UCR
THE MAGAZINE OF UC RIVERSIDE
SPRING 2012 VOL.7 NO. 2

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UCR Magazine is published by the Office of Strategic Communications, University of California, Riverside, and it is distributed free to the University community. Editorial offices: 900 University Ave., 1156 Hinderaker Hall, University of California, Riverside, Riverside, CA 92521, telephone (951) 827-6397. Unless otherwise indicated, text may be reprinted without permission. Please credit University of California, Riverside.

UCR ISSN (1056-4276) is published four times a year: winter, spring, summer and fall by the University of California, Riverside, Riverside, CA 92521-0155.

Periodicals postage rates paid at Riverside, CA.

POSTMASTER: Send address changes to UCR, Subscription Services (0063), 900 University Ave., 1156 Hinderaker Hall, Riverside, CA 92521.

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Mining Big Data

The explosion of digital information is creating a new kind of scientist, like geneticist Sue Wessler (above) and computer scientist Eamonn Keogh (cover), who mine databases of information to uncover trends.

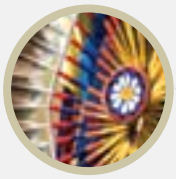
Keep up with UCR news at UCR Today, the university's new electronic newsroom: **ucrtoday.ucr.edu**

DEPARTMENTS

Cover photo of Eamonn Keogh by Lonnie Duka

For profiles of UCR innovators, including Keogh, visit PROMISE.UCR.EDU

HAPPENINGS

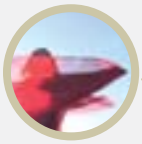


www.nasp.ucr.edu

31st Annual UCR Pow Wow

5.25-5.26

The 31st annual UCR Pow Wow – with the theme "Honoring Our Warriors" – is an intertribal social gathering celebrating Native American culture and traditions through singing, drumming and dancing. Musicians and other artists will be present, and vendors will sell food, arts and crafts, and other merchandise.

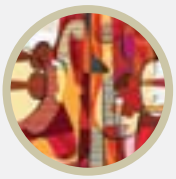


www.culvercenter.ucr.edu/film

Video Festival 2012: University of California Student Videos

5.31

The 2012 Video Festival showcases exceptional videos from talented film students at UCR. A selection of videos has been curated by students to showcase their visual and narrative styles. The festival is open to the public. Tickets are free, but an RSVP is required.

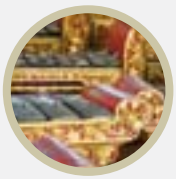


www.music.ucr.edu

UCR Chamber Singers with the UCR Orchestra

6.2-6.3

The UCR Chamber Singers are joined by the UCR Orchestra for a night of choral music on the theme of "Sustainability" – this year's theme for the College of the Humanities, Arts and Social Sciences – with performances, films and talks occurring throughout the year.

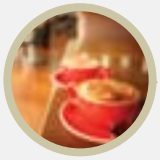


www.music.ucr.edu

Music of Indonesia: UCR Gamelan Ensemble

6.8

A gamelan is a group of instruments that includes a set of tuned bronze gongs suspended from a carved serpentine dragon, metal-keyed instruments, xylophones and drums. Experience a variety of traditional and contemporary Indonesian gamelan music, from profound to lighthearted, serious to sentimental.

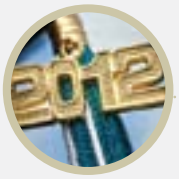


www.culvercenter.ucr.edu/film

"Cafe Coexistence"

6.14

This film focuses on a trust-fund 20-something activist and proud malcontent who believes himself to be one-quarter Navajo. After he opens a Native American-themed coffee shop on tribal land, his life is thrown into turmoil when he discovers he is white.

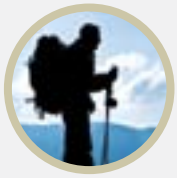


www.commencement.ucr.edu

Commencement 2012

6.15-6.18

The annual ceremonies will be held on the Pierce Lawn, near the Bell Tower. More than 3,000 students are expected to take part in seven ceremonies.

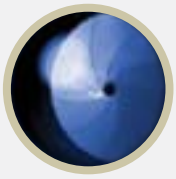


www.artsblock.ucr.edu

"The Loneliest Planet"

6.29-6.30

This film finds Alex and Nica, a young engaged couple, backpacking through the Caucasus mountain range in the Republic of Georgia. The trip is pleasant at first, but a particular moment seems to drive a wedge between the two. "The Loneliest Planet" explores love, youth and betrayal.



www.artsblock.ucr.edu

"Roots Against the Sky": Photographs by David Whitmire Hearst Jr.

7.13

"Roots Against the Sky" is a presentation of David Whitmire Hearst Jr.'s recent explorations of the natural world. In these photographs, Hearst utilizes the tools available in the digital process to produce highly expressive prints that depict the exquisite color, forms and patterns found in the natural world.

www.emp.ucr.edu

Chancellor's Dinner to Benefit UCR Students

10.13

The fourth annual Chancellor's Dinner to benefit UCR students will be held at the Highlander Union Building. Dinner will be in the third floor ballroom and will feature UCR performing groups, guest speakers and the presentation of the 2012 Alumni Awards of Distinction and the UCR Medallion.

The Morrill Act as Game-Changer

In April, the University of California celebrated the 150th anniversary of the Morrill Act. This long-ago piece of legislation had a profound, in fact transformative, effect on public higher education in this country.

The Morrill Act of 1862 gave every state a grant of public land with which to fund public colleges. Two years later, California legislators seized the opportunity and by 1868 the first University of California buildings were completed.

These so-called "land-grant" institutions were designed to provide ordinary citizens with a liberal higher education; to carry out basic and applied research in such areas as agriculture, technical and industrial disciplines; and to disseminate that knowledge to the public. The Morrill Act addressed the growing demand for improvements in agricultural and technical education as the American West opened up, and the need for a technologically savvy work force to serve the spread of industry and the expansion of the telegraph.

In the first few years of the 20th century, UC instituted two research facilities that would become the foundations of UC Davis and UC Riverside. The Riverside facility addressed such issues as water distribution, pests and disease, and it became a world leader in citrus and subtropical horticulture research, contributing substantially to the development of today's $2 billion-a-year state citrus industry. The Citrus Experiment Station evolved into UCR's College of Natural and Agricultural Sciences, which remains in the forefront of crop-saving discoveries and agricultural improvement.

Beyond that, our land-grant roots imbued the entire UCR campus with the tradition of providing accessible education, problem-solving research and community engagement.

In the current issue of the UC journal California Agriculture **californiaagriculture.ucanr.edu**, UC President Mark G. Yudof describes the Morrill Act as "a game-changer in social mobility and economic prosperity." That remains true today.

And this issue of UCR Magazine illustrates that evolution perfectly.

Through the Water Science and Policy Center, UCR researchers connect science and policy as it relates to California, the country and the globe. Recognizing the multifaceted aspect of water supply issues, UCR faculty from three colleges are collaborating to teach students how to draw on multiple resources to address problems of scarcity.

The lead story in this issue demonstrates how far UCR has traveled from its agricultural focus to address new areas of knowledge. Our researchers have been making headlines with the discoveries made possible by analyzing huge amounts of data from myriad sources. So-called "Big Data" is an emerging field, but it has already begun to change the way we function as a society. It affects the kinds of ads that target us on sites like Facebook and Amazon. It is changing the way that patient medical notes are stored and linked to the latest applicable research data. It uncovers trends from voting patterns to stock-market movements.

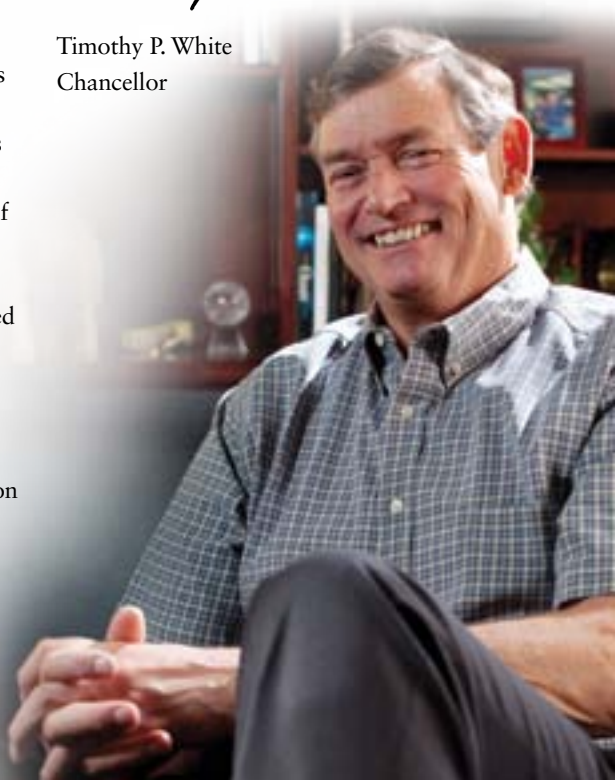
One researcher recently received a national award for a cell-phone application that uses data mining to pinpoint the distribution of pests, which inflict $40 billion a year in damage to food crops in this country.

Fifty years ago, President John F. Kennedy told a UC group, "The people of California ... have supported their colleges and universities and their schools because they recognize how important it is to the maintenance of a free society that its citizens be well-educated."

I would add that they support an education open to all and an educated citizenry that energizes the economy for the good of all.

When I hear talk of privatization of public higher education because of current budget woes, I'm reminded that Abraham Lincoln signed the Morrill Act during the early months of the Civil War, when nothing was assured, certainly not funding. And yet we continue to profit from that one action today. I trust that in another 150 years, we will still be lauding the Morrill Act.

Timothy P. White
Chancellor

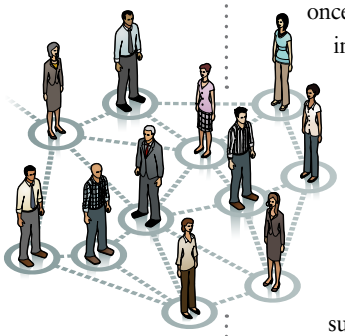


Campus Lands UC Center That Will Employ Hundreds

On May 3, the University of California announced it would be centralizing all routine personnel services in its 10 campuses in office space near the UC Riverside campus. The city and university celebrated the announcement, which will result in the addition of up to 600 knowledge-sector jobs for the Inland Empire.

The center, called UCPath, will handle routine payroll, benefits, leave management and workforce administration.

The project is a key element of UC's Working Smarter initiative, part of an ambitious effort to convert the entire UC system to a single payroll and human resources system. Savings are expected to total as much as $100 million annually once it is fully deployed, as well as improve service to employees.



Working Smarter, developed to help preserve academic quality in the face of deep budget cuts from the state, accrued $157 million in new revenue and cost savings in its first year.

Six UC campuses had submitted bids to host the shared service center.

"UC Riverside emerged as the best choice, particularly when we factored in our desire to attract UC staff," said UC Executive Vice President Nathan Brostrom. "We hope to draw job applicants from across the University, but this central location will make it an especially convenient choice for staff at our four Southern California campuses."

The UCPath Center will open its doors in July 2013, initially serving five locations: UCLA, Ronald Reagan UCLA – Medical Center, UC Santa Cruz, UC Merced, and UC Office of the President. All other campuses and medical centers will make the transition by October 2014.

New Poet Laureate Is from UCR

Professor Juan Felipe Herrera — known for chronicling the bittersweet lives, travails and contributions of Mexican Americans — was named California Poet Laureate by Gov. Jerry Brown in March. The appointment is for two years.

Herrera, the son of migrant farm workers, holds the Tomás Rivera Chair in Creative Writing at UC Riverside. He joined the UCR faculty in 2005.

The award-winning poet said he was touched by the honor and acknowledged the influence of Tomás Rivera, a noted Chicano author, poet and educator who served as UCR's chancellor from 1979 until his death in 1984.

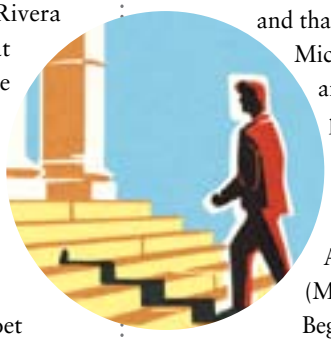
UCR is "extraordinarily proud of Juan Felipe Herrera, who is not only a poet but an author and writer of children's books," Chancellor Timothy P. White said. "Herrera is the epitome of living the promise of a California public education. This son of farm laborers was the first in his family to attend college. Today he is a revered, award-winning poet and writer who speaks to the young and the old through his depictions of the lives of ordinary people."

For a Q and A with Herrera, turn to Pages 14-15.

Master's Degree in Accounting and Auditing Launched

UCR is now offering a master's degree in accounting and auditing, and is recruiting students for September's inaugural class.

"This will make graduates much better able to handle accounting and auditing work from day one and that's critical," said Michael Moore, an accounting professor who helped design the Master of Professional Accountancy (MPAc) program. Beginning Jan. 1, 2014, a fifth year of accounting, auditing, ethics and business-related courses will be required in California to become a certified public accountant.



"The new fifth-year California requirement, which mirrors those in 47 other states, is long overdue," said Moore, who has been a CPA and accounting professor for more than 40 years and helped draft the new California requirements.

UC Riverside and UC Davis, which is also launching a master's degree in accounting this fall, will be the only UC campuses to offer the degree.

The UC Riverside program will offer several new courses, including courses on professional accounting research and information technology auditing. Demand for accountants and auditors is expected to continue to grow by up to 22 percent by 2018, a rate much faster than other occupations.

For information about the program, visit agsm.ucr.edu/mpac, call 951-827-6200 or e-mail mpac@ucr.edu.

Next Stop, Mount Everest

Young Hoon Oh staggered down the treacherous slopes of Mount Everest toward base camp at 28,000 feet, his body starving for oxygen after an equipment failure near the summit.

Recalling that 2006 expedition, the UC Riverside doctoral candidate said he felt no pain or fear. "I was really dying at the time, but it didn't register that I was dying," he said.

Oh will attempt to summit the 29,035-foot peak, the tallest in the world, again this month as part of the fieldwork for his anthropology dissertation.

His research will focus on the types of communities that mountaineers create — both philosophically and experientially — and the transformation of Sherpa society after nearly a century of aiding hundreds of international climbers.

He will write about his experiences in a blog, Anthropologist in Himalaya, at 7mmrope.blogspot.com.

When the Mount Everest expedition is finished, Oh will spend more than a year living with Sherpa families to document the impact of mountaineering on their culture.

Oh said he also wants to explore the discovery, resulting from his near-death experience six years ago, "that extreme physical conditions provide a good space in which to observe that gap between experience and understanding of that experience."

