“Our extraordinary founding faculty did not come to this place in order to copy their way to the top. They came here to do things that were not possible at more established institutions, and they created a culture that embraced the power of ‘different.’”

Howard Gillman
Chancellor

Students stroll along the veranda of the Humanities-Social Sciences Building (now Krieger Hall), as captured by Ansel Adams in April 1967.

Ansel Adams, UCR/California Museum of Photography, Sweeney/Rubin Ansel Adams FIAT LUX Collection, University of California, Riverside
Special Issue: Our Brilliant Future

UCI’s Next 50: A change in leadership and a golden anniversary mark the start of a new era – and vision – for the university.

Ahead of Their Time: In the spirit of UCI’s forward-thinking founders, campus researchers see beyond the present to create a brilliant future.

About This Issue:
As UCI continues the 50th anniversary celebration of its “Bright Past, Brilliant Future,” it’s the perfect time to ask: What will the next 50 years bring? What changes are ahead for the campus – and the world?

To find out, UCI Magazine turned to some people with bright ideas about the future – among them Scott Samuelsen, director of the National Fuel Cell Research Center (page 12); engineering dean Gregory Washington (page 23); and sci-fi author Gregory Benford (page 27).

Will their predictions pan out? Will we have fully self-driving cars that run on nonpolluting, hydrogen-powered fuel cells? Will homes and shops recognize us and cater to our needs and desires? Will we have robotic body parts or even digital bee brains (as hypothesized by writer and radio personality Sandra Tsing Loh on page 17)? Only time will tell – perhaps when UCI marks its 100th year.
From Beads to Bitcoin: The way people pay for things is changing, UCI experts say. Will paper money become passé? **Plus:** Center helps businesses ‘reboot’ in digital age.

Mentoring: Caring faculty and scholarships made all the difference for LaShonda Carter ’15.

Nursing: In the largest gift ever to UCI, Sue and Bill Gross commit $40 million to establish a nursing school.
From the Chancellor

It’s good to be writing about one of my favorite subjects: UCI’s vision for the future. As we head into our second half-century, we have charted a strategic course for the next 10 years and beyond. It is a bold vision – some would say audacious.

The progress we make as an institution depends on reaching out to and engaging people who share our goals and want to change the world. One way we will do that is through this new, redesigned UCI Magazine. In this issue, you’ll read about research, partnerships and programs that illustrate our bold vision of the future. These stories demonstrate how “Think different” is more than a motto for us. It’s a way of life.

Our faculty, for example, is developing new academic programs and reaching new students. We are creating interdisciplinary educational experiences that break down traditional barriers. We are reaching out into the community to cement partnerships that drive ongoing development and inspire life-changing research, because even with all our talents, gifts and resources, we can’t do all this on our own.

People often tell me, “What I love about being involved with the university is that I learn so many great things and meet so many amazing people.” And they’re right. UCI is like an enormous banquet of inspirational people.

I invite you to take your place at the banquet. Involve yourself in the university community in whatever ways you can. We value your insight and ideas and support.

Fiat lux!

Howard Gillman
Chancellor

We Want to Hear From You

When submitting a letter to the editor, please include your full name, UCI graduation year or affiliation (if applicable), mailing address, city of residence, phone number and email address. Submissions that do not include this information cannot be published. Contact information is for verification purposes only – not for publication or commercial use. Letters should be 150 words or less and may be edited. They become the property of UCI/the UC Board of Regents and may be republished in any format.

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Include “Letters to the Editor: UCI Magazine” in the subject line

To submit a letter via U.S. mail, send to:
Letters to the Editor
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Irvine, CA 92697-5615
Guess who turned 50? That’s right, UCI’s own Peter the Anteater reached the half-century mark on Nov. 30, and he’s never looked better. While Peter has sported different looks over the years, his iconic self is unmistakably original. “Students at UCI wanted to set their own mark,” recalls Mike Grayston ’69 of why he and his fellow UCI students voted for an anteater mascot in the fall of 1965. “And having an anteater as a mascot may seem like something frivolous or even silly, but it was not. It was hotly debated. When people started to think about it, we were going to establish a brand-new university with its own culture. We were not going to be a Berkeley or UCLA knockoff; we were going to be UCI.” Here’s a triumphant “Zot!” to the next 50, Peter!
Vicki Ruiz Awarded National Humanities Medal From President Obama

Vicki Ruiz, Distinguished Professor of history and Chicano/Latino studies and president of the American Historical Association, has received the 2014 National Humanities Medal. She’s among 10 honorees from elite universities nationwide who accepted the award from President Barack Obama at the White House in September.


