at innovative solar startups, and Carter herself is a technical advisor to a number of leading-edge firms.

With Glenn Aler, UCSC adjunct professor of physics, Carter has also initiated the Laboratory for Solar Energy and Renewable Fuels (SERF). SERF is part of the Advanced Studies Laboratories, a technology incubator located at the NASA Ames Research Center and sponsored by UCSC’s Silicon Valley Initiatives (UCSC recently announced a partnership with NASA; see page 15). We can offer the experimental vision. We can actually do it, but we can’t yet generate hydrogen efficiently enough for it to be practical. We need to make it competitive with gas for people to actually use it.”

Zhang and his research team are developing and testing new nanomaterials for a two-part integrated system that splits water into hydrogen and oxygen using sunlight.

“In theory,” said Zhang, “you could have this device on one side of your car, with perhaps solar collectors on the roof, and just refuel with your garden hose.” Realistically, he added, we might first see a hybrid vehicle that runs on its own solar-generated hydrogen when the sun is out—and on another fuel at night or on cloudy days.

NEW HEAT WAVE

UCSC’s Ali Shakouri made news in 2001 when his research team developed a “refrigerator on a chip.” The tiny device—about the size of a credit card—can produce large areas of solar-generating material quite cheaply.”

However, warns UCSC’s Ali Shakouri, professor of electrical engineering, “Engineering solutions alone won’t be enough to address the world’s environmental and energy problems. We also need to make societal changes in the ways we use energy, and that will be far more difficult.”

University of California Santa Cruz Review / Spring 2009
Silicon Valley has long been a global center of innovation. Now, with help from UCSC, it’s becoming the epicenter of the green revolution. UCSC and the Foothill-De Anza Community College District have formed a partnership and signed a lease with NASA Ames Research Center to establish a sustainable community for education and research at the NASA Research Park at Moffett Field.

The goal of the partnership is to create a prototype for an environmentally sustainable community and contribute to the economic vitality of the region, while providing a unique collaborative environment in which to deliver innovative education and research. A March event at NASA Ames Research Park announcing the partnership was attended by university officials, scientists, engineers and Silicon Valley company leaders, in addition to Democratic Reps. Anna Eshoo of Palo Alto and Mike Honda and Zoe Lofgren, both of San Jose.

The project, which is to be developed on 75 acres of land in the NASA Research Park, will create jobs and drive private industry, said Eshoo. “This partnership is important for our entire nation and will help to make this century an American century,” Eshoo said. This vision includes an integrated community featuring state-of-the-art research and teaching laboratories, shared classrooms, housing, accommodations for industrial partners, and modern infrastructure. Work on the site could begin as early as 2013, with initial occupancy as early as 2015. “Our vision is to seed innovation, entrepreneurship, and sustainability through the creative reuse of an important public asset for regional benefit,” said UCSC chancellor George Blumenthal. “We aim to establish world-class programs and facilities dedicated to preparing the workforce of the future and to conducting research at the forefront of science and technology.”

Designed to have a minimal carbon footprint, the community will serve as a model site to deploy and validate new renewable energy and resource conservation systems. “Researchers, working together, will expedite development of emerging green technologies,” Blumenthal said. “We will create knowledge, apply it to real-world challenges, and equip students to deliver results in the valley’s burgeoning green-tech sector.” Carnegie Mellon University, Santa Clara University, and San Jose State University have also been involved in the early planning and may eventually join the partnership, said Joseph Miller, UCSC’s vice provost for Silicon Valley Initiatives.

Development of the site, which is expected to cost over $1 billion, would be undertaken through a public-private partnership.

Artists’ rendering of the education and research community envisioned for the NASA Research Park.

This partnership is important for our entire nation and will help to make this century an American century.”

Anna Eshoo
U.S. Representative
14th District, California

Innovation entrepreneurship sustainability

width of a human hair—uses engineered nanomaterials with just the right electrical and thermal properties to cool hot spots in microprocessors. Now Shakouri is turning that breakthrough on its head, developing similar materials to turn waste heat from cars and power plants into electricity. His work, like Zhang’s, relies on designing new materials at the nanoscale. “Our task is to engineer materials that don’t exist in nature,” said Shakouri.