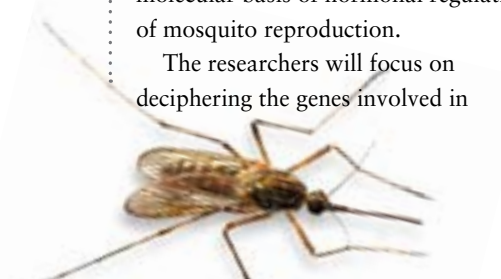
"I've studied the biographies of mountaineers who wrote about this as a religious or spiritual experience," he said. "I'm trying to talk about that kind of experience from a social science perspective and how it influences mountaineering community relations."

Introducing Birth Control in Mosquitoes

A research team led by Alexander Raikhel, a distinguished professor of entomology, has received a five-year $2.8 million grant from the National Institute of Health to study the molecular basis of hormonal regulation of mosquito reproduction.

The researchers will focus on deciphering the genes involved in mediating the action of hormones involved during egg production in mosquitoes — specifically, *Aedes aegypti*, the mosquito that spreads dengue and yellow fever.

Nearly 2.5 billion people are at risk for contracting dengue fever. Each year, there are 100 million cases of dengue in the world. Yellow fever results in 30,000 deaths per year; about 200,000 cases are reported each year.



UCR Libraries Celebrate 3 Millionth Volume

UCR Libraries celebrated the acquisition of its 3 millionth volume April 18 at the Tomás Rivera Library. The ceremonial 3 millionth volume was a 2004 facsimile of the Gutenberg Bible donated by bibliophile Edward Petko.

Achieving a collection size of 3 million volumes is a milestone for UCR, said University Librarian Ruth M. Jackson. The library celebrated its 1 millionth volume in March 1981, and its 2 millionth volume in November 2001.

With this achievement, UCR ranks 81st for the number of volumes held among the 115 academic research libraries in the United States and Canada that are members of the Association of Research Libraries. That places UC Riverside just below UC Irvine, which ranks 77th, and just above UC Santa Barbara, which ranks 84th.

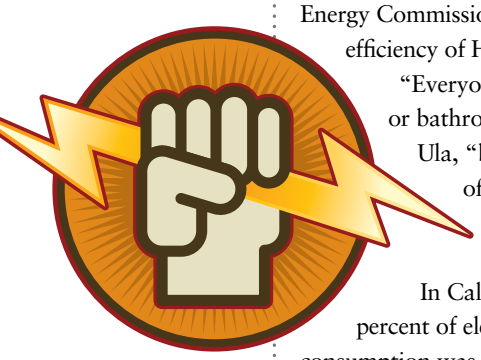
Of the 3 million-plus volumes held by the libraries, more than 404,000 are e-books. "The digital transition is occurring at a steady pace," Jackson said, and will ultimately transform libraries in much the same way the printing press revolutionized bookmaking and distribution in the 15th century.

Printed books will continue to coexist with e-books and other formats and will remain a staple of university and research libraries for some time, she said. Currently, only 20 percent of all in-copyright scholarly books published in the U.S. and worldwide are fully available in digital form, she said.

Making Motors More Energy Efficient

Energy efficiency efforts tend to focus on improving lighting and insulation. But, in fact, motors that run heating, ventilation and air conditioning (HVAC) systems are the largest user of energy in buildings.

Sadrul Ula, who is a member of the research faculty at UCR's Bourns College of Engineering Center for Environmental Research and Technology (CE-CERT), is trying to change that. He recently received a $385,000 grant from the California Energy Commission to evaluate the efficiency of HVAC motors.



"Everyone turns off lights or bathroom fans," said Ula, "but, no one turns off motors. The awareness is not there."

In California, nearly 47 percent of electrical energy consumption was used by commercial buildings. Motors that create that energy tend to operate at 5 to 10 percent below optimum efficiency, Ula said. Increasing that efficiency can have enormous implications.

With the grant, Ula and co-principal investigators Matthew Barth and Alfredo Martinez Morales plan to:

- measure energy use of large HVAC motors on-site under actual operating conditions in office, institutional and commercial buildings.
- set up a large-motor testing facility at CE-CERT. The new independent test facility will be the first of its kind in California and the third in the United States.
- evaluate commercial and in-house software used by architectural and engineering firms designing HVAC systems.

UCR: A Best Value

UCR has been named one of the top 75 best value public undergraduate schools in the nation, according to a list published recently by The Princeton Review.

The list, part of "The Best Value Colleges: 2012 Edition," also listed UCR as one of the top 150 best value colleges in the nation — public or private — based on its excellent academics, generous financial aid and/or relatively low cost of attendance.

UCR was described as an "underrated" and "research-oriented" school with an "extensive library" and heaps of "very up-to-date" technology. Cutting-edge research opportunities for undergraduates are ample "in virtually any area."

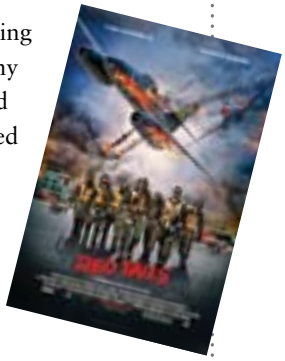
Also, according to The Princeton Review, UCR boasts one of the best entomology departments in the nation, is a leader in agricultural research and has "some very excellent teachers" who "go out of their way to help students learn both inside and outside the classroom."

In another national survey, UCR placed 29th among more than 400 state universities ranked in the 2011-12 PayScale College Salary Report.

The report stated that the average starting salary for a UC Riverside graduate is $43,900, and the average mid career salary for a graduate is $88,800.

Tuskegee Airmen Archive Consulted for Feature Film

"Red Tails," a feature film released in January, depicts the heroism and skill of the African-American pilots and crew members who battled segregation on the ground as they challenged Germany's aces in the air during World War II. Those aviators, known as the Tuskegee Airmen, went on to become judges, university presidents, teachers, architects, engineers, physicians, actors, scientists and musicians. Documents and artifacts illuminating the careers of many of those pilots and crews are preserved in the Tuskegee Airmen Archive at UCR.



Before shooting on the Lucasfilm Ltd. production started in Europe, several actors auditioning for parts visited the UCR archive to learn more about the original Tuskegee Airmen they hoped to portray, according to University Librarian Ruth Jackson. Photographs from the archive were used in preparing for the production's release activities, and the archive helped with a DVD documentary about the Tuskegee Airmen that was released with the feature film.

The UCR archive, established in 2005, is the largest archive in a U.S. public university chronicling the history of the Tuskegee Airmen and Women.

Powering Electric Vehicles with Sunlight

The Riverside area will become a leader in using solar energy to power electric vehicles with a $2 million award to the Center for Environmental Research and Technology at UCR's Bourns College of Engineering.

The two-year project, supported by the South Coast Air Quality Management District, will build solar arrays, advanced battery storage, vehicle charging stations, an electric trolley and a grid-management system to provide clean energy to clean vehicles efficiently.

The funding will allow the university to install up to 2 megawatts of solar arrays and two megawatt hours of lithium battery storage systems at three locations on and near campus. The solar energy will be used to charge vehicles at several sites on campus and additional sites throughout Riverside.

In partnership with the city of Riverside and Riverside Public Utilities, UC Riverside engineers will design methods to direct the solar energy to electric vehicle charging in a way that minimizes loads on the grid and demands for electricity generated from non-renewable resources.

Additionally, UC Riverside plans to convert a trolley from diesel to electric power to shuttle students and area residents around UC Riverside.

Highlanders Volunteer the Most

University of California, Riverside, undergraduate students averaged 3.5 hours of volunteer or community service work per week, the most in the UC system, according to data drawn from the 2010 UC Undergraduate Experiences Survey.

The report showed the systemwide average was 2.7 hours per week.

"UCR students are very deeply committed to service and bettering the society they live in," said Tonantzin Osegura, assistant dean of students. "Our students don't just talk about it. They let their actions speak for themselves."

In recognition of this, UCR was named to the President's Higher Education Community Service Honor Roll with Distinction by the Corporation for National and Community Service and the U.S. Department of Education.

UC Riverside was also named to the honor roll in 2010.

Astronomers Discover Rare Galaxy at Dawn of Time

Astronomers, including UCR's Bahram Mobasher and graduate student Hooshang Nayyeri, have discovered that one of the most distant galaxies known is churning out stars at a shockingly high rate. The blob-shaped galaxy, called GN-108036, is the brightest galaxy found to date at such great distances.

The galaxy, which was discovered and confirmed using ground-based telescopes, is 12.9 billion light-years away. Data from NASA's Spitzer and Hubble telescopes were used to measure the galaxy's high star production rate, equivalent to about 100 suns per year. For reference, our Milky Way galaxy is about five times larger and 100 times more massive than GN-108036, but makes roughly 30 times fewer stars per year.

The discovery is surprising because previous surveys had not found galaxies this bright so early in the history of the universe.

The international team of astronomers, led by Masami Ouchi of the University of Tokyo, Japan, first identified the remote galaxy after scanning a large patch of sky with the Subaru Telescope atop Mauna Kea in Hawaii.

GN-108036 lies near the very beginning of time itself, a mere 750 million years after our universe was created 13.7 billion years ago in an explosive "Big Bang."

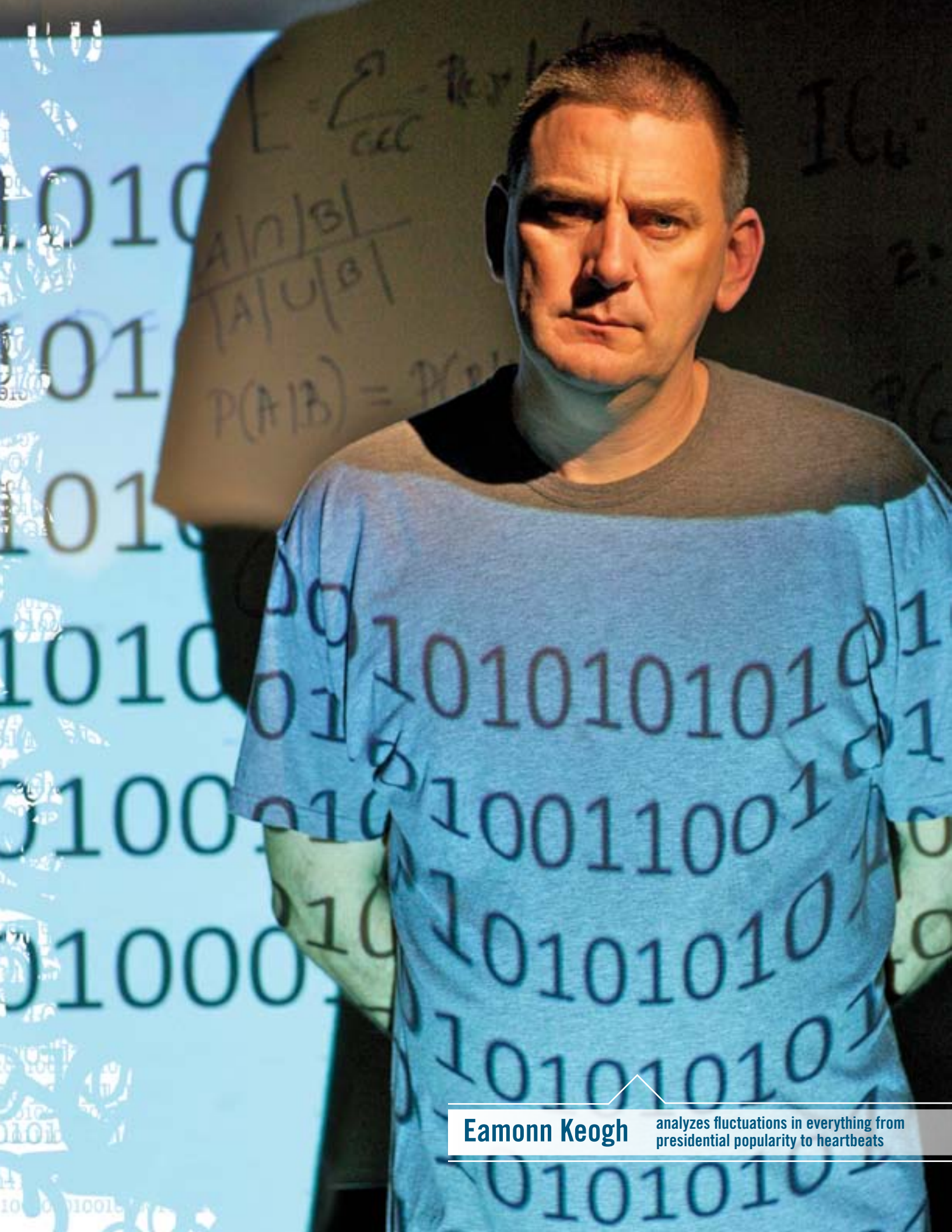
Mining Big Data

By Sean Nealon

The explosion of digital information from social media and consumer tracking is creating a new kind of scientist. Data analysts and mathematicians find themselves in demand as number crunching is being used in unexpected ways, such as identifying insects and classifying Stone Age tools.

Twenty years ago, Sue Wessler was searching computer databases to further understand transposable elements, which are an abundant component of genomes that may help plants and animals adapt to a changing environment.

Wessler, then a professor at the University of Georgia, was met with resistance when she tried to publish her laboratory's findings. Reviewers of the



Eamonn Keogh analyzes fluctuations in everything from presidential popularity to heartbeats

Sue Wessler an early adapter of data mining for plant genetics

manuscripts weren't comfortable with the work because it was based strictly on existing data.

"They called me a database predator," says Wessler, who is now a distinguished professor of genetics in the Department of Botany and Plant Sciences at UC Riverside.

Things have changed.

Today, Wessler, along with professors across the UCR campus in fields including political science, marketing, education, anthropology and computer science, is among those focused on an emerging field known as "big data," a term that refers to mining databases of information to uncover new trends.

As the amount of digital information continues to grow exponentially, researchers at UCR and elsewhere are able to tap that data in ways that were unimaginable 10 years ago.

Geneticists, including Wessler, are focused on such things as the impact of global warming on plants. A political scientist and education professor at UCR are creating databases, and slicing them up to create valuable tools for policy makers. A computer science professor is mining Twitter data to help understand the stock market. Another computer scientist worked with an anthropology professor to understand how the Americas came to be populated.

But this emerging field also is creating problems. These include ever-expanding and costly supercomputer systems to store the data, and security and privacy issues, particularly involving websites and social media sites. For example, UCR marketing professors are studying privacy as it relates to retail stores using personal data drawn from customers.

Meanwhile, government money is being poured into this type of research, in part to help meet the demand for employees with data analysis skills.