Joseph L. White Honored by American Psychological Association

Professor Emeritus Joseph L. White arrived at UCI in 1969 as a professor of social sciences and bucked academic tradition in the field of psychology from the start. As a result, the man who became known as the “father of black psychology” produced a body of work that was lauded in August at the American Psychological Association convention in Toronto during what the organization called Joseph L. White Day.

"Your numerous books and articles and your seminal manuscript 'Toward a Black Psychology,' published by Ebony magazine in 1970, were instrumental in beginning the modern era of African American psychology," the APA citation reads.


“Many people are inclined to say things like, ‘Well, stuff has to be made somewhere and China can do it cheaper.’ In reply to that logic, we’re showing that China’s role as the world’s manufacturer means much higher emissions than if the ‘stuff’ were made just about anywhere else.”

Steven Davis
Assistant professor of Earth system science
Oct. 1, 2015
The New York Times

Beloved mascot Peter the Anteater sets sail Dec. 16 aboard the campus’s entry in the 107th Newport Beach Christmas Boat Parade. Funded by alumni donors and friends, the UCI @ 50 craft highlighted the university’s commitment to sustainability. Students wearing anteater masks pedaled stationary bikes connected to generators to power the boat’s lights.
Howard Federoff Named CEO of UC Irvine Health

Howard Federoff, vice chancellor for health affairs, was appointed CEO of UC Irvine Health on Jan. 21. As head of UCI’s health system, Dr. Federoff will be responsible for the administration of various clinical locations, including: UC Irvine Medical Center and the Chao Family Comprehensive Cancer Center in Orange, UC Irvine Health-Newport, and numerous primary and specialty care outpatient centers. Federoff said he will expand UCI’s clinical footprint, grow outpatient services and implement new community healthcare delivery models.

“Just because someone tells you something with a lot of confidence, detail and emotion, it doesn’t mean it really happened.”

Elizabeth Loftus
Distinguished Professor of social ecology
Nov. 24, 2015
The Washington Post

We’re No. 1

UCI has placed first among the nation’s top colleges for doing the most for low-income students, according to a ranking by The New York Times. The ratings were based on the share of students who receive Pell Grants (which typically go to families making less than $70,000 per year); the graduation rate of those students; and the price that colleges charge both low- and middle-income students. Other evidence that UCI offers access to a high-quality education, especially to first-generation and low-income students:

- This year, more than half of incoming freshmen are the first in their families to pursue a four-year degree, and more than a third are from low-income families.
- More than 70 percent of UCI students receive some form of financial aid.

BY THE NUMBERS

Thanks to generous supporters, UCI is now the youngest university in the country to have raised $1 billion. In October, the campus ended its successful Shaping the Future campaign to raise funds for scholarships, academic chairs, high-impact research and projects that make a difference. The effort was the largest philanthropic campaign in Orange County.

- **1,013,853,274** dollars raised
- **113,071** donors
- **558** new scholarships and fellowships funded
- **50** endowed chairs funded
- **89%** donations under $1,000
- **10** years’ duration

- **51,554** alumni donors
- **31,779** friends and patients of UCI
- **22,099** students, faculty, staff and parents
- **7,639** corporations and foundations

More than 70 percent of UCI students receive some form of financial aid.

- This year, more than half of incoming freshmen are the first in their families to pursue a four-year degree, and more than a third are from low-income families.
Food, music, games and the crowning of Jordy Cardenas and Dominic Grand as 2016 queen and king highlighted UCI’s homecoming festivities on Jan. 30 in Aldrich Park. Despite the drizzly El Niño weather, the event achieved a record-breaking attendance of about 6,000.

Jorge Cisneros Named New UCI Police Chief

Jorge Cisneros, a 25-year veteran of law enforcement, has been appointed the new chief of the UCI Police Department. Cisneros leads a force of 32 sworn officers, 17 community service officers and 16 staff members serving as many as 50,000 faculty, staff, students and University Hills residents. He oversees UCIPD operations, including the patrol and investigation divisions, emergency management, and administration on campus and at UC Irvine Medical Center in Orange.