Put simply, when materials that don’t exist in nature, are helping to put much-needed new technologies to practical use.

GOING CARBON NEGATIVE

Escalating CO2 in the atmosphere not only contributes to global warming but is also rapidly making the world’s oceans more acidic as they absorb all that excess CO2. According to Gregory Rau, a senior researcher at UCSC’s Institute of Marine Sciences, this change in ocean pH is already linked to declines in coral and other marine organisms.

“We need to implement sustainable energy sources immediately,” said Rau, “but no matter how quickly we can gear up, fossil fuels will still be with us for the foreseeable future.”

At UCSC’s Long Marine Laboratory, Rau is testing an ingenious method of removing excess CO2 that takes its cue from nature. “We’re simply accelerating the natural process of limestone weathering,” he explained, “which is one of the ways nature consumes excess atmospheric CO2 and neutralizes ocean acidity.” Unfortunately, Rau adds, in nature that process takes many thousands of years.

Rau’s process borrows a technique from saltwater aquarium hobbyists, who use a comparable reaction to maintain the proper pH in tanks of coral and shellfish. Rau mixes limestone particles with seawater and pumps simulated power plant exhaust through the mix. His test reactor balances seawater chemistry while successfully removing up to 95 percent of incoming CO2. Scaled-up reactors could potentially absorb the CO2 emitted by power plants, while benefitting ocean ecosystems.

Rau is also working on a “supercharged” version of the technology designed to scrub CO2 from the general atmosphere, not just waste streams. The trick is making the process faster and more efficient by adding a jolt of electricity—from renewable sources. “This could be done on a large scale,” said Rau. “For example, we might see fleets of barges on the open ocean, loaded with limestone and covered with wind turbines, solar panels, or wave energy converters to power the reaction.” An added benefit of the process is the production of hydrogen gas, a carbon-free alternative to fossil fuels.

the campus’s longstanding partnerships with Silicon Valley are helping to put much-needed new technologies to practical use.
expressing frustration with Sodexo’s labor practices. The discussions continued at the 2004 Earth Summit, and participants formed the Food Systems Working Group, which drafted purchasing guidelines for the campus that included buying local, certified organic, worker-supportive food products. After a six-month student campaign, UCSC ended its 30-year contract with Sodexo in June 2004.

Student-generated groundswell has, in fact, been at the heart of a sustainability movement for the entire UC system. Many national reviews and assessments indicate that the system leads the higher-education pack in making big green changes, creating the most comprehensive and ambitious sustainability policy of any university system in the United States, according to the California Sustainability Alliance.

UC’s path to leadership in sustainability was initiated by students who teamed up with the environmental group Greenpeace to bring together student activists, administrators, and faculty to tackle the lack of formal environmental awareness among the UC campuses.

Inspired by students’ calls for action, the Board of Regents adopted a sustainability policy in 2003. While UCSC’s Dining Services unit is among those at the forefront of the campus sustainability movement, experts are seeing a trend toward sustainable food initiatives at universities and colleges across the nation.

Dining Services is cooking up ways to accomplish its twin goals: serving good-tasting, locally sourced, sustainably grown organic food—and aiming for zero waste.

By Gwen Mickelson
Photos by Phil Carter, ’10

WEDNESDAY 10 A.M. The kale and beets sitting on a kitchen counter at College Eight, bursting with vivid purples and deep greens, were in the ground just an hour before.

“This is prime time for kale right now,” said David Evershed, who had brought several boxes of organic produce from the UCSC Farm to College Eight Dining Hall’s kitchen through the January chill.

“It gets super sweet in the cold,” said the bearded young man, gesturing to a large, leafy bundle of kale with a knowing smile. “Like candy.”

Evershed, a second-year apprentice with UCSC’s Center for Agroecology and Sustainable Food Systems (CASFS), is part of a grassroots movement started by students and encouraged by the campus’s Dining Services unit to change the world one bite at a time.

Dining Services, started in 2004 after the campus ended its contract with integrated food and facilities management giant Sodexo (previously Sodexho), has become one of the most cutting-edge campus food service divisions in the nation, constantly seeking out and incorporating innovative methods to increase sustainability and reduce waste.