In March, the federal government announced a $200 million research effort focused on big data computing. This includes many agencies, ranging from the National Science Foundation to the United States Geological Society to the Department of Defense.

The United States faces a shortage of 140,000 to 190,000 people with deep analytical skills and 1.5 million managers and analysts to analyze big data and make decisions based on their findings, according to a 2011 report by McKinsey Global Institute, the research arm of consulting firm McKinsey & Co.

That need has filtered down to UCR.

A scan of the more than 1,000 job postings in the UCR Career Center database showed titles such as "critical thinking software engineer," with CityGrid, an online media company; "emerging technology analyst," with the IRS; "senior and technical writer for social and economic analysis proposal team," with Gallup.

"I don't think this is a wave of the future," says Linda Latendresse, assistant director of employer relations and recruiting at the UCR Career Center. "It's here now. And I don't think it's going to go away."

Political Numbers

Karthick Ramakrishnan, an associate professor of political science, is interested in the politics of race, ethnicity and

immigration in the United States, particularly relating to Asian Americans.

The problem with focusing on Asian Americans: lack of data. Ramakrishnan set out to change that.

With three colleagues, Ramakrishnan conducted the 2008 National Asian American Survey, the first study of its kind conducted at the national level. They surveyed more than 5,000 Chinese, Indian, Vietnamese, Korean, Filipino and Japanese Americans.

The data formed the basis for the 2011 book, "Asian American Political Participation: Emerging Constituents and Their Political Identities."

The survey and book are important tools for community advocates, politicians and policymakers. For example, voter mobilization groups such as APIA Vote! have used the survey's findings to identify the places and ethnic groups where civic participation could use the most improvement. Also, the Democratic National Committee has focused on the findings that most Asian Americans still have not made up their minds on which party to identify with, and is seeking to improve its outreach efforts.

The survey also has generated interest among organizations serving the Asian American community, and Ramakrishnan is raising money from foundations to conduct in-depth research on issue preferences in 2012. (The 2008 survey focused largely on civic participation.)

Ramakrishnan and his co-authors have also deposited the data on the Inter-University Consortium for Political and Social Research (ICPSR), a data archive of more than 500,000 files of research in the social sciences that is housed at the University of Michigan.

"In some ways having our data available at ICPSR is even more rewarding than publishing," Ramakrishnan says. "By releasing data so others can access it we are having a really big impact."

Meanwhile, Luciana Dar, an assistant professor of education, is also interested in politics, specifically its intersection with higher education. She focuses on how political dynamics, ideology and political institutions affect government decisions on higher education spending, regulation and policy.

She prepared to conduct that research by spending about two years in the mid-2000s as a graduate student compiling a database of information.

The database includes information from all 50 states and spans from 1976 to 2010. It includes more than 50 variables – ranging from unemployment to college age population to indicators of legislative partisanship – that she can study.

That database forms the basis of much of her research, which focuses on topics such as how best to award financial aid and the impact of state higher education centralization/decentralization on the price students pay to go to college.

Gaming the Market

In the business school, Donna Hoffman and Tom Novak, marketing professors for more than 20 years and co-directors of the Sloan Center for Internet Retailing at UCR, have focused on social media, online consumer behavior and digital marketing trends.

The biggest change Hoffman has seen in recent years has been the availability of more sophisticated data that can be used to target consumers through a wider range of channels.

Hoffman says billboards like those seen in the movie "Minority Report," in which John Anderton, the character played by Tom Cruise, is bombarded with personalized advertisements as he walks through a shopping mall, are not too far away from being a reality. Using wireless technology and data stored in a person's cell phone, advertisers could target consumers in real-time based on their shopping habits.

"I think we're kind of entering a brave new world where retail and Internet knowledge of consumers are being combined in interesting ways people don't understand yet," says Hoffman, who has been a digital marketing consultant with companies including Procter & Gamble, Microsoft and Walmart.com.

With that in mind, Hoffman and Novak have started a new line of research they are calling the gamification of marketing. It focused on adding game play elements – such as Facebook "likes" and being the "mayor" of a store on Foursquare – into marketing.

"This has the potential to get pretty out of control," Hoffman says. "Marketers are starting to treat customers like monkeys. They are dangling large bananas. You walk in a store: 'Here's your banana. Now buy something.' It's important to step back and study the implications of this."

"I think we're kind of entering a brave new world where retail and Internet knowledge of consumers are being combined in interesting ways people don't understand yet."

Donna Hoffman
UCR marketing professor

Stock Tweets

Also focused on social media, but coming from a different angle is Vagelis Hristidis, an associate professor of computer science and engineering.

Hristidis specializes in data mining, which focuses on discovering patterns and/or irregularities in large data sets. The field became recognized as a major discipline about 10 years ago after growing out of research in statistics, databases and artificial intelligence.

Hristidis and several other researchers recently developed a model that uses data from Twitter to help correlate and predict

Luciana Dar researches how political dynamics affect higher education

the traded volume and value of a stock the following day.

A trading strategy based on the model created by the team outperformed other baseline strategies by between 1.4 percent and nearly 11 percent and also did better than the Dow Jones Industrial Average during a four-month simulation. In that simulation, they analyzed nearly 27 million tweets.

Hristidis is also conducting research on the health care industry. This includes attempting to build a tool to enter clinical notes using standardized medical terminology so notes can be searched more effectively. Further, he is studying ways to link patient medical records with medical publications and ongoing medical research.

He was attracted to the medical informatics industry because for various reasons it has not benefited much from advances in information technology. He compared it to where the financial industry was 30 years ago.

The work could have a significant economic impact. In the U.S. health care industry, if big data is used creatively and effectively to drive efficiency and quality, the sector could save more than $300 billion per year, the report from the McKinsey Global Institute found.

Data Renaissance Man

Eamonn Keogh, who sits in the office next door to Hristidis, is also a data miner. But Keogh doesn't focus on social media or finance, two of the hottest areas in data mining.

Instead, he has collaborated with everyone from anthropologists and cardiologists to astronomers and entomologists and worked with data as diverse as 15th century manuscripts, primate skulls, graffiti and medical records.

"I'm attracted to things that others are not working on," Keogh says.

That makes sense when Keogh's background is considered.

He grew up in Dublin, Ireland, where his father worked for Guinness, the beer company. At 15, he dropped out of high school and worked painting cars. Four years later, he won a visa lottery and came to the United States.

While working full time doing everything from building and designing mountain bikes, restoring vintage cars, and painting carousel horses, he worked his way through college.

He arrived at UCR in 2001. Early on, he developed Symbolic Aggregate Approximation, or SAX, a method to analyze time-series data, which includes everything from presidential popularity to a heartbeat. The method can allow previously unseen fluctuations to be seen.

The SAX work, which has been cited frequently in academic papers, also has provided Keogh an opportunity to showcase his sense of humor. Paper titles focused on SAX research include "SAXually Explicit Images: Finding Unusual Shapes" and "Hot SAX: Efficiently Finding the Most Unusual Time Series Subsequence."

Now, his primary focus is insects, specifically the $40 billion per year in damage they do to food crops.

He is trying to build models to track the movement of insects in a space and over time. He has devised devices using, among other things, modified laser pointers purchased at a 99-cent store and Legos, to measure insect wing-beat frequency from a distance.

The idea is to identify the type of insects based on wing frequency data. The data

could be valuable to farmers, who would be able avoid "blanket spraying" pesticides because they would know the type and location of insects.

Stone Age Data

Among Keogh's collaborators is Sang-Hee Lee, an associate professor of anthropology.

She met Keogh in 2001, when they both arrived at UCR. He talked to her about collaborating by using data mining algorithms to classify objects, such as arrowheads and petroglyphs.

She was hesitant.

"I never thought in my life that I'd be talking about big data because I do fossils," Lee says.

But he was persuasive. She opted in. It was a good move.

In 2008, they were awarded a grant of more than $800,000 from the National Science Foundation.

Currently, Lee and one of her Ph.D. students, Jessica Cade, are using Keogh's algorithms to examine Clovis fluted projectile points, which resemble arrowheads. They were found throughout North America and are believed to be 12,000 to 14,000 years old.

With help from Keogh's algorithms, they are looking to decipher subtle differences in the shape of the stone tools. This is done by turning the outline of each tool into a set of 150,000 data points, which are represented by a line graph. Studying series of these line graphs can show slight variations in the shapes.

By studying differences in the shapes, they are trying to determine whether the Clovis tool technology was spread by a population of people migrating or by a group of previous settlers coming into contact with a group of Clovis people, seeing the Clovis design and bringing it back to their home base.

This is significant question in anthropology. If their hypothesis that variation in stone tools would be high in the case of cultural transmission is true, it could help answer a longtime debate about when and how the Americas were first settled.

Faster Obsolescence

Wessler, the professor who early in her career was called a "database predator," says today the people in her lab spend 80 percent of their time on computers and 20 percent in a traditional "wet" lab. Twenty years ago, those numbers were flipped.

That flip has occurred because genetics is rapidly changing due to advancing technology.

For example, in 2000, after 10 years of work, scientists announced they had sequenced the more than 3 billion base pairs of the human genome. Today, Wessler says, that project would take one week.

At UCR, in 2008, the campus received its first so-called next generation DNA sequencer, says Glenn Hicks, the academic administrator of the Institute for Integrative Genome Biology and an associate research plant cell biologist.

In 2010, when the university upgraded to a newer instrument, that original sequencer was essentially obsolete. The new refrigerator-size machine, which is used by more than 35 labs on campus, ranging from psychology to bioengineering to entomology, can process nearly 10 times as much data up to 25 percent faster than the original one, Hicks said.

"It really is revolutionary," Hicks says. "And the revolution is technology driven."

For Wessler, the impact is being felt with her research on transposable elements, that abundant component of genomes that may help plants and animals adapt to a changing environment.

Scientists now recognize that transposable elements, once thought of as "junk DNA," play vital roles, from guiding developmental processes to contributing to correct gene regulation. This is largely due to the ability to identify and characterize transposable elements through genome sequencing.

Wessler focuses on active transposable elements, also known as "jumping genes," because they can move from one location in the genome to another. Active transposable elements generate genetic diversity, the raw material for evolution and adaption, which could allow some members of a population to survive, for example, with less water or in a colder region.

Wessler, the professor who early on was called a "database predator," says today the researchers in her lab spend 80 percent of their time on computers and 20 percent in a traditional "wet" lab. Twenty years ago, those numbers were flipped.

"This could guarantee, in the case of a catastrophe, the survival of an organism," Wessler says.

Excitement about the possibilities of harnessing big data is being felt across campus.

As papers are published and word spreads about the mysteries to be unlocked by data mining, researchers in disciplines that were rarely considered data-driven are using this tool to consider problems with fresh eyes. As anthropologist Sang-Hee Lee put it: "This is opening new horizons for anthropology research. We think we have nothing to do with big data, but look, from one stone tool, there's big data. Now it's time to apply that big data into answering really interesting questions.

"That work is just starting," she says.

To read more about Sue Wessler, Eamonn Keogh and other UCR technology innovators, visit PROMISE.UCR.EDU

POETRYMAN

JUAN FELIPE HERRERA, PROFESSOR OF CREATIVE WRITING, WAS RECENTLY NAMED CALIFORNIA'S NEW POET LAUREATE.

HE TALKS TO UCR MAGAZINE ABOUT IMPROMPTU READINGS, HIS FARM WORKER CHILDHOOD AND HOW HIS ENDOWED CHAIR HELPED HIM UNCOVER A LOST DECADE IN LATINO CREATIVE HISTORY.

What are your plans for your two-year term as poet laureate?

The most important thing is to acknowledge everyone who's working so hard in the world of words and language, which is all of us. Young people, writers, people that want to learn how to write, those in alternative schools-senior centers, gyms, clubs, the story-tellers, folk singers, people in hospices, prisons, continuation high schools, gifted classrooms, poets and artists doing their bit with string basses and electric guitars, people in workshops who are working at it. Acknowledging lives and landscapes is really what a poet does. We address what's going on in whatever way we can with these little things called letters and scripts, cuneiforms and codes. They are crystals of our voice. They crystallize our voice.

How did you react to the call in March giving you the news?

When I got the actual lightning bolt, my first reaction was wordless. Then I think I said 'wow.' I did a '60s 'wow.' For me, it's a very big thing. This is what I've been doing since 1962, since middle school, when I first forced myself to be on stage because I was so afraid of speaking.

Have you always done things because they scared you?

I've either done that or I've launched myself into an impossible thing that everyone said I couldn't do. An example would be when I was at UCLA in the 1970s in a class with Dr. Nicholson, a renowned anthropologist. He mentioned that there were 250 Lacandon Maya left in the rainforest in Chiapas, Mexico. He said it kind of casually, as part of his lecture. I was in the back row, kind of daydreaming. I turned to my friend and said, 'Did you hear that? There's 250 Lancandon left. We gotta go save them.' I wrote a proposal to get funded for a film documentary from the brand-new Chicano Research Center. We got $8,500 and I recruited a graduate filmmaker, and our swashbuckling crew of four went through Mexico to Maya country to the more robust Indian populations of the Totonac in Veracruz and the Huichol in central Mexico. Everywhere we went the doors were wide open. That was the first launching of myself into the unknown on a dream.

What happened to the Lacandon Maya?

Their numbers have increased. Now there are about 500 or 600 of them. And they are still dealing with resource exploitation by oil exploration and timber industries, as well as the onslaught of Central America's and Mexico's dispossessed.

Last June, you walked through the Hub, reading poetry, on a video that's gone viral. What's the attraction of impromptu readings?

Impromptu readings — that's my middle name. I enjoy the feeling of being among people and moving through them and doing poetry. I want to catch students off guard and in the open and – bang – there's a poem. I've been doing impromptu and improv performances of poetry since the 1970s.

How have these experiences affected your poetry?

They've opened up my vision of what poetry is and made it superpublic. That's why I say it's so important to acknowledge everyone in all areas and all places and all generations and all spaces. Because that's how I'd grown up, traveling as a child as a farmworker with my parents. It was kind of an open space life. Tents and on the road and having breakfast outside. A very makeshift, simplified life. And you're moving around in a little truck and a little homemade house my dad built on top of a car chassis he found. That was my home. A runaway home.

How did you get started writing poems?

My mother always played with words with me. My home library really was sayings, stories, riddles and some jokes, but not like ha-ha jokes, just kind of funny. That's a great way to get the verbal mind nourished. My childhood was filled with verbal rhyming games.

The Tomás Rivera Endowed Chair in Creative Writing brought you to UCR in 2005. What has the chair meant to you?