The Campus of the Future

Higher education leaders convened Feb. 26 for the signature event of the UCI 50th Anniversary Symposium, “The Future of Higher Education,” at the Beckman Center of the National Academies of Sciences & Engineering. The panel, moderated by Michael Riley, editor-in-chief of The Chronicle of Higher Education, included Ralph Cicerone, president of the National Academy of Sciences and former UCI chancellor; Howard Gillman, UCI Chancellor; James E.K. Hildreth, president Meharry Medical College and the Harvard University Board of Overseers; and Maria Klawe, president of Harvey Mudd College. Topics included rethinking our vision in the face of slashed funding, $1 trillion-plus in student debt, demographic transformations, breakthrough teaching methods and challenges to the research mission.

Not to Be Missed

Come ‘Celebrate UCI’
All are invited to the campus’s annual open house from 10 a.m. to 3 p.m. Saturday, April 16, for a day of food, games and entertainment. Such traditional favorites as the Car Show on the Green (pictured below), a kiddie carnival and the Wayzgoose festival are included. Free admission and parking.

More: www.celebrate.uci.edu

Illuminations
UCI Illuminations: The Chancellor’s Arts & Culture Initiative will offer a variety of public events in early 2016, including:

“Vietnamese Focus: Generations of Stories,” an exhibition showcasing the diversity of the Vietnamese community in Orange County, will include interactive features, photographs, documents, artifacts, ephemera, artwork and oral histories from private collections, UCI’s Vietnamese American Oral History Project and UCI Libraries’ Orange County & Southeast Asian Archive Center. Monday, March 7, through Wednesday, March 30. Viewpoint Gallery, UCI Student Center.

For more Illuminations events, go to:
http://illuminations.uci.edu

For additional campus events, go to:
http://today.uci.edu/calendar

“Immigration reform is needed to ensure that the labor needs of the U.S. economy can continue to be met.”

Louis DeSipio
Professor of Chicano/Latino studies
Nov. 20, 2015
The Wall Street Journal
After a seven-year hiatus, UCI Drama returned in November with a resounding welcome to the Irvine Barclay Theatre in a staging of “Man of La Mancha.” The musical, based on Miguel de Cervantes’ Don Quixote, premiered on Broadway the same year UCI was founded, 1965. Students Sam Arnold (above left) and Jacob Ben-Shmuel (above right) played the roles of Don Quixote and his faithful manservant, Sancho Panza. Directed by senior lecturer Don Hill with musical direction by senior lecturer Dennis Castellano, “Man of La Mancha” marked the first of two UCI Drama productions for the season at the Barclay; on May 27 and 28, for three performances, the department will present a concert staging of “Evita.” UCI Drama’s 2015-16 season focus, “Care/Cure/Corruption,” explores various themes of somatic and mental illness, as well as the institutional disease endemic to certain factions of industry, community and the body politic. For more information, visit: http://drama.arts.uci.edu.
Learning From the Drought Down Under

Silvia Gonzalez, who graduated in 2015 with a B.A. in social ecology, and Andrew Mehring, a postdoctoral scholar at the Scripps Institution of Oceanography, collect water samples in one of Melbourne’s constructed wetlands. Southeastern Australia is a case study in how to successfully weather a lengthy drought. “It’s like looking into what the future could be for California if we got our act together,” says UCI civil & environmental engineer Stanley Grant.
Q&A

Fuel Cells: Driving Force of the Future

After decades of development, hydrogen-powered vehicles are emerging as the go-to alternative to gasoline engines, says Scott Samuelsen

Fifty years from now, some kid will pop open the hood of his parents’ 2065 Toyota Mirai and find a fuel cell engine with no oil or moving parts instead of the combustion engine people are accustomed to today. “If they’re the curious teenager I was, they’ll try to take it apart,” predicts Scott Samuelsen, UCI professor emeritus of mechanical, aerospace and environmental engineering. “And they’ll be in even more trouble than if they’d taken apart a gasoline engine. It’s an intricate but elegant technology.”

As director of UCI’s National Fuel Cell Research Center and the Advanced Power & Energy Program in The Henry Samueli School of Engineering, Samuelsen has led efforts to make the vision of a fuel cell car in every garage a reality. “The 50th anniversary of UCI turns out to be a tipping year for fuel cell vehicles and hydrogen stations to be recognized and embraced,” he says. Automakers are rolling out attractive fuel cell vehicles that satisfy consumers’ needs and also environmental goals for climate change and urban air quality. More hydrogen stations are opening, so drivers will soon be able to fill ‘em up all over the state. If things keep going along this route, Samuelsen says, fuel cells will be the go-to energy source for cars.