The department has done so well with those twin goals since becoming self-operated, in fact, that it beat out more than 20 national competitors to win a $5,000 grant to invest in even more projects. In addition, UCSC’s dining halls were ranked the nation’s “greenest” by Plenty magazine, a major environmental publication.

The effort has been rewarding, said Scott Berlin, director of Dining and Hospitality Services, and UCSC has the luck to be in its particular location—overlooking the rich farmland of the Pajaro and Salinas valleys, home to some of the most successful and productive organic farming operations in the country.

But the movement, he said, was student-generated and continues to be fueled by student energy.

“There’s a significant amount of student interaction. It’s a unique aspect,” Berlin said.

“These were student successes; we were just a willing vehicle.”

Roots of reform

In 2003, the campus group Students for Organic Solutions brought together various stakeholders of the campus food system at the annual Earth Summit to discuss how to create sustainable change in the system, including purchasing organic produce from local farmers. At the same time, other students were...
from farm to table:
The kale and beets sitting on a kitchen counter at College Eight, bursting with vivid purples and deep greens, were in the ground just an hour before.

Events on campus and works on the campus to provide locally grown organic produce. This contract was a first among the UC system’s 10 campuses.

In addition to the 25-acre UCSC Farm, consortium farms include the Agriculture and Land-Based Training Association, Coke Farm, Phil Foster Ranches, Happy Boy Farms, New Native Greensward Nurseries, and Swanton Berry Farm.

Terminating the contract with Sodexo, creating an entirely new Dining Services department, developing purchasing guidelines, and forming a purchasing arrange- ment with Sodexo’s members to provide organic produce to students through the generations: burgers, fries, and pizza.

Sustainable and organic foods are “there, but on the periph- ery,” said Abraham Rivas, 20, a Merrill College history major who was eating lunch in a very cent weekday at College Eight.

Rivas had taken a small scoop of those day’s organic, local veget- able offerings—sautéed green beans with roasted turnips and beets—but said he generally chooses foods based on flavor.

“Whether it’s organic or not makes a difference, but mostly it’s the taste,” Rivas said.

One problem is educating students about the “seasonality” of foods, according to Scott Berlin.

Students are used to seeing a huge array of foods in the marketplace and often do not understand that crops produced locally may be limited. But with ongoing education and marketing, the awareness of the relationship between food and the world we live in can only grow, he said.

On the waste front, each year Dining holds several “Zero Waste” events to bring atten- tion to minimizing the campus’s carbon footprint. Unwanted food scraps are collected during these events and weighed.

From one recent audit, Dining learned that 106,070 pounds of potential food waste is cre- ated annually during the lunch period of just one of the five dining halls on campus.

These “waste audits” educ- ate students on what taking more than they can really eat adds up to, said Scott Berlin.

“You people are really dispointed during the audits when they see how much gets wasted,” said fourth-year student and UCSC’s Enviro Connect intern Eliza Bohn.

Rivas thinks his eating habits have changed during his years at UCSC.

“Students are overwhelmingly open-minded—even to things that sound really bad, like tofu,” said Rivas. “I’m definitely more open- minded.”

Stages UCSC Dining Services has taken over the past five years toward increasing sustainability:

Dining Services teamed up with PG&E to replace old lighting with more energy-efficient alternatives, saving nearly $11,000 annually. A $26,500 rebate from PG&E will fund future sustainable Dining Projects.

Installation of 56 Energy Star–rated appliances has cut most department energy costs in half.

Elimination of all food trays is saving an estimated 30,000 gallons of water a month while reducing water- heating costs and the use of cleaning chemicals. Food waste per plate has been cut by more than 40 percent—significant, since Dining Services serves more than 11,000 meals per day.

Thanks to a pilot composting program (collecting kitchen scraps from four dining halls and transporting to the Vision Recycling composting project at Buena Vista Landfill in Watsonville), Dining Services diverted nearly 30 tons of food scraps from the landfill between August 15 and December 1, 2008. Campus recycling has been instrumental in collection, transport to the landfill, and supporting educational outreach.