It's like opening a door as big as the sky. Before I got here, the Tomás Rivera committee had been working for 18 years to promote the legacy of Tomás Rivera as a writer, as a thinker, as a chancellor, as a pioneer in the arts and in education, as an essayist, a storyteller, a poet, a novelist. It started the year after he died. The group, under the leadership of Concha Rivera, his wife, brought in a number of well-known speakers on a variety of topics, and a lot of people donated to the endowment.

What has the chair allowed you to do?

The chair has allowed me to be more mobile. I've visited a lot of schools, cultural and art museums and galleries, working with them to put together a number of things, including the student Verbal Coliseum show with bleachers downtown at UCRARTSblock, in this case in conjunction with Shane Shukis from the Sweeney Art Gallery. There's a little money for travel, so I also visit libraries, tiny libraries like Highgrove, and speak at elementary school assemblies. In the eyes of the schools, the chair ushers me in. It means something to them to have the Tomás Rivera Chair at their school.

Has the chair affected your scholarship?

It's allowed me to bring innovative writers to campus. And it's allowed me to travel to El Paso the last two years on a very amazing project. I think there is a lost decade of Latino literary and performance history from Juarez and El Paso that was like the Harlem Renaissance. In the 1930s, Juarez and El Paso were like rockets. There was radio, there was poetry, there was dance, there were songs, there was theater, and there was circus and jazz and visiting artists from the United States and Mexico City, all in that little borderland.

This period hasn't been documented?

No. Perhaps it was perceived as a wild and red light and low-class and speak-easy world. The cabarets closed down in the mid-'30s because of Prohibition. By 1942, the era was over because of the war. There was documentation, but it was at the household level, the family level. My uncle was part of that '30s cadre of artists, and I had some photographs. He was in a radio show in Juarez called "El Barco del Illusión" (the ship of illusion). It was a radio play with comedy and music. His radio partner was this guy named Germán Valdez, who became an internationally known comedian called Tin-Tan. Tin-Tan popularized the zoot suit in Mexico and Latin America. I knew about Tin-Tan because my uncle worked with him. I knew about the radio show. But that was about it: a floating square in a blank checkerboard without any squares in it. But then someone called me from El Paso and said, 'I understand you know about "El Barco del Illusión."' They asked, 'Do you have any photographs? Because our mother who is going to be 92 was a singer for that show.' I've gone to interview her for the last two years. What I discovered then was this lost decade.

Are there any tape recordings of the radio programs?

I am looking for those.

What will do with your research?

I want to remount the radio show as a musical so we can see the actors and see the songs. I'm really excited about it. And it turns out that Cuca Aguirre, the women I interviewed, has a sister in Riverside, Eva Amezcua, who was also on the radio program. She's 96. They both still sing and recite poetry. They joined this whole renaissance in their teens.

How would you describe your UCR students?

The students here are amazing. The writers, whether undergraduate or graduate, are charting new ground. For a writing or poetry professor, it's exciting because they are really charging ahead. I say, 'Wow, I wish I was at the level they are when I was an undergraduate.' Some of them I wish I was just at their level now! They have different cultural experiences and languages and they are talented, very talented. You walk into a creative writing class and you are not going to see one style of creative writing. You are not going to see one style of writing poems. They're all charting-new-ground styles. It was like me when I first started writing, even though they're better than me. I started writing whatever I could, with whatever I could and any way that I could. And then later, 20 years later, I picked up books and tools to shape and work the poem and read and talk about the poem. But first it was just lighting the fire of poetry. That's what students are doing here. They are lighting the fire of poetry.

To view videos of Juan Felipe Herrera, visit ***bit.ly/GSBU2a***

TO CREATE A MIDDLE EASTERN STUDENT CENTER,

LAUGHTER HELPS

By Ross French

Rabbi Bob Alper looked out on a diverse audience of about 500 UC Riverside students, staff and faculty who had come to an aptly named Laugh in Peace comedy show and reminded them of why they were there. "When you laugh together you can't hate each other," he said. "You learn to love each other."

Alper's mantra is one that a group of forward-thinking UC Riverside students are taking to heart as they work together to create the first Middle Eastern Student Center in the University of California.

Shadi Matar, a sophomore political science major whose family is from Palestine, says: "The concept of a center for Middle Eastern students has been around since 2003, but the previous attempts were not inclusive enough. We've reworked it to include anyone who associates with the Middle East, religiously, culturally or in any other way."

UC Riverside, the most-diverse campus in the University of California system and the fourth most-diverse research university in the nation, has four centers dedicated to students from specific regions or ethnic backgrounds: African Student Programs, Chicano Student Programs, Native American Student Programs and Asian Pacific Student Programs. Two other centers focus on gender issues: the Women's Resource Center and the Lesbian Gay Bisexual Transgender Resource Center. The centers provide cultural, social and educational support to students, staff, faculty and friends of the UCR community; promote scholarship and internship opportunities; help provide access to campus resources for clubs; and host social and cultural events.

Heba Diab, a sophomore biological sciences major, says that the proposed Middle Eastern center's role as an educational outlet is important.

"People from the Middle East – Muslim, Christian, Jewish, atheist, agnostic, anything – have the same problems, the same challenges, the same hopes, the same fears," she says. "The center would give all of us a voice here on campus, and give people a different perspective of us."

The students working on creating a center share a Middle Eastern heritage, but come from a wide variety of religious, political and social groups, some of which have a history of tense interactions.

According to Joe Virata, director of the Diversity Initiatives Program at UCR, it was Middle Eastern students who had the idea to work together. He says that years of tension, particularly between some Palestinian and Israeli student groups, had begun to take a toll.

"Some students recognized that constant bickering is not what a university ought to be about. They have their differences, but they should be able to engage with each other about them in a civil way," Virata says. "They decided to come together to work on a project and, in doing so, to work on their relationships with one other. They opened conversations that lead to collaborations, which can then lead to a community."

The Laugh in Peace show on Feb. 22 was a perfect opportunity for cross-cultural interactions. It features Alper, a practicing rabbi who bills himself as "the world's only practicing clergyman doing stand-up comedy ... intentionally." The ecumenical partners for his shows vary, but for the UCR performance they were the Rev. Susan Sparks, a Baptist minister, and Ahmed Ahmed, a Muslim born in Egypt who grew up in Riverside,

A broad range of campus organizations participated in planning the show and laying the groundwork for a center, including the Armenian Student Association, Pakistani Student Association, Lebanese Social Club, Hillel, Muslim Students Association, Highlanders for Israel, Coptic Club and the Students for Justice in Palestine. And while meetings had tense moments with many voices and differing opinions, in time the students began honestly engaging with one another.

Diab says that one of the biggest lessons the students learned was that they are more alike than different. It is a dynamic on display at the end of every meeting, no matter how stressful or contentious it becomes.

"Somehow we forget everything and we just talk to each other. It's amazing," she says. "Maybe it is that as students, we have a connection to one another. We are all the same generation. We know what the other person is going through, what classes they are taking, how hard they are. These are the little things that bring us together and push us forward."

In mid-January, the group was faced a challenge when Students for Justice in Palestine sponsored an appearance of "The Wall," a symbolic presentation designed to raise awareness of the Israeli/Palestinian conflict. Several Jewish students felt slighted by the event, which they felt promoted misconceptions about Israel.

But to their credit, many of the students were prepared for conflict to arise, and, rather than take sides, they used it as an opportunity for discussion.

"It was the elephant in the room, and it got to be a very tense moment," Virata recalls. "But because of the work that had been done earlier, we were able to reconnect with those early conversations about our purpose, about why we were doing this."

The Laugh in Peace show went off without a hitch and received rave reviews, much to the delight of the organizers.

"I can't even express how amazing it was when the night ended," Diab says. "Everyone was just hugging each other. All the tensions, every problem just evaporated. It was magical."

But just days later, the groups' bond was tested again by a pair of on-campus incidents. On March 1, UC Riverside Hillel was a co-sponsor of "Israel Soldiers Speak Out," which featured a pair of reserve-duty Israeli Defense Forces soldiers speaking about their experiences. Some individuals protested the soldiers' appearance by walking out during the event. Two days later, a vandal scrawled the word "terrorists" on an Israeli flag outside the Hillel offices.

The incidents brought the scrutiny of the media and the public, with a focus on the perceived feud between groups like Hillel and Students for Justice in Palestine. But the students working toward the Middle Eastern center, many of whom are members of those groups, would not let the incidents derail the cause. Instead, they provided another opportunity for discussion, which in turn gave their cause more momentum. All involved realize that establishing a permanent center will take time, but the group is moving ahead by planning events: a concert at the Barn and a screening of the film "A Separation."

"We were able to talk to each other afterward and get honest opinions from everybody," says Danny Leserman, a junior applied physics and engineering major and member of Hillel. "If we hadn't been working together, we never would have been comfortable opening up and talking about how we felt about what happened."

Diab says that both incidents further underscored the need for more communication and for the center.

"Perhaps if the person who defaced the flag had been given the same opportunity that we have been given, they wouldn't have done that," she says. "They might have considered how the action would affect the people they had been working with and talking to — their friends."

Leserman says that while he was disappointed by both the protest and the flag graffiti, he refuses to look at the incidents as a step backward.

"Dissent is something you have to accept," he says, acknowledging that individuals from many groups have expressed concerns. "It seems that a lot of people believe that if you try to make something better and something bad still happens, then all is for nothing. But that is just not correct. We are moving toward our goal of creating a space for respectful, non-livid dialogue — the Middle Eastern Student Center. It is not going to be easy, but I can see it happening."

RESEARCH THAT'S ALL

wet

FROM HELPING LAND MANAGERS COPE WITH INCREASINGLY SCARCE WATER SUPPLIES TO IMPROVING TAP WATER TO TEACHING UNDERGRADUATES THE COMPLEXITIES OF WATER POLICIES, UC RIVERSIDE HAS RESEARCHERS ALL OVER CAMPUS HELPING CALIFORNIA — AND THE WORLD — DEAL WITH WATER WOES.

Ariel Dinar
studies groundwater and wastewater

By Phil Pitchford

Research being done at UC Riverside reflects the reality that water shortages are a long-term, global problem. On the positive side, the research also reflects the belief that science can get in front of the problem and provide solutions. The work being done here is critically important to a state where water shortages are common and where the effects of climate change could be especially devastating.

"California is still in a comfort zone, because there are certainly countries that are living with far less available water," says Ariel Dinar, a professor of environmental economics and policy who is studying how utilities can best utilize groundwater supplies and capture wastewater for re-use. "But California is going to be one of the areas that is hardest hit by climate change, affecting supply variability. Connecting researchers and research on water science and policy in California, the United States and internationally is especially important under conditions of water scarcity and risk to its quality."

One critical area of UCR research is how a decline in water availability may reshape our vast public lands by the migration and death of plant species that now dot the landscape. Louis Santiago, an assistant professor of physiological ecology, works with land managers to study which plants species will survive in an altered climate, because changes in the plant species that are present ultimately affect the water cycle. Similar research is underway at other institutions in Utah, Spain and Australia.

"People around the world are starting to ask these questions," Santiago says. "Water is something that everyone can relate to."

Santiago is studying changes to 17 species of shrubs at a field site on the eastern side of the San Bernardino Mountains, where chaparral gives way to the Mojave Desert. He studies transpirational water loss – the amount of water plants lose to the atmosphere via their leaves – and how that transpiration affects the local ecosystem.

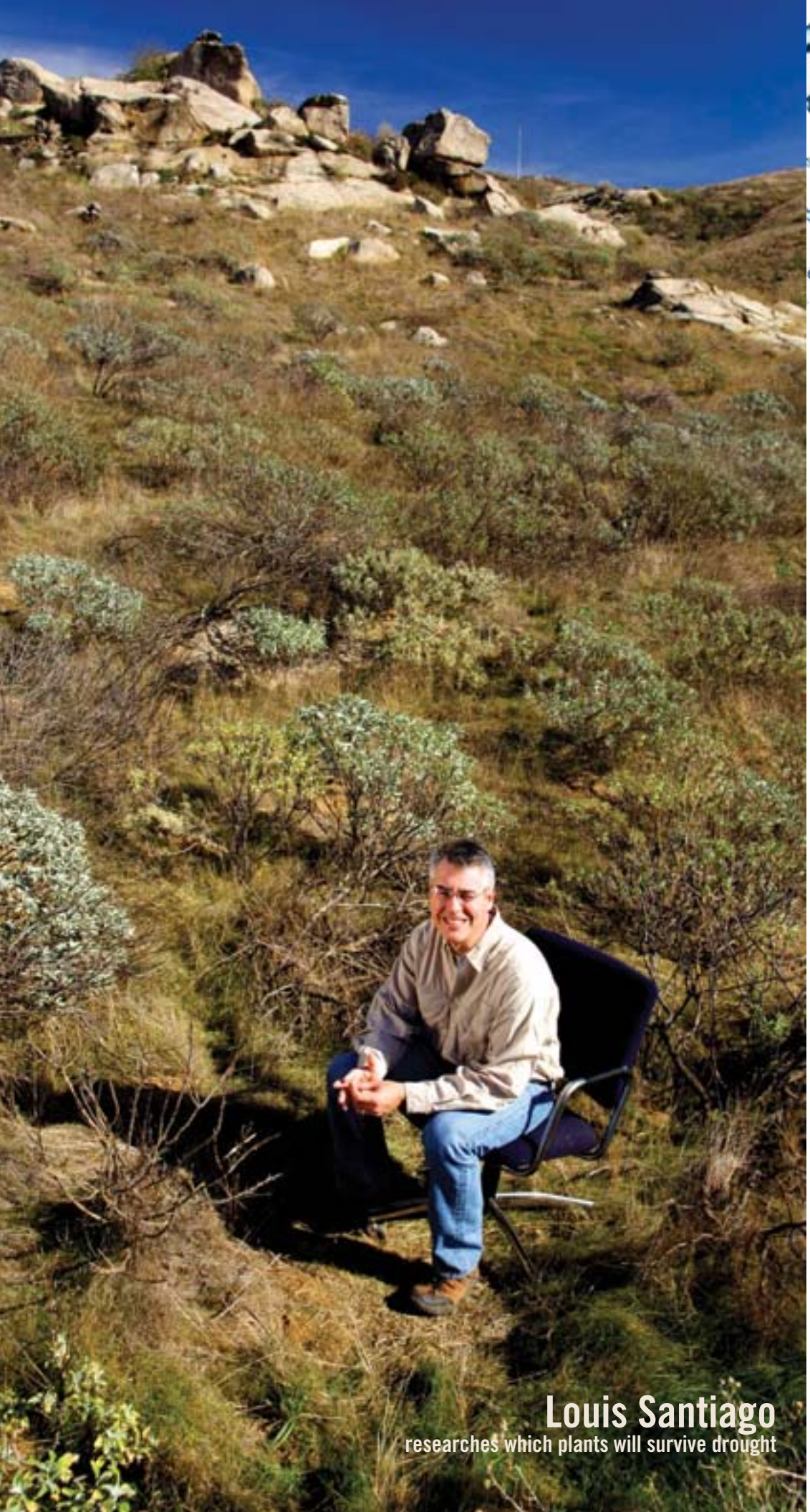
Determining which plants are resistant to drought, and why, will help determine how the plant makeup of public lands might change in the coming years if water becomes drastically more scarce.