He talked with UCI Magazine about recent developments on the fuel cell front and his hopes for a future with smog-free skies – his mission since he was a youngster working on cars.

Q: Your research focuses on alternative, Earth-friendly energy systems. How did you become interested in this field?

Samuelsen: I grew up in Pasadena, a city that was heavily impacted by smog. I was often told that I couldn’t exercise at all during the day, or if I did, it would have to be indoors. It seemed to be a new nuisance that hadn’t been seen before. So I developed an interest in what was giving rise to degraded air quality.

In addition, my innate interest in building things led me to study mechanical engineering, particularly the opportunity to develop or modify engines that convert the energy bound in fuel into electricity to power a home or automobile, or into thrust to propel an airplane.
Q: What do you see as the future of energy?
Samuelsen: There’ll be a paradigm shift in the automobile’s engine and fuel – and in the generation of electricity in homes and business spaces that today we all take for granted. We insert a plug into the wall, we turn on a computer, we switch on our TV and our KitchenAid mixer, and they work. We don’t realize that the source of that electricity is actually causing significant environmental challenges for future generations. The fuel cell, along with solar and wind – renewable energy – will play a major role in meeting those challenges and reducing carbon emissions. Fuel cells will be as pervasive in our homes and businesses as personal computers are today.

Q: How do fuel cells help the environment?
Samuelsen: What’s remarkable about fuel cells is that they have no moving parts or emissions of pollutants. For the automobile, they run on hydrogen, not gasoline or diesel. For generating electricity, they run on natural gas or renewable biogas. The only gaseous species coming out of fuel cells’ exhaust are water vapor and nitrogen. They don’t have these other pollutants – partially oxidized hydrocarbons and oxides of nitrogen – that lead to smog and carbon monoxide. Fuel cells are a critical path to improving air quality and cutting the emissions that contribute to global warming.

Q: How do fuel cell electric vehicles compare to electric-battery cars?
Samuelsen: A fuel cell electric vehicle has a longer range and short refueling time. A reasonably priced car that runs solely on an electric battery has a range of 80 to 100 miles, whereas the fuel cell car has a range between 300 and 400 miles – what we’re used to in gas-powered vehicles. And that range will be extended, because the efficiency of the fuel cell engine is still ratcheting up. Filling a fuel cell vehicle takes less than five minutes, just like today’s car.

Q: What needs to happen to make fuel cell cars more viable?
Samuelsen: There are two steps: One is developing a vehicle that the public finds to be an attractive, reliable option to the gasoline vehicle. That’s been accomplished in spades by companies such as Toyota, Honda, Hyundai and Mercedes. Hyundai began retail deployment of a fuel cell vehicle, the Tucson, in June 2014. This fall, Toyota will release its first commercially available fuel cell vehicle, the Mirai. It’s a sedan like the Camry. That’s saying that yes, we’re ready.

The other step is providing enough hydrogen stations so that when you need to refuel the car, you have ready access to a dispenser. California – along with Japan and Germany – is leading the world in this area. We have almost 15 stations, including one here at UCI that’s been in operation since 2003, but we expect by the end of this year to more than double the number of stations in the state. We expect to grow to at least 100 stations by 2020.

At UCI, our computer model [called STREET for Spatially and Temporally Resolved Energy and Environment Tool] has shown that 68 stations are needed throughout the state to enable the market, and we’ll be at that point by the end of 2017. STREET was created by a team led by one of our former students [Shane Stephens-Romero, M.S. ’08, Ph.D. ’11] and identifies where those stations should be placed. The plan is to drive comfortably within the region and be able to travel from San Diego to San Francisco to Lake Tahoe to Santa Barbara, although it’ll be a while before you can get to Oregon or Colorado. But at least for a majority of your trips [within California] you’ll be covered.

Q: When they write the history of fuel cells, how do you think UCI will be remembered?
Samuelsen: As pioneering the future in the generation of power and utilization of energy. In 1998, UCI established the National Fuel Cell Research Center, the first in the world dedicated to fuel cells, with the U.S. Department of Energy and the California Energy Commission. The center today is at the forefront of the paradigm shifts in transportation and generation of electricity and is recognized as an international leader in resolving the conflict between energy use and protecting the environment. The future is here.