Compostable paper products and flatware made from corn or potatoes—and 100 percent biodegradable and compostable—have replaced traditional disposables.

Vegetable and meat scraps are used for stock soup, and grease, fat, and French-fry oil are recycled for other purposes, such as biodiesel fuel. Other perishable food is donated to a local food bank. When food must be thrown away, it is converted to slurry with a pulper, reducing cubic yards of waste collected in dumpsters by two-thirds.

All campus dining halls and retail locations brew Community Agroecology network (CAn) coffee daily. An innovative project between the campus and coffee growers, CAN creates a fair-trade market and collaborates with farmers to improve local, sustainable farming practices.

Ome- free eggs are available at all dining halls and retail locations.

Nine campus dining locations are “green” certified by the Monterey Bay Area Green Business Program, and two more sites are being inspected and certified. To be certified “green,” participants must be in compliance with program regulations and meet standards for conserving resources, preventing pollution, and minimizing waste.

Other sustainable practices under consideration include using reusable containers for all-to-go meals, investigating more vegetarian-based menu items, installing self-service water-bottle refills stations to reduce the use of disposable plastic water bottles on campus, and installing solar-powered trash compactors.

—Gwen Mickelson
A Sustaining Vision

When Frank Zwart was a student at UC Santa Cruz in the late ’60s, he and his friends would gather for full-moon picnics on the site where the Theater Arts Center stands today. There were few permanent buildings then—the campus had just opened in 1965—and those first pioneering students came to know intimately the meadows, forests, and ravines of the campus.

By the time Zwart graduated in 1971, the campus core was beginning to take shape, guided by the principles developed by nationally known architects and landscape architects. The planners sought to weave UCSC’s unique academic plan with its extraordinary site, following a few overarching guidelines:

- The setting would remain simple and natural, with landscape refinement restricted to the college and academic courtyards.
- There would be a core of larger academic and common buildings surrounded by smaller-scale colleges.
- Each building would be designed individually with respect for its distinct academic mission and its particular setting.
- Ravines and wildlife corridors would be conserved.
- Meadows would remain open to protect views.
- Buildings would mingle with the trees at the forest edge.
A Sustaining Vision

Zwart returned to UCSC in 1985 to take a job as project manager in the campus architect’s office. He became part of the team guiding the campus through a period of significant growth, adding colleges and developing the density of the academic core.

Today Zwart is associate vice chancellor for physical planning and construction—leading an international team of campus architects and planners who continue to integrate the early planning principles into a sustainable vision.
**COWELL COLLEGE**

**Blair COOPER** has developed a web site in memory of George Sklake, one of two Cowell students killed in Vietnam; the statue in the Cowell courtyard is dedicated to them. City on a Hill Press published numerous letters from George vividly describing the war and a soldier’s life in Vietnam. To read these letters and learn more about George, go to http://web.msu.edu/bshops266/Remember_George_Wolfe_Sklake_GWS.html. Irene VAN DER ZANDE is the cofounder and executive director of Kidpower, a nonprofit organization teaching people of all ages and abilities to stay safe and act wisely. Her book, The KIDPOWER Book for Car-Grown-ups: How to Teach Self-Protection and Confidence Skills to Young People, is available at www.kidpower.org.

**Hattie RUBENSTEIN** Blair works in technology consulting and lives a stone’s throw from Washington, D.C. For 30 years she was married to a wonderful Argentinian, who died of Creutzfeldt-Jakob Disease in 2004. She has a son who does stand-up comedy, and her daughter became a College Nine review@ucsc.edu for Dataworks Educational Foundation.

**ALUMNI NOTES**

**Cowan College**

**Bob Mahrer** was named winner of the first annual GPE Poetry Prize for his first book of poetry, Requiem. As winner, he received a $1,000 honorarium, a two-week fellowship at the GPE Center, and publication of his book by Big Pencil Press. **Tom FAGAN** is the author of Extreme Attraction (Universe, 2005), a story about the transformation effect two women had on him. **Narciso RODRIGUEZ** received an A+ for Energy grant from the BP Energy Education Program to teach his third-grade students in South Gate about energy, energy conservation, alternative energy choices; he is the parent of two current Banana Slugs: Destiny (4) and Jared (3) on Bridget’s blog www.familyadventureguidebooks.com.