"There are certain areas that will suffer drought more than other areas, and these can be used as test cases to see how drought will affect other places, like an early warning system," Santiago says. "What's really important for these plants is the frequency of extreme droughts, and we have seen a real spike in extreme droughts in California."

> **"WHAT'S REALLY IMPORTANT FOR THESE PLANTS IS THE FREQUENCY OF EXTREME DROUGHTS, AND WE HAVE SEEN A REAL SPIKE IN EXTREME DROUGHTS IN CALIFORNIA."**
>
> LOUIS SANTIAGO
> ASSISTANT PROFESSOR OF PHYSIOLOGICAL ECOLOGY

Not all the plants that Santiago is studying react the same way when faced with drought conditions. Some lose their leaves, while others survive because they have deep roots. Still others benefit from having wood that is resistant to drought.

"Predicting which species will survive a drought requires evaluating their



Louis Santiago
researches which plants will survive drought

drought resistance on multiple axes," Santiago says. "There are a lot of different ways that plants can resist drought."

Some plant species migrate, while others go locally extinct, Santiago explains. Santiago expects to eventually create a computer model that will be able to predict under what specific conditions certain species will drop out of the ecosystem.

In June, he will begin a one-year study that is being funded by the federal Bureau of Land Management. "The Bureau has been really, really supportive of what we are trying to do and is excited about what we are finding," Santiago says.

While water is primarily known for supporting life, it also can serve as a vector to transmit deadly diseases. Marylynn Yates, the new dean of the College of Natural and Agricultural Sciences, researches the transmission of pathogens through water and wastewater. She is doing one of the first long-term studies on what factors determine how long viruses can survive in groundwater.

Yates also is at the forefront of trying to determine how to control microorganisms that cause diarrhea, which annually kills more than 1.5 million children

worldwide. The research has implications for the United States, given the number of cases each year of people being sickened by disease carried in water or food.

"Most people in the U.S. don't think of diarrhea as a problem, because relatively few people in developed countries die from diarrhea," she says. "What many people don't realize is the burden that diarrhea places on society — even in a developed country like the U.S. There are millions of cases of food-waterborne disease in the U.S. every year, but because we are generally sick for a few days, we don't consider it a big problem. However, the costs due to lost time in school, lost time at work, doctor visits, etc., are huge."

> **"WASTEWATER IS A RESOURCE THAT IS BEING VASTLY UNDER-UTILIZED IN CALIFORNIA, COMPARED TO OTHER COUNTRIES IN THE WORLD WITH SIMILAR SCARCITY PROBLEMS, CALIFORNIA RE-USES VERY LITTLE OF ITS TREATED WASTEWATER."**
>
> ARIEL DINAR, PROFESSOR OF ENVIRONMENTAL ECONOMICS AND POLICY

As water supplies dwindle, water agencies face increasingly difficult management issues. UCR researchers are stepping up to help state water agencies make wise choices about how to manage and replenish their water supplies.

Much of this work takes place at UCR's Water Science and Policy Center, a research center directed by professor Dinar that addresses the interactions among water policy, water quality and water scarcity, and creates opportunities for interactions on these issues among scientists, economists and the community. Dinar's own research examines how climate change may affect the amount of water available to Californians and the increasingly important role that local groundwater will play in meeting water needs.

As water supplies get tighter in coming years, Southern California may struggle to obtain the amount of imported water it needs from the Colorado River and other sources that are coveted by other Western areas. In such a scenario, it will be more important than ever to locate, maintain and protect local water supplies.

"In cases like that, groundwater can step in and make a difference," Dinar says. "The question is how to manage groundwater so that in times of crisis, it will be available."

Dinar's research has drawn the attention of local water districts and the mammoth Metropolitan Water District, which oversees water delivery to millions of Californians. He also is working with the California Avocado Commission to study how growers will be able to continue to maintain production even as water supplies become marginal.

One tool Dinar studies is the use of highly treated wastewater to meet long-term water needs. Other parts of the world already are proving that highly treated wastewater can be a useful resource for water managers.

"Wastewater is a resource that is being vastly underutilized in California," Dinar says. "Compared to other countries in the world with similar scarcity problems, California reuses very little of its treated wastewater. There is still too much of that water flowing out to the ocean."

The process of recycling the effluent from sewage treatment plants has in the past been derided with the unappetizing description of "toilet to tap." But not reusing that water after spending millions of dollars to treat it and remove harmful bacteria is no longer an option, Dinar contends.

"The problem is really psychological," he says. "We can see around the world that wastewater can be brought to drinking water quality, but California has not yet reached the point of real scarcity, where the water doesn't come out of the faucet. When that happens, perhaps they will change their perceptions and priorities."

Before that dire future arrives, the next generation of problem-solvers is in college. Some of them will be taking an interdisciplinary course on water issues offered next fall that will incorporate faculty from the Bourns College of Engineering, the College of Natural and Agricultural Sciences and the College of Humanities, Arts and Social Sciences.

Interested parties from each discipline have been working together for more than four years to make the course a reality, says Mary Gauvain, a psychology professor and one of the course organizers. (The other two primary organizers are Dean Marylynn Yates and Sharon Walker, an associate professor of chemical/environmental engineering.) The class is designed to teach students how to

To read more about Ariel Dinar, Louis Santiago, Marylynn Yates and other UCR innovators in sustainability and policy, visit **PROMISE.UCR.EDU**

Marylynn Yates
looks at the transmission of pathogens through water

engage in problem-based inquiry that draws on multiple resources because "these problems are not divided up by discipline," Gauvain says.

"Too often, our structure at the university is focused on developing majors, but our students also need to understand how the discipline they choose can be integrated with other disciplines to solve problems," Gauvain says. "It isn't enough to have students thinking about this only in graduate school."

The course will be designed for about 100 students, likely freshmen and sophomores, from any major. Ideally, the class will represent a cross-section of the student body. Gauvain says she expects to see future sociologists sitting next to budding engineers, learning how to solve problems by bringing out the best in each other.

The course material will span a wide range of topics, from how high-level engineering makes water delivery possible across the state, to how water is used as a metaphor in literature, and how standing water can contribute to the spread of malaria. The economics of water will share time with gender issues related to water and water access around the globe.

"We expect that the students here will be good teachers for each other, conveying not only information, but also respect for each other's knowledge," Gauvain says. "A problem-based class can be really exciting. The goal is to give students a sense of the future because their future will be what is created out of their work on these problems."

CONFESSIONS OF A SECRET SCIENCE GEEK

Photo courtesy of CERN

Assistant UCR Chancellor Cindy Giorgio visited CERN near Geneva, Switzerland, in March. She is second to left in this image taken in the CERN control center, along with Distinguished Professor Gail Hanson, far left, Chancellor Timothy P. White and Paul Collier, Beams Department head.

By Cindy Giorgio

I have to figure out how to tell my boss that I want to run off and become a physicist.

It's going to come as a surprise. First, because I am a 31-year UCR staff member without a Ph.D., and second, because my major was journalism and I never took a science course in my life if I could avoid it.

Then again, maybe he'll understand. After all, my boss is Chancellor Tim White and he's the reason I went to CERN – the European Center for Nuclear Research – where I discovered my inner science geek.

To say I was awestruck is a serious understatement. My friends say I've been levitating ever since I returned. Quarks! Muons! Gluons! Neutrinos! The visit sparked a realization in me. I might have missed my calling.

What is so extraordinary about CERN? To tell you, I first have to explain what it is.

CERN is a complex comprising some of the world's largest and most sophisticated scientific instruments. Straddling the Swiss-French border, CERN

uses particle accelerators and detectors to re-create the first moments after the Big Bang, 13.7 billion years ago. These instruments allow scientists to study the particles that form the very foundation of the universe.

That alone is mind-boggling. But there's more.

To accomplish this work, the accelerator hurls two beams of particles in opposite directions at almost the speed of light. The magnets continually narrow the field through which the particles pass, forcing them to collide, as many as 600 million times per second! (Yes, you read correctly.) This feat is something like firing two needles from 10 kilometers apart so that they connect in the middle.

If CERN is a place of precision, it is also a place of extremes.

Extremes of size and scope. The Large Hadron Collider (LHC) is a 26.7-kilometer ring of superconducting magnets buried 100 meters underground. It holds 9,300 magnets, many 50-70 feet long. Yet the circuitry inside is as fine and precise as the inside of a smart phone. And the particles it produces are the tiniest in the universe.

We visited the hall where these leviathans are constructed and tested. But parts are built elsewhere and shipped to CERN. UCR scientists played a pivotal role in the assembly and testing of the muon detectors, a critical part of the instrumentation.

Extremes of temperature. At full operation, the magnets are lowered to minus 456 degrees Fahrenheit. (Yes, I said minus.) Yet, when two beams of lead ions collide, they generate temperatures 100,000 times hotter than the sun.

Extremes of appearance. Some of CERN's buildings date back to its founding in 1954 (the same year as UCR), and have seen better days. But the configurations formed by the LHC are so beautiful and multi-hued that CERN has its own artist-in-residence. Photographers come from all over to capture the images.

And did I mention the computers? We toured two vibrant control rooms, each equipped with hundreds of monitors. We stood, fascinated, in front of a monitor showing more than 200,000 data transfers taking place at that very moment – an illuminated globe with lighted strands of color running from locations all over the world to CERN's computer grid.

CERN is a model for international research collaboration. With 20 member states, CERN has nearly 10,000 visiting scientists, representing 608 universities across 133 countries. Currently among them are six UCR faculty members (see below), three postdoctoral researchers and 14 graduate students.

Distinguished Professor of Physics Gail Hanson led us on the tour. Later we met with her research team: one graduate student, three postdoctoral researchers and a recent Ph.D. student. They are among many teams worldwide engaged in the search for the elusive Higgs boson, the elementary particle that is believed to give other particles mass – which they lacked in the first moments after the Big Bang. It is the final piece of the puzzle that forms the standard model of physics.

Those at CERN are so confident they will find the Higgs boson within the next year that they are postponing a scheduled shutdown until the discovery is made. The excitement is palpable. And UCR is part of the global research team. If they find it soon, I can say, "I was there!" And if it takes longer, maybe I'll have time to go back to graduate school.

The UCR Physicists at CERN

Robert Clare – Researches electroweak and Higgs physics. His team helped commission the Compact Muon Solenoid facility at CERN, and he is deputy chair of the U.S. contingent at the solenoid facility.

John Ellison – Works on searches for new particles, including supersymmetric particles and heavy neutrinos. He's also helping design a new pixel and tracking system to be installed when the Large Hadron Collider is upgraded, starting around 2018.

J. William Gary – A member of the Compact Muon Solenoid collaboration, focusing on searches for supersymmetry in events with bottom quarks, and contributing to operation of the hadronic calorimeter.

Gail Hanson – Involved in the search for the Higgs boson and physics beyond the standard model. She works on the Compact Muon Solenoid Silicon Tracker, as well as on research and development toward a future neutrino factory and muon collider, probably at Fermilab.

Owen Long – Works on physics beyond the standard model. As part of the Compact Muon Solenoid collaboration, he is searching for signs of supersymmetry.

Stephen Wimpenny – Involved in Large Hadron Collider physics. He is collaborating on the Compact Muon Solenoid experiment, with a focus on top quark physics.

The Cast of Particles

Quarks – elementary particles (point-like, with no internal structure) found inside protons and other hadrons

Hadrons – any particle made from quarks

Gluons – force carrier particles that bind quarks inside hadrons

Top quark – the heaviest quark, and the heaviest by far of all known elementary particles

Bottom quark – the second-heaviest quark, distinguished by a long lifetime

Higgs boson – a hypothetical particle used to explain how particles acquire mass. It is the only Standard Model particle that has not yet been observed.

Muons – heavier versions of electrons

Neutrinos – neutral, nearly massless particles that interact only via weak nuclear forces and so are almost invisible

FACEBOOK FEEDBACK

Question: What professor made the deepest impression on you and why?

This question was posed on UCR's Facebook page, at www.facebook.com/UCRiverside. Become our "friend" and look for future questions.

Lidia Puga '07

Carlos Vélez Ibanez (professor of anthropology emeritus) was one of my first professors at UCR and I remember never wanting to miss a single one of his classes. His lectures were the most captivating, engaging and inspiring lectures out of all my courses at UCR. I will never forget his insight, motivation and passion for anthropology. His name will always be among the ones embedded in my brain.

Angel Rodriguez '08

Philosophy professor **Peter Graham**, for shattering my college freshman mind with "The Last Days of Socrates" by Plato.

Ryan Alcantara '95

So many wonderful memories and fantastic professors. Having taken courses in the honors program, I benefited from the small, seminar-style courses, but by far my most memorable professor was the late **John Ashe** (professor of psychology), whose neurobiology course I took the last quarter of my senior year. He was a gifted professor, passionate in teaching us to be critical in consuming scientific reporting. He made a point of having everyone in class meet with him in office hours, and I remember him asking about my future career plans. He left a tremendous impression on me because he took a real interest in his students beyond the classroom. May you rest in peace, Dr. Ashe.

Angela Lunt '04

Joseph Childers (professor of English) and Sensei Edmond Otis. I learned so much from their series of classes about conflict and how to say "no" to people. And more from karate class than I will ever be able to explain!

Silvia Aburto '02

I will have to say **Gary Dymski** (professor of economics). He not only made an impression on me but ALL of his students. He actually cared about us learning the material. He made going to lecture fun and something we would all look forward to. I had the pleasure of being his student in three different economics classes, and if I could have had it my way he would of been my professor for many more. I know I don't only speak for myself. Professor Dymski is awesome. I graduated 10 years ago this June and he is probably the only professor whose lessons still come to mind. By the way, I will also never forget how big of a Laker fan he is. He constantly used them in examples for his classes. Thank you, professor Dymski, for being the perfect example of a GREAT professor!

Holly Bailey Evans '90

A course taught by sociology professor **Alexandra Maryanski** inspired me. Her assigned readings and lectures were so interesting. In her class I figured out that I was not a business major destined to be an accountant, but might be convinced to pursue an advanced degree and tinker in human resources.