Video: https://youtu.be/MuxIbRw9O7U

“Fuel cells will be as pervasive in our homes and businesses as personal computers are today.”
As UCI celebrates its 50th anniversary this year, the campus isn’t resting on its laurels.

Instead, the university is doing what it has always done: forging ahead with new plans and visions that will expand its worldwide impact.

“While there’s tremendous pride in what we have done to date, there’s also an eagerness to do more: make even stronger contributions in research, education and service; accelerate our ascendancy among globally preeminent research universities; marshal our passions, skills and ingenuity to further improve people’s lives,” Chancellor Howard Gillman said at his investiture in 2015.

Here are some key areas in which UCI will be focusing its talents and resources to realize its “brilliant future,” as outlined by the chancellor:

- Increase the student body to 40,000 (currently 31,000) – in part by boosting online offerings
- Increase the size of the permanent faculty by 250 (currently 1,100)
- Increase research funding from $300 million a year to $500 million a year

Inside the Festival of Discovery’s My Virtual Dream tent, participants’ brain waves are transformed into a panorama of colors, sights and sounds, creating a multisensory experience for observers.
Daring to Be Different

UCI’s founders planned the campus around a circle – today’s verdant Aldrich Park – with the idea of encouraging interactions across all disciplines and fostering innovation.

Among the many firsts for the campus: the University of California’s first stand-alone school of information and computer sciences; the nation’s first department of Earth system science; and a school of life sciences that dispensed with familiar departments such as botany and physiology and envisioned instead a “new biology.”

In the next 50 years, UCI will continue to explore areas of knowledge that cut across existing schools and structures, noted Gillman, going beyond traditional boundaries of academic disciplines.

For instance, he’ll work with deans and faculty to build a large research and educational facility devoted to the “convergence of science and engineering.”

“We must continue to strive to be a sought-after destination for the most talented and ambitious faculty, students and staff – reflecting all backgrounds and life experiences – who see that UCI is where they can reach their full potential and do their best work.” Chancellor Howard Gillman

Chancellor Howard Gillman described his vision for the campus’s future during his investiture as UCI’s sixth chancellor at the Irvine Barclay Theatre in March 2015.
“While we have exciting pockets on campus where these sorts of collaborations take place, we do not have the kind of facility that will allow big-scale research on a broad range of global challenges,” Gillman said. “To my mind, the absence of such a facility on this campus is the single biggest impediment to transformational innovation in our core missions of research, education and service.”

Health & Wellness

“Any AAU research university with an academic medical center has an obligation to make innovative contributions to our basic understanding of human health and well-being, and to create the next generation of clinical interventions that will transform the way we keep people healthy and, when necessary, effectively treat their diseases and improve their quality of life,” Gillman said. “We will continue to be the place that brings to the region the future of medicine.”

To that end, the university is committed to expanding the impact of UC Irvine Health throughout the area, as well as launching endeavors to contribute to people’s well-being. The new Family Violence Initiative, for instance, unites community partners with faculty from 20 UCI departments in prevention and intervention efforts.

“We seek to better understand family violence across the lifespan and generations, and we are doing this from an interdisciplinary perspective,” said nursing science professor Ellen Olshansky, who’s leading the initiative. “We’re working with four domestic violence shelters in Orange County, and we’re developing more community partnerships. Our ultimate goal is to create a world where families no longer experience violence.”

K-12 Outreach

Recognizing that children are the future, UCI will expand its involvement in public schools, touching the lives of K-12 students through a variety of new programs.

In fall 2014, for example, the university received a $6.4 million grant from the National Science Foundation to launch its ESCAPE program, which integrates arts and sciences to help elementary school students learn the basics of Earth, life and physical sciences.

Digital Bee Brains for Humans? UCI thinkers share theories on what’s ahead

Sandra Tsing Loh, associate adjunct professor of art and host of “The Loh Down on Science”:

I was fascinated to learn that drones will soon have digital brains modeled on bees. Perhaps in 50 years, scientists can begin replacing the brains of humans with digital bee brains. Surely, the result will be a race of people who will happily pollinate our crops, build architecturally perfect dwelling places and produce many gallons of organic honey.

This will solve problems of overpopulation, world hunger, renewable energy and sustainability. The best part? Anybody who uses their stinger dies. So we don’t have to worry about excessive police force.

What could go wrong? (Oops – cue theme music from “The Fly.”)