**MERRILL COLLEGE**


**Richard Harris reporting from the Arctic for NPR**

Richard Harris has traveled to Timbuktu to witness how climate change is forcing nomadic tribes to give up their wandering lives for a more sedentary existence. He has climbed the ice-shrouded Mt. Erebus in Antarctica to watch a volcanologist at work and stood beside a charismatic Maasai named Samuel Pilipi as the man administered daily doses of tuberculosis medicine to fellow tribe members in Kenya in an effort to cut the disease’s deadly toll. All of this was done, not for adventure, but to help people learn about scientific discoveries and challenges in our world today. “I’d like to tell stories to help people understand what kind of a place we live in and the interesting things scientists are doing,” said Harris, an award-winning science correspondent for National Public Radio and a 1980 Crown College graduate. “So it’s my own desire to find solutions,” he said—helping people think about their personal lives on this delicately balanced planet. Unassuming on the phone, the 51-year-old Harris talks easily about the people he has met but is more reticent about himself, although he admits to being in training for a 100-mile bike ride. He also is looking forward, he said, to doing more stories about how we can shift our lives in the face of climate change and how our oceans are undergoing major alterations, including acidification. His job, he admitted, has given him a front-row seat on the earth, where he can see just how much he has been taking us along for the ride.

Richard Harris will be a panelist in a discussion on “Shaping Our Environmental Destiny” April 25 as a part of the Alumni Association’s Reunion Weekend, April 24–26. For more information about Reunion Weekend, see page 3 or visit view.ucsc.edu/reunion.

—Peggy Townsend
Vanessa Cervantes: Becoming a leader

Vanessa Cervantes credits the strong support of her family for her success at UCSC. Cervantes knows the importance of family when it comes to success. She saw the determination of her hardworking parents, both high school dropouts, who saved their money and opened a jewelry store in the area as a way to help finance her final quarters at school after her divorce left her struggling financially. But Cervantes was determined to get her degree in sociology and eventually work for Child Protective Services.

It will be a way, she said, to help children who do not have what she had: a family. You can help support today's student leaders by becoming a member of the UCSC Alumni Association, which includes a $500 scholarship supported by members in the organization.

The award was important for Cervantes, not only to demonstrate that a shy young woman could face so far, but also to help finance her final quarters at school after the recent economic downturn. Her parents’ divorce left her struggling financially, but Cervantes determined to get her degree in sociology and eventually work for Child Protective Services before becoming a child psychologist.

She will be a way, she said, to help children who do not have what she had: a family. You can help support today’s student leaders by becoming a member of the UCSC Alumni Association, which includes a $500 scholarship supported by members in the organization.

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Peggy Townsend
Ezequiel Olvera: Sweet success

Olvera to get an internship with the California Commission for Economic Development. Olvera, a business management and economics major at Oakes College, seemed to be fulfilling Vargas’s predictions. But then trouble intervened. The fiancé of one of Olvera’s sisters died and then she suffered a paralyzing stroke. His father was also having a hard time. Duty made Olvera take time off from college, although he didn’t tell anyone his reason for leaving.

“I thought it would be seen as a weakness,” said Olvera, now 25. “But it was just part of life.”

Discouraged, Olvera went home but saw an opportunity to work in Antonio Villaraigosa’s L.A. mayoral campaign. There, he met labor leader Dolores Huerta, who encouraged him not to lose sight of his dreams. Olvera eventually returned to UCSC, where he founded the Latino Business Student Association and then, after graduation, landed a job with a major accounting firm in San Francisco. But drawn to Barack Obama’s historic campaign, Olvera quit his job to work for the candidate. Now he is helping spearhead a friend’s congressional campaign.

“Remembering the lessons he learned at UCSC, Olvera became a lifetime member of the Alumni Association.”

― Peggy Townsend

Once in a lifetime. Celebrate it forever.

If you are not receiving invitations and e-newsletters about alumni activities, and you would like to, send your e-mail address to review@ucsc.edu.