Rita Medina '09

Hands down, associate professor of English **Vorris Nunley.** This guy made you sit back and think. It wasn't long dry lectures or notes on a slide show, it was critical thinking and lots of it. It was pop culture and literature at its best. Professor Nunley has a way of turning the world inside out, making you scratch you head and it isn't until later (the end of the quarter) that you fully understand the impact of his messages. It's not just about English and symbolism, but it is lessons about life!

Vicki Hill Carrigan '85

Rick Risso (professor of theater emeritus) was an absolutely amazing theater professor as well as a brilliant artist himself. He saw something special in his students and created a safe environment for artistry and exploration.

Brian Gray '06

A trio of professors who team-taught a class I took: **Richard Cardullo** (professor of biology), **Kim Hammond** (professor of biology) and Tim Paine (professor of entomology). They shook the very foundation of my educational experience by challenging me to think not just about what I know, but how I know. They reinforced the idea that learning doesn't occur in a vacuum, and that learning can be a social activity where everybody benefits. And they taught, by example, that we learn so much when we help others. Truly, some of the finest professors around, not just at UCR, but anywhere.

Tracy Phutikanit '09

Kathleen Mongtomery (professor of organizations and management emerita) from the School of Business Administration. I only took one class with her but it was the most exciting and thought provoking 10 weeks I had at UCR. Business 157: Managing Workforce Diversity inspired me to pursue my master's degree because she always challenged students to think from another perspective than our own to make ourselves more enriched individuals. I became a better student, person and leader because of her. I wish I could have taken more classes with her while I was a student but I still keep in touch with her and give her thanks whenever I can. She is FANTASTIC.

ATOMTRONICS

By Shan-Wen Tsai

Shan-Wen Tsai, associate professor of physics and astronomy, researches a relatively new science, atomtronics. She explains the basics of this developing field.

Atomtronics: What Is It?

Atomtronics is an emerging technology devoted to creating artificial tailored materials consisting of neutral atoms held in an array with laser beams, or atoms moving along a track under electric or magnetic influence. With such motion, analoges of electronic circuits and devices may be created.

How are materials made?

To create atomtronic circuits, the neutral atoms have to be cooled to extremely low temperatures, on the order of nano Kelvins. (One nano Kelvin corresponds to 10-9 Kelvin, one billionth of a Kelvin!) After the cooling, the next step is the realization of what are known as "optical lattices."

Optical Lattices

In optical lattices, properties for electronic materials can be controlled and tuned, and their effects studied in a systematic way. For example, optical lattices do not contain imperfections or impurities, but these can be introduced in a controlled manner — through laser speckles or by way of trapped atoms acting as localized impurities.

Applications

Aside from simulators for electronic materials, atomtronic systems are now being devised to form circuits and devices. In electronic devices, an external electric field can be used to tune a material from an insulator state to a metallic state, creating electronic switches. One can envision similar effects in atomtronics, where external fields can be used to tune a system between different quantum states. These systems then act as devices and can be connected through channels. Other potential applications are sensors for high precision measurements and applications in quantum information.

Much needs to be done before some of the envisioned applications can be realized. The idea is not to replace electronics, since atomtronics systems cannot be scaled as easily as electronic circuits and devices. Also, the time scales involved are much longer than the incredibly fast processes involving electrons. But atomtronics provides a unique setting for the study of fundamental physics of quantum collective behavior and it may help us better understand the properties of materials.

Atomtronics at UCR

Recently, colleagues and I showed how a simple "joystick" consisting of an adjustable magnetic field can create several new phases of atomtronic matter, some of them never seen before. We studied what happens when ultracold highly magnetic atoms are held in an optical lattice and subjected to an external magnetic field, which could be steered in various directions. We found that the atoms don't just stay put, but distort themselves into patterns, each of which can be considered to be a different phase of atomtronic matter. This work may provide access to new quantum phases of matter.

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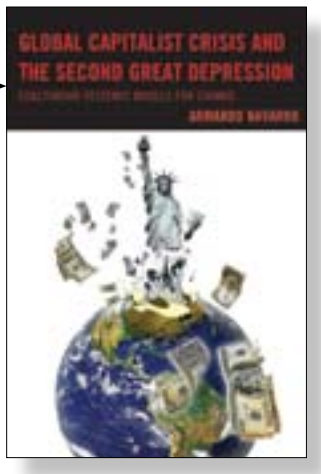
Dirty Secrets Inside Our Electronics, Futuristic Novellas and other Page Turners

Global Capitalist Crisis and the Second Great Depression: Egalitarian Systemic Models for Change
By Armando Navarro
Lexington Books
452 pages, December 2011

This book delivers a timely analysis of the current global capitalist crisis under way in the United States. Navarro offers a wide-ranging historical and political analysis of events that led up to the co-called "Second Great Depression." Starting at the end of World War II, he tracks the various political and economic decisions that led to the emergence of the global economic crisis in 2006. He discusses the Great Depression, the New Deal, the rise of neo-liberal capitalism and the collapse of the subprime mortgage industry.

As Navarro critiques the Obama administration and legislation put forth by Democrats, he calls for reform and proposes dramatic, systemic change. Navarro concludes by blaming U.S. political culture—which he contends is the major obstacle to the rise of egalitarianism in the United States—and speculates about the potentially bleak economic future to come.

Navarro is a UCR professor of political science.



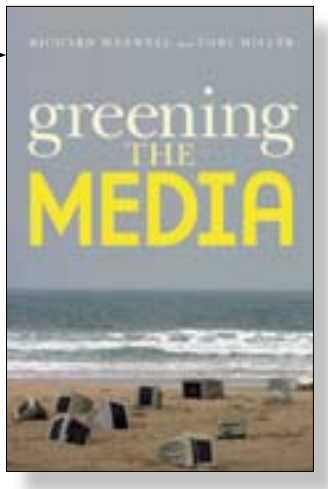
Greening the Media
By Richard Maxwell and
Toby Miller
Oxford University Press
256 pages, May 2012

"Greening the Media" reveals the dirty secrets that hide inside our favorite electronic devices, and takes apart the myths that have pushed these gadgets to the center of our lives. Marshaling an array of economic, environmental and historical facts, Maxwell and Miller debunk the idea that information and communication technologies are clean and ecologically benign.

The authors show how making, consuming and discarding these devices involve toxic ingredients, poisonous working conditions and hazardous waste. But all is not lost. As the title suggests, Maxwell and Miller dwell critically on these environmental problems in order to think creatively about ways to solve them. They enlist a range of potential allies to foster greener media — from green consumers to green citizens, with stops along the way to hear from exploited workers, celebrities and assorted bureaucrats.

Ultimately, "Greening the Media" rethinks the status of print and screen technologies, and opens new lines of analysis of communication technologies, consumer electronics and media production.

Miller is a UCR distinguished professor of media and cultural studies.



Deep Control: Essays on Free Will and Value
By John Fischer
Oxford University Press
256 pages, November 2011

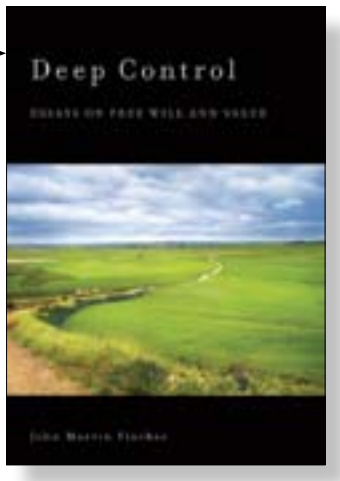
In this collection of essays, Fischer defends the contention that moral responsibility is associated with "deep control," which he defines as the middle ground between two untenable extremes: "superficial control" and "total control."

Our freedom consists of the power to add to the given past. Fischer contends that we must be able to interpret our actions as extensions of a line that represents the actual past. He argues that in connecting these dots, we engage in a distinctive sort of self-expression.

Fischer writes that we do not need genuine access to curative possibilities in order to be morally responsible. Also, he writes, deep control is freedom conditioned on moral responsibility. Total control, he contends, is too much to ask – it is a form of "metaphysical megalomania."

In this collection, the third in a trilogy Fischer has written for Oxford University Press, he presents a new argument that deep control is compatible not only with causal determinism, but also with causal indeterminism.

Fischer is a UCR distinguished professor of philosophy.



These books are available for purchase at the UCR Campus Store and online at ***www.ucrcampusstore.ucr.edu*** *They have been discounted up to 30 percent.*

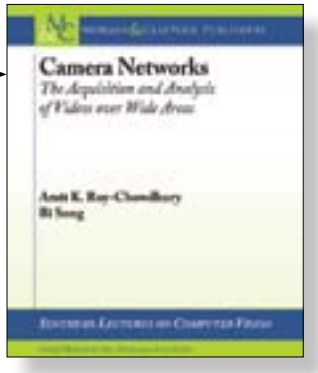
Camera Networks: The Acquisition and Analysis of Videos over Wide Areas
By Amit K. Roy-Chowdhury and Bi Song
Morgan & Claypool Publishers
134 pages, February 2012

As networks of video cameras are installed in ever more numerous and disparate applications such as security and surveillance, environmental monitoring, disaster response and assisted living facilities, image understanding in camera networks is becoming an important area of research and technology development.

This book focuses on the basic research problems in camera networks, reviews the current state of the art and presents a detailed description of recently developed methodologies. One of the fundamental tasks in the analysis of dynamic scenes is to track objects. Since camera networks cover large areas, the systems need to be able to track over such wide areas that there could be both overlapping and non-overlapping camera fields of view.

An underlying theme in the work is the need to take a network-centric view, whereby decisions are made at the network level. This is sometimes achieved by accumulating all data at a central server, and at other times by exchanging decisions made by individual cameras based on their locally sensed data. The book concludes by highlighting major directions for future research.

Chowdhury is a UCR associate professor of electrical engineering.



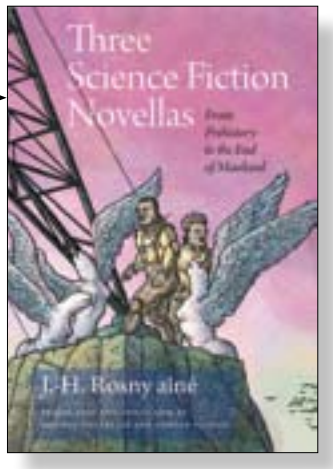
Three Science Fiction Novellas: From Prehistory to the End of Mankind
By J.-H. Rosny aîné
Translated and introduced by Danièle Châtelain-Slusser and George Slusser
Wesleyan
240 pages, January 2012

To the short list that includes Jules Verne and H.G. Wells as founding fathers of science fiction, the name of the Belgian writer J.-H. Rosny aîné must be added. He was the first writer to conceive, and attempt to narrate, the workings of aliens and alternate life forms. His fascination with evolutionary scenarios and long historical vistas, from first man to last man, is an important precursor to modern science fiction.

Until now, his work has been virtually unknown and unavailable in the English-speaking world. Three wonderfully imaginative novellas are included in this volume, translated by George Slusser, curator emeritus of the Eaton Collection of Science Fiction & Fantasy at UCR, and University of Redlands associate professor of French Danièle Châtelain-Slusser.

"The Xipehuz" is a prehistoric tale in which the human species battles geometric alien life forms. "Another World" tells of a mysterious being who does not live in the same acoustic and temporal world as humans. "The Death of the Earth" is a scientifically uncompromising Last Man story.

Slusser is a UCR professor of comparative literature.



Forecasting for Economics and Business
By Gloria Gonzalez-Rivera
Prentice Hall
512 pages, January 2012

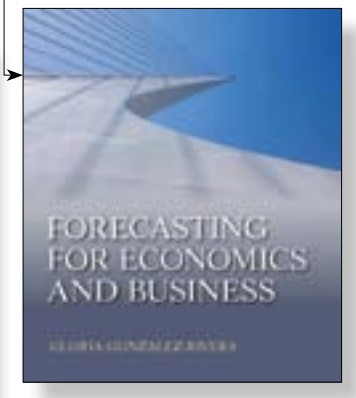
Knowledge of forecasting methods is among the most requested qualifications for professional economists and businesspeople working in the private or public sector. In this textbook, Gloria Gonzalez-Rivera offers a reader-friendly approach to forecasting.

Geared toward students, the textbook is written in a conversational style that promotes an active learning environment. Pictures, graphs and plots engage students and are useful tools to motivate and develop forecasting intuition in anticipation of formal, more technical concepts.

All chapters in the book include real-life data. The same data sets that professional forecasters study are also provided. Examining these data sets provides an immediate immersion in the practice of forecasting. In all chapters, the introduction of a new concept, model or procedure is immediately followed by a real data exercise.

Short computer programs also are provided to bring a hands-on experience to the understanding of forecasting. The aim of the textbook is to develop professionals who are able to critically analyze time series data and forecasting reports.

Gonzalez-Rivera is a UCR professor of economics.



Rose Hill: An Intermarriage Before Its Time
By Carlos E. Cortés
Heyday
192 pages, March 2012

This memoir by acclaimed multicultural scholar Carlos Cortés is a lovingly examined portrait of a family at odds with itself. Wedged between loyalties and deeply ingrained cultural traditions, Cortés was raised with Yiddish in one ear and Spanish in the other, studying for his bar mitzvah after Mass. With an eye for the subtleties of conflict and tenderness, Cortés recounts his development amid the complex affections of a family whose members remained firmly by each other's sides throughout their lives.

Cortés is a UCR professor emeritus of history.

Office of Alumni & Constituent Relations Recognized for Outstanding Programming

The UCR Office of Alumni & Constituent Relations oversees the Alumni Association, the Emeriti Faculty & Staff Retiree Association, the Student Alumni Association, and the Office of Events Management and Protocol. Recently the Council for Advancement in Support of Education (CASE) District VII recognized several of the programs for outstanding work in alumni relations. The programs recognized include the UCR Parents Association for Programming for Special Constituencies, the Alumni Association Alumni Awards of Distinction for Regular Alumni Programs, and Membership Drive & Grad Fair for Student Alumni Initiatives.

Thank you to all the alumni, parents and students whose volunteer work made these awards possible.

Calendar:

August 4

L.A. Chapter Annual Hollywood Bowl Event: "Pixar in Concert"

Alumni and friends are invited to join the L.A. chapter at its annual Hollywood Bowl outing. Come early for a pre-concert picnic and meet fellow Highlanders.

Program: "Pixar in Concert"

From the "Toy Story" trilogy to "The Incredibles" and "Up," Pixar has forever changed filmmaking and given audiences of all ages some of the most beloved characters in cinematic history. Now, for the first time, the Hollywood Bowl presents "Pixar in Concert," with visually stunning clips and memorable scores from each of Pixar's movies (including its latest release, "Brave") performed live by the Hollywood Bowl Orchestra. $42 Alumni Association members and guests; $47 for nonmembers. Order tickets online at ***www.alumni.ucr.edu/hollywoodbowl***

August 5

Fifth Annual Alumni Day at the Races – Del Mar, Calif.