More on Sandra Tsing Loh: bit.ly/ucimag_winter2016_Loh
Saving the World

Named the nation’s No. 1 “Coolest School” by Sierra magazine in 2014 and 2015, UCI prides itself on being a “green” campus, and it will be doing even more to stay “ahead of the curve” (in the words of President Barack Obama) on climate change research, energy efficiency and sustainability.

While the Green Campus Initiative has led the transformation of UCI’s physical campus toward sustainable practices and operations, the new Sustainability Initiative focuses on academic components, including research, education, engagement and philanthropy.

In addition, UCI OCEANS aims to strengthen bonds between the university and the public by focusing on ocean issues. Announced in March, the initiative will include important scientific research, hands-on K-12 educational programs at local beaches, and science cruises for community members interested in collecting data for UCI research projects.

“People really love the ocean,” said Adam Martiny, an associate professor of Earth system science who specializes in ocean plankton and who will lead the initiative. “The UCI OCEANS committee shares this love of the ocean and feels like there are so many things we could do together.”

For more on the campus’s sustainability efforts, visit http://sustainability.uci.edu.

“When it comes to understanding and resolving social challenges, we got off to a great start as a campus when one of our founding faculty members, Sherry Rowland, saved the planet’s ozone layer and, in the words of his Nobel Prize citation, ‘may have saved the world from catastrophe.’”  Chancellor Howard Gillman
Partners in Progress

From its early days, UCI has worked with community partners to broaden the impact of discoveries made in its labs and lecture halls. Many campus entities – including The Don Beall Center for Innovation & Entrepreneurship, the Antrepreneur Center and the Office of Technology Alliances – foster relationships between faculty, students and staff and those in business who share their interest in transforming people’s lives.

As the next step in UCI’s evolution, Gillman plans to expand partnerships that develop commercial uses for campus research and expedite the transfer of technology to the marketplace. In 2014, the university established Applied Innovation with support from the Beall Family Foundation. The interdisciplinary center focuses on integrating research, entrepreneurship and technology to create real-world applications that benefit the public and drive the economy.

Gillman told the Orange County Forum: “Most of the issues we care about relating to the future of our region can be addressed more productively, and with greater positive impact, if we partner the passion and expertise of UCI’s faculty, students and staff with the passion and expertise of others who share our commitment to making the world a better place.”

Video: https://youtu.be/L9peJjxsze0

Shining a Light on the Arts

All students, no matter their major, should have serious and meaningful exposure to the creative arts, Gillman said. To that end, he launched Illuminations: The Chancellor’s Arts & Culture Initiative in fall 2014.

Led by Julia Lupton, professor of English and associate dean for research in the School of Humanities, Illuminations offers drama, dance, music, film festivals, exhibits and other activities both on and off campus at venues such as Costa Mesa’s South Coast Repertory. With the creation of a UCI Community Arts Council, the initiative also strengthens the university’s connections with regional arts and cultural institutions.

“I’m really excited about supporting art in unusual places – art installations on Ring Road, biology slides in an art gallery, improv workshops in a nursing class,” Lupton said. “I love seeing art link up different disciplines and spark conversations among students of all backgrounds.”

This spring, Illuminations-sponsored events turned up all over campus. Students joined in a “Circle Painting” by artist Hiep Nguyen in the Langson Library courtyard. Some found themselves in pop-up performances of “Shaken Shakespeare,” featuring actors who delved into brief scenes by the Bard at random locations. And a giant beach ball even turned up at Humanities Gateway, courtesy of artist Negar Farajiani. The colorful, interactive art piece, “Made in China,” was making a stop at UCI on its world tour.

In August, undergraduates attended a free performance of “Macbeth” at the UCI Claire Trevor School of the Arts’ New Swan Shakespeare Festival. For upcoming events, visit http://illuminations.uci.edu.


The Shaken Shakespeare troupe gives a flash mob performance on Ring Mall to the delight of students and passers-by.

Steve Zylius / UCI
n September, Enrique Lavernia traveled to his native Cuba, the country he hadn’t seen since he left the island with his parents in 1965. He’d come a long way in 50 years, from young immigrant to key administrator at a top research university.

As the new provost and executive vice chancellor at the University of California, Irvine, Lavernia met informally with Cuba’s academic and cultural leaders, scholars and dignitaries – a triumphant return made possible by his lifelong dedication to higher education.

“‘My father was an engineer at ITT [Corp.], and my mother was a biology professor,’” he says. “‘They taught me that the one thing no one can take away from you is your education. That’s yours forever.’”