Join alumni and friends in a private skyroom where you can watch and wager on exciting Thoroughbred racing. **Special Guest:** Leonard Duncan, handicapping expert and Thoroughbred trainer. $40 UCRAA members; $45 nonmembers. ***Space is limited and this event has sold out every year!*** Order tickets online at *www.alumni.ucr.edu/delmar*

How to contact the UCR Alumni Association:
Website: alumni.ucr.edu
E-mail: ucralum@ucr.edu
Phone: (951) UCR-ALUM or (800) 426-ALUM (2586)

Travel the Globe and Expand Your Horizons

"Experience, travel – these are as education themselves."

— Euripides

The UCR Alumni Association travel program provides many opportunities for incredible learning experiences. Our carefully selected destinations allow participants to explore new cultures, peoples and places that bring history to life. Experience one of our many destinations:

- China Connoisseur and Tibet, Sept. 13-28
- Ancient Mysteries of the Americas, Jan. 5-23
- Pearls of Southeast Asia, Jan. 12-28
- The Pride of Southern Africa, Jan. 24-Feb. 5
- Asian Wonders, Feb. 2-21

Visit the UCR Alumni Association's website (alumni.ucr.edu) to view pricing and program details. Tour participants, whether UCR alumni or not, must be members of the UCR Alumni Association. Each member may bring one travel companion as a guest.

International Education Center Looking to Reconnect With Alumni for Reunion Celebration in November

The UC Riverside International Education Center will be celebrating its 50th anniversary in the fall and is looking to reconnect with UCR students who spent time studying abroad as well as international students who studied here.

Center interim director Karen McComb said a reunion gathering is in the planning stages for November.

McComb said that while some alumni have stayed in contact over the years, many others have lost touch with the center. Alumni who have studied abroad and international alumni can ensure they receive updates and reunion details by updating their personal and contact information at https://advancementservices.ucr.edu/Alumni/.

She said that the reunion will be a great opportunity to reconnect with classmates and fellow study-abroad students. In addition, there are plans to honor former program director Diane Elton, who retired in October 2011 after having worked at the center for 39 years.

"We are also interested in suggestions as to what sort of activities or events people would like to have," McComb added. She invites alumni to contact her via email at karen.mccomb@ucr.edu or at (951) 827-6145.

Say It Ain't So, Kyle!

As this issue was going to press, Kyle Hoffman, assistant vice chancellor for alumni and constituent relations, accepted a position of vice chancellor at UC Merced. Read details of his more than two decades of service to UCR at **http://ucrtoday.ucr.edu/6002**

TAKE FIVE

David Sides

'07, B.A. Music and Culture

David has received millions of views on YouTube (youtube.com/user/kemlye1) for playing hip-hop and R&B songs on the piano by ear, and adding his own twists.

1. **Who is your biggest musical inspiration?**
I honestly don't have a particular person, but I can credit a soundtrack and those who had a hand in making it. "The Lion King" soundtrack in the mid-'90s is what gave me that desire to really get involved with the piano and music.

2. **If you could go back and take any class at UCR, which would you take?**
I would love to go back and take some business classes. Some of the business ventures that I'm involved with now are giving me a hands-on crash course in the world of business, and although I love the firsthand education I'm getting, I do wish I could have fit in some business courses when I was in college.

3. **Tell us about a shining moment you've had.**
A shining moment that I really value happened at UCR. When I was a senior, I entered an on-campus talent competition called "Apollo Night," and it was my first time participating in, and winning, a music competition playing the piano. That event was actually what gave me the confidence to post my videos on YouTube, and it's because of me posting on YouTube that my music career was able to excel as quickly as it did. In the music industry, the biggest challenge is just being noticed. There are thousands of aspiring musicians out there and they all have the same goal of being heard. The challenge is setting yourself apart from the rest.

4. **What is your favorite memory of UCR?**
My favorite memory of UCR has to be the day I graduated. Being the first in my family to graduate from a university, the look of pride that I saw on the face of my parents as I walked across the stage to accept my diploma was priceless. I'll always remember that day.

5. **Any advice for new grads?**
The best advice I could give is to work hard and believe in yourself. I know it sounds clichéd but I sincerely believe that in order to be successful, it not only takes hard work, but it also takes the belief that whatever goals are being reached for will be achieved. I live by a simple equation: Belief + Hard Work = Success. I know that life after graduation can be confusing and a little scary at times, but just hold on to that equation and watch everything in life fall into place.

50s

'59 **Ron Endeman** was honored as one of the world's most traveled persons by the Travelers' Century Club in Los Angeles. Ron, a retired attorney from the San Diego area, has traveled to all 321 countries and major islands of the world. He started in 1956 when he and **Ray Duncan** '59 spent three months hitchhiking around Europe. In 1961, Ron and wife **Judy Endeman** '60 spent six months camping in Europe, the former Soviet Union, Eastern Europe and the Middle East. Judy is also a member of the club, and has visited nearly 300 destinations.

60s

'60 **Edward Blakely** was honored with the establishment of the Edward Blakely Award. The Planners of Color Interest Group, a group affiliated with the Association of Collegiate Schools of Planning, established the award to honor individuals who have supported the cause of social justice, particularly in urban planning or development for communities of color. Edward also has an extensive collection of published books, including his most recent work, "My Storm," a firsthand account of a critical 16 months in the post-Katrina recovery.

'66 **Henri De Roule** is in the process of developing the Banning Science and Technology Center, which will focus on developing hands-on educational experiences in science, technology, engineering and math in order to educate people on what they should know to live and work in the 21st century. The center's service area will be Palm Springs, Palm Desert and a large portion of the Inland Empire.

'69 Six members of the class made time this year to catch up and reminisce about good times in Lothian Hall during a gathering in San Francisco. They are **Linda Kerker Hoffman**, **Joan Buchbinder Sommer**, **Dwan Flansburg Taylor**, **France Riggs Fenical**, **M. Alicyn Abramson Goughnour**, **Stephanie Lindsay Lar.**

… **Gerald Edwards** is a Regents Professor for the School of Biological Sciences at Washington State University. He works on photosynthesis, including effects of environmental stress and potential global climate change. In December 2011 he was announced as a 2012 American Association for the Advancement of Science (AAAS) Fellow. AAAS Fellows are recognized for meritorious efforts to advance science or its applications.

Names printed in Blue indicate members of the UCR Alumni Association.
To update your membership, visit www.alumni.ucr.edu

70s

'70 **Glen Grayman** has practiced as an emergency physician in the western Coachella Valley for more than 25 years and was the medical director of the Richards Emergency/Trauma Center at Desert Regional Medical Center. He currently serves as a district representative of the center's governing board, and is past president of DRMC's medical staff. He has served on the boards of the Riverside County Medical Association and the county chapter of the American Heart Association, was the medical adviser to the Palm Springs Fire Department as well as the medical director of the Cathedral City Fire Department … **Andrew Smith** is pleased to report the publication of his 18th, 19th and 20th books: "Potato: A Global History" (Reaktion Books, 2011) focuses on the culinary history of the potato and the impact it has had on the world; "Starving the South: How the North Won the Civil War" (St. Martin's, 2011) discusses how the Civil War affected the way we eat; and "Fast Food and Junk Food: An Encyclopedia of What We Love to Eat" (Greenwood, 2012) tells stories behind the successes of commercial food products and documents the numerous issues associated with them. In addition to writing, Andrew teaches culinary history and professional food writing at the New School in Manhattan, serves as the general editor of the "Food Series" at the University of Illinois Press and is the general editor for the "Edible Series" at Reaktion Press in the United Kingdom.

'75 **Robert Rosenberg** recently retired from the University of New Mexico Health Sciences Center after 25 years and is now a professor emeritus. He joined a private practice radiology group and continues to work full time and do research on breast imaging. He also serves as chairman of the FDA Radiological Devices Advisory Panel.

'77 **Brian McRae Barnes** is a professor of zoophysiology and director of the Institute of Arctic Biology at the University of Alaska, Fairbanks. He researches physiological ecology and endocrinology of hibernating mammals, biological rhythms and sleep, and the overwintering biology of animals, including insects. He works in both field and laboratory settings investigating behavioral and physiological mechanisms by which animals cope with high latitude winter and summer environments. He was elected as a 2012 American Association for the Advancement of Science Fellow.

'78 **Lewis deSoto** is an artist whose art installation was displayed at the UCR Culver Center of the Arts in March. The installation, which featured a replicated boulder of the Tahquitz peak in the San Jacinto Mountains, was inspired by the Cahuilla Indian "Tahquitz" creation legend. His public art projects have been on display throughout the U.S. and in many foreign countries … **Michael Huerta** was named acting administrator of the Federal Aviation Administration in December 2011. As acting director, he is responsible for the safety and efficiency of the largest aerospace system in the world. He oversees a $15.9 billion budget and more than 47,000 employees. Huerta also

"I have been passionate about politics, government and public service since high school. My focus on state and local government took root in Ron Loveridge's class in my freshman year, and I am finding my career very rewarding. Staying current with UCR was important enough to join UCRAA as a life member right after graduation, and I love returning to campus each year for the annual fall alumni dinner."

Darin Schemmer serves as communications director for Riverside County Supervisor John J. Benoit. A valedictorian of Norco High School, he graduated cum laude from UCR in three years. Darin's career began as a student intern with then-Assemblyman, and subsequently-Senator, Benoit. Darin works to shape policies and plan for Riverside County's future growth.

To view an extended interview with Darin, visit **alumni.ucr.edu/darinschemmer**

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oversees the FAA's multi-billion-dollar NextGen air traffic control modernization program as the United States shifts from ground-based radar to the latest satellite technology. His other experiences include being confirmed by the U.S. Senate as the FAA's official deputy administrator, and managing director of the 2002 Olympic Winter games.

80s

'84 **David Cyril Geary** is a Curators' Professor in the Department of Psychological Sciences at the University of Missouri-Columbia. He is a cognitive developmental and evolutionary psychologist with interests in mathematical learning and sex differences, and has published more than 200 articles and chapters across a wide range of topics. Among his many distinctions is a MERIT award from the National Institutes of Health and co-recipient of the 2009 George A. Miller Award, American Psychological Association, for outstanding journal article in general psychology. He and fellow alumnus **Bradford Hawkins** '84 were elected as 2012 American Association for the Advancement of Science Fellows. Hawkins is a professor of Ecology and Evolutionary Biology at the School of Biological Sciences at UC Irvine. His research focuses on why species are distributed non-randomly in the environment and why diversity gradients exist.

'86 **Stephan Gallegos** and his wife, Loretta, are proud to announce the finalization of the adoption of their daughter Olivia, who was born in northwest Florida in February 2011 and welcomed home to Northern

TAKE FIVE

Ofelia Valdez-Yeager

'69, B.A. Spanish

Ofelia Valdez-Yeager graduated from UCR in 1969, married fellow graduate Ley Yeager and settled in Riverside. They have four grown children and four grandchildren, with one more on the way. Her career has focused on education and community volunteerism, and she is involved with the César Chávez Memorial in Riverside.

1. **Tell us about the Chávez Memorial.**
A group of community members came together several years ago with a dream of building a memorial statue to honor the legacy of farmworker labor leader César E. Chávez. The memorial will be placed on the downtown mall on Main Street and University Avenue. It will be the last monument placed on the downtown mall. The César Chávez memorial will serve as a focal point for students and community members to visit, learn and remember the sacrifices made to improve the working and living conditions and human rights of farmworkers. More information may be found on our website, www.riversidelatinonetwork.org.

2. **How did you get involved with the project?**
I was about to retire from my position with the Riverside County Superintendent of Schools when Mayor Ron Loveridge expressed an interest in supporting our effort to erect the memorial statue. I knew it would be difficult, but I knew I would now have the time to work to build the memorial. After my retirement, I became chair of the committee.

3. **Who is your biggest inspiration?**
My inspiration comes from my father, my oldest sister and my husband. My father literally worked all of his life. During the Depression, his widowed father split the children and took him and his two sisters to Mexico from Arizona and worked in the mines. My father married, returned to the U.S. and had eight children. He was also the main support for six half-brothers and sisters. He worked double shifts at the steel mill to bring in more money. He couldn't spend a lot of time with us, but we knew he expected us to do our best in school. My siblings still say, "Pa would have said …" My older sister sacrificed her opportunity to further her education after high school to help my father with the large family. She was the smartest of us all and became the first Latina to be appointed to the position of Registrar/Recorder of L.A. County. My husband has inspired me to do anything I ever wanted to do. He has always respected my independence and supported it.

4. **Can you recommend a book?**
I would recommend "The Hummingbird's Daughter," by Luis Alberto Urrea. It is an example of storytelling at its best.

5. **Tell us about your favorite memory from UCR.**
I used to go the library to study and if I went after lunch I would get sleepy. They used to have a little leather cot off the bathroom and I would go in there and close my eyes for about 10 minutes. It felt great!

Another special memory was being helped by Eugene Cota-Robles, head of the Microbiology Department. He was responsible for me getting one of the first Education Opportunity Program Scholarships to UCR. When I got a C in my biology midterm, he called me in to meet with him. He asked how I was doing and went through each of the midterm questions so I would understand. He was always there for me during my time at UCR.

California in March 2011 … **Kevin Plaxco** is a professor in the Department of Chemistry and Biochemistry at UC Santa Barbara. There he oversees the Plaxco lab, an interdisciplinary research group focused on building biosensors and investigating protein biophysics, among other basic and applied research areas. In December 2011, he was elected a 2012 American Association for the Advancement of Science Fellow.

'88 **Josefina Canchola** was recognized as a Woman of the Year 2012 by California Assemblyman Tony Mendoza. The award celebrates the accomplishments of women from each city within the 56th Assembly. Josefina, who lives in Cerritos, serves as the associate director of partnerships at for the University of California Office of the President.

'89 **Jeff Hone** is a unit supervisor in social work for San Bernardino County. He is married with two children.

90s

'91 **John Lane** recently released an album, the John Lane Project's "Finding Wilson." The album is available for purchase or download at CD Baby, iTunes, Amazon.com, Spotify and Sound Cloud.

'92 **Bill Chapin** was named senior vice president of business operations for the Kansas City Chiefs in December. He oversees marketing, branding, advertising, market research, marketing strategy and implementation. Additionally, he directs corporate communications and special events for the Chiefs. He brings experience from all five major professional sports leagues, including serving as vice president of business development for Seattle Sounders FC, director of marketing and partnership development for the Seattle Seahawks, director of ticket sales for the Anaheim Ducks, and director of group and inside sales for the Los Angeles Kings. He was also part of the management team for the construction of the Staples Center in Los Angeles in 1999. Additionally, Chapin has worked for the San Diego Padres and the Los Angeles Clippers.

'97 **Jill Chadroff** has practiced and performed Baroque dance reconstruction for 15 years. She is a member of the Baroque dance troupe Les Menus Plaisirs, which has performed 18th-century dances in the United States, Canada and Japan. She was recently part of the Los Angeles Chamber Orchestra's Baroque Conversations Series. In addition to her experience in dance, she also teaches English at a middle school in Calabasas, Calif. … **Christopher Kellett** is a senior lecturer for the School of Electrical Engineering and Computer Science at the University of Newcastle in Australia.

In November, he was awarded a grant from the Australian Research Council for research into the emerging area of hybrid dynamical systems, including next generation electricity distribution networks. He also was awarded the prestigious Humboldt Research Fellowship, which sent him to Germany to research the development of efficient and productive control systems. In November 2011 he received the Vice-Chancellor's Award for Teaching Excellence and Learning Support … **Keith Metzler** was appointed to serve as the city of Victorville's assistant city manager in September. Prior to this appointment, Keith served as Victorville's director of economic development for eight years.

'98 **John al-Amin** is the new vice chancellor of administrative services for the Contra Costa Community College District. In his new role, he will oversee Finance Services, Facilities and Police Services. Jon has more than 14 years of experience performing managerial/supervisorial duties, including serving as the vice president of business services at Oxnard College, vice president of administrative services at Grossmont College, and business and administrative services manager at Laney College. John also worked at the California Department of Finance as a finance budget analyst for four years.

00s

'03 **Luis Carazo** appears in Casa de Mi Padre, a feature film starring Will Ferrell. The film is a spoof of 1970s-style Mexican soap operas. Luis plays Ferrell's father, Miguel Ernesto, during a flashback sequence. The film's dialog is in Spanish, with English subtitles. When not acting in movies, Luis is a lecturer for the Theatre Department at UCR … **Todd Miller** has opened a new office of his business, Pasadena Scientific, in Chicago's loop. Pasadena Scientific is an accident reconstruction firm that includes experts with more than 30 years of trial experience.

'04 **Adam Powell** was recognized as one of the top teachers in a four-county region. He was among 10 finalists for educator of the year in Region 10, which includes San Bernardino, Riverside, Inyo and Mono counties. Adam teaches English at University Preparatory in Victorville and serves as chair of the English Department … Joel Smith and **Liz Casebolt** '07 are being hailed by critics for their brand of vaudeville-style dance performance that focuses on their gay man-straight woman friendship. The duo has performed in festivals and venues throughout the country and recently sold out multiple shows at a 200-seat theater at the Minnesota Fringe Festival.

'06 **Megan Chao** is a director of development for Daniel H. Birman Productions in Pasadena, Calif. She recently finished producing and editing "Velocity," a documentary for Discovery Channel about the world's fastest woman on a motorcycle. The subject, Leslie Porterfield, holds several land and speed records in different motorcycle classes for racing at the Bonneville Salt Flats. Chao is an adjunct faculty member at the University of Southern California. She works with undergraduate and graduate students in long form stories at the Annenberg School for Communication & Journalism, and is the faculty line producer for "Impact," a student-run television newsmagazine.

'08 **Cassandra Greenawalt** will be participating in the AIDS/LifeCycle Ride to End AIDS this June. The 545-mile bicycle ride from San Francisco to Los Angeles involves 2,350 riders who each raise a minimum of $3,000 in donations. During her time at UCR, Cassandra played catcher for

the UCR Highlander softball team, earning second-team All-Big West honors in 2006. After graduating, she worked as a volunteer assistant coach as well as a part-time position with the university's Department of Environmental Health & Safety. She is now an analyst in that department and works part time as a diet clerk at Montclair Hospital.

'09 **Anirban Banerjee** is co-founder of StopTheHacker, a technology start-up that focuses on helping website owners prevent, detect and recover from hacker attacks. The company has raised $1.1 million to expand operations. The money will allow StopTheHacker to move solely from research and development into selling and marketing its product while continuing to develop new features … **Sean McBride** and **Eric-Chandler Tucker** '10 and **Jared Baisley** '11 comprise the musical group Dyles Mavis. The R&B group recently recorded a video for its song "Butterflies" on the UCR campus … **Fionna Wright** recently published "Lyrics of a Dreamers Heart," a poetry book focused on lessons in love, pain, healing and growth. She is currently studying for her master's degree in multimedia communications at the Academy of Art University.

10s

'11 **Stephanie Turner Chen** has received the prestigious Larry Sandler Memorial Award given by the Genetics Society of America to the most outstanding doctoral dissertation of the year in *Drosophila* genetics. She received the award at the 53rd Annual *Drosophila* Research Conference in Chicago. While at UCR, she worked on the detection of carbon dioxide in the fruit fly and the mosquito. Her work resulted in the publication of two papers. … **Nick DiFilippo** is the new communications and technology specialist in the UCR Office of Alumni & Constituent Relations. Nick manages the development of technology initiatives designed to engage and connect alumni, students, parents and other constituents. He also manages new and existing web-based communications, and serves as the system administrator of the alumni online community. In 2010, he co-created a successful website, Twend.it, which tracked and compared current and historic trending topics on Twitter. Prior to working at UCR, Nick was digital content manager at CBS Radio. While an undergraduate, Nick worked as a digital media assistant for the ARTSblock. … **Brenda Martinez** became a member of the U.S. track and field team after finishing second in the 1,500 meters at the U.S. Open.

WE REMEMBER

Alumni

'74 **Charles McCharthy** ('80 M.S.), program manager at Northrop Grumman. December 2011.

'93 **Michael Rank**, supervising prosecuting attorney, Department of Justice. January 2012.

'09 **"Jason" Stephen Edward Marshall**, instructional designer for Midware Software. February 2012.

Faculty and Staff

John "Jack" Charlton Crawford, former chair of the UCR Department of Music, died in January. He was 80.

Faculty and staff who worked with Crawford remember him as a talented musician and academic.

He came to UCR in 1970 after teaching at Amherst and Wellesley Colleges. He had graduated from the Yale School of Music and earned a Ph.D. from Harvard University. He studied composition in Paris on a Fulbright fellowship, and Harvard awarded him both the Boott Prize in choral composition, and Paine Traveling Fellowship to study vocal expressionism in Vienna.

He founded the Contemporary Music Festival on campus and is remembered by UCR alumnus and former Director of Theatre Facilities David Kellstrand as "a kind, gentle man who was committed to bringing experimental music to a larger audience."

Although he staged many works by others, his own choral compositions and instrumental works were widely performed all over the country.

He is survived by his wife of 57 years, Dorothy; children, Peter and Susan; and grandchild, Venise.

The family plans a musical memorial later in 2012.

Nita Bullock, director of physical and environmental planning, died in February. She was 68.

A longtime UCR employee, Bullock was known for her commitment to environmentally sensitive physical planning — and her quick wit.

Nita began her tenure at UCR in 1999, as the campus Physical Planner. During that time she project-managed several planning initiatives, including the 2005 Long Range Development Plan and its second amendment, the East-Southeast Area Study, the East Campus Entrance Area Study, the Campus Aggregate Master Plan Study, the Campus Signage Program, and the Campus Design Guidelines. By 2011, Nita had advanced to the position of director of Physical and Environmental Planning/Campus Landscape Architect.

Nita held a master's degree in landscape architecture from Cal Poly Pomona. She had previous planning experience working for the city of Moreno Valley. She was an avid gardener and often shared the bounty of her home garden with friends and co-workers.

She is survived by her husband, Bob ('67); children, Robert and Katherine; and two grandchildren.

Nancy E. Beckage, professor emerita of entomology and of cell biology and neuroscience, died in April.

Beckage was born Sept. 10, 1950. She attended the College of William and Mary and received her B.S. from the University of Wisconsin. She was awarded a doctorate in zoology from the University of Washington in 1980, and remained there for a postdoctoral appointment. Beckage was then a program director at the Seattle Biomedical Research Institute before being named an assistant professor of entomology and USDA assistant entomologist at the University of Wisconsin-Madison.

She joined the faculty of UCR in 1990 and achieved full professor rank in 1997. She retired in 2011.

Beckage's research was in the area of host-parasite interactions. She was known for having made the significant discovery that primary molecular effects of parasitism on the host are due to the injection of a polydnavirus by the female wasp parasitoid. In 2004 she was elected a Fellow of the American Association for the Advancement of Science, and in 2008 she received an honorary doctorate from the Swiss Federal Institute of Science and Technology.

Other awards included the 2005 UCR Chancellor's Faculty Award for Excellence in Mentorship of Undergraduate Research and the 1996 UCR "Woman Who Makes a Difference" Award.

Beckage was known for her exceptional record of professional and university service and for her devotion to her students. Her family requested that memorial gifts be made in Beckage's name to whatever charitable organization the donor chooses.

John Carlos Baez

Mathematics to the Rescue

By Litty Mathew

Math solves more than equations for John Carlos Baez, professor of mathematics at UCR. It is the key to finding solutions for today's environmental problems.

"I learned that to slow global warming, we need to take actions on far vaster scales that most people are talking about," says Baez, who is a visiting researcher at the Centre of Quantum Technologies in Singapore until fall 2012. "We need to cut carbon emissions by at least 7 gigatonnes per year by 2050. How do we cut it by 1 gigatonne? Get everyone in the world to drive half as much or produce 80 times more solar power than we're doing now? That's serious."

It's also a complex math problem.

"Using very basic math to understand how big different problems are, and whether proposed solutions do enough to really matter, is important. It's easy to fool people if they don't do the math," notes Baez, who has been part of the UCR faculty since 1989. As Baez grasped the breadth and depth of environmental issues, he realized the need to bring the different people interested in solving these problems together. In 2010, he started the Azimuth Project, an online international collaboration, to create a focal point for scientists and engineers interested in saving the planet.

Its goal was to make accurate information on the relevant issues easy to find and to help people work together on common problems. "I started it when I realized there were lots of people like me with technical backgrounds who were eager to do some good," says Baez. The Azimuth Project built a wiki of reliable information and now is working on online climate simulation software for educational purposes. "We always need more people willing to help out and we always need better ideas," says Baez.

Baez, who had spent much of his career on abstract math related to physics, has shifted his focus to more practical mathematics, namely network theory — the study of complex networked systems like cells, organisms or ecosystems.

"Many of the big problems facing us involve complex networks," explains Baez. "For example, a power grid is a big electrical network, a living cell involves a lot of chemical reaction networks and ecosystems involve 'food webs' where different species eat each other. At the planetary level, we have the water cycle, the carbon cycle, the nitrogen cycle and so on. We need to get better at living in a world made of networks."

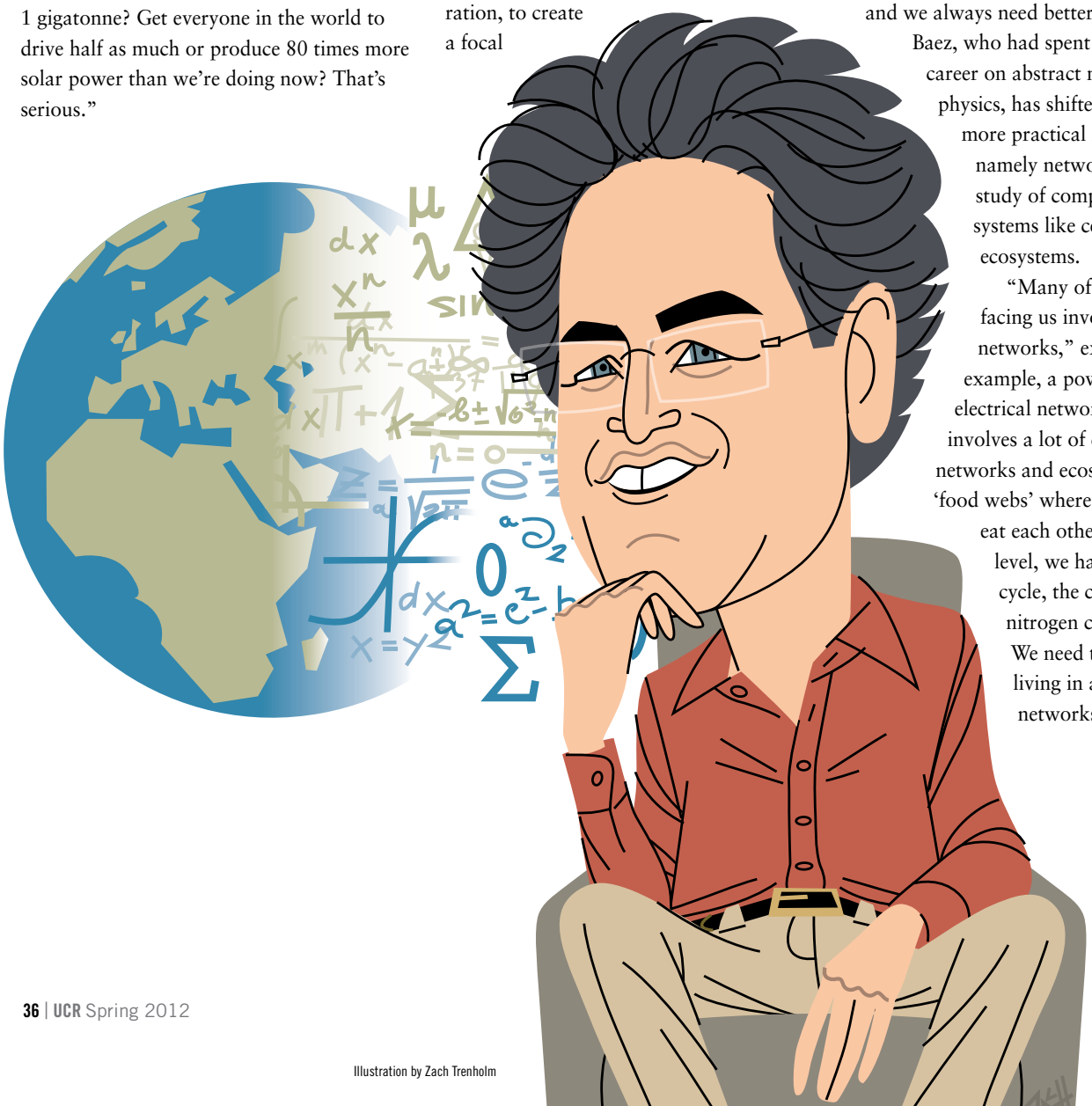

Illustration by Zach Trenholm

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