It’s a lesson Lavernia will be passing on to many at UCI, where he’s the chief academic and operating officer responsible for the university’s teaching and research enterprise.

“Higher education is perhaps the most transformative power that we have,” he says.

His own life offers proof. Lavernia attended high school in Puerto Rico, then earned a bachelor’s degree in solid mechanics with honors at Brown University and a master’s degree in metallurgy and a doctorate in materials engineering at the Massachusetts Institute of Technology.

He joined UCI in 1987 as an assistant professor in the department of mechanical engineering, eventually becoming chair of the Department of Chemical Engineering & Materials Science and a Chancellor’s Professor. In 2002, Lavernia left for UC Davis, serving as dean of the College of Engineering and the campus’s interim provost. He returned to UCI in July 2015.

“I came back during the summer to give myself a couple of months to really get to know the leadership at a time when the campus was still a little quiet,” Lavernia says. “I’ve now met one-on-one with every dean and every vice chancellor. It’s a first-rate group.

“I was struck by the degree to which they work together and support each other’s successes — that’s uncommon. Not surprisingly, UCI has a large number of interdisciplinary activities and thrives on those relationships, which is terrific.”

He arrived just in time to help draft the campus’s new, multiyear strategic plan. He and Chancellor Howard Gillman circulated a draft in October and are releasing the final version in February.

“We sent it out to the entire community for input,” Lavernia says. “That’s a really important first step — to get faculty, students, staff and outside stakeholders to join in and all feel that their voice is heard.”
Lavernia intends to work closely with faculty members on meeting the plan’s objectives. “Part of the strength of this great university is the fact that the faculty are truly leaders in the educational component and work in partnership with the administration to deploy academic programs that make sense intellectually. They are the experts,” he says. “I’m proud to be a faculty member in addition to being an administrator.”

A Distinguished Professor of chemical engineering & materials science, he’ll advise graduate students despite his ambitious agenda as provost. “That’s motivated by several goals,” he says. “I enjoy the interaction with students – it’s one of the main reasons I selected this career. It grounds me and helps me remain aware of issues that affect faculty.”

Lavernia will work with Michael Dennin, dean of undergraduate education and vice provost for teaching & learning, to enhance students’ college experience. The strategic plan, for instance, calls for more opportunities for undergraduates to participate in state-of-the-art research and for ensuring they have the tools they’ll need to succeed in a world of rapidly changing technology.

“We’re also going to study the best modes of delivering online education and teaching underrepresented minorities,” Lavernia says. “The entire campus becomes a laboratory where we integrate our teaching and research mission.”

In short, it’s a plan to provide students from all backgrounds with the one thing he knows can’t be taken away from them: a great education.

UCI Unveils Ambitious Strategic Plan

In February, UCI is releasing a final draft of its new 10-year strategic plan, which provides a roadmap for the campus’s growth and expansion. Here are the plan’s four “pillars” and key goals:

**Growth That Makes a Difference: Expanding Our Capacity to Improve Lives**
- Expand the number and impact of faculty [add 250 more members]
- Increase research expenditures to $500 million annually
- Expand the quality and impact of UCI Health [for example, establish schools of nursing, pharmacy and population health]
- Create opportunities and infrastructures for convergence science [specifically, across medicine, biology, physical science, engineering and information & computer science]
- Develop, support and promote new comprehensive research initiatives that shed light on social problems and address regional and global grand challenges
- Make pervasive the impact of art, culture, creative expression and humanistic inquiry on our broader research and educational mission

**First in Class: Elevating the Student Experience to Prepare Future Leaders**
- Expand the study body [increase enrollment to 40,000] and make UCI a first-choice campus for students
- Foster excellence in teaching and learning
- Utilize modern technological tools to create the most effective learning environments
- Integrate student life with educational experiences
- Ensure that UCI’s educational opportunities are an engine for social mobility, impact and positive innovation
- Build on the success of UCI’s Campuswide Honors Program by developing a new honors college

**Great Partners: Making Regional and Global Connections That Enhance Our Mission and Serve the People**
- Build an engagement culture
- Create a powerful Anteater-for-life ethos that promotes ideal and sustained student and alumni participation
- Become a stronger partner with community organizations
- Partner with Orange County to develop a national model for how to live responsibly and well in the 21st century
- More broadly communicate and translate UCI’s discoveries and innovations

**New Paths for Our Brilliant Future: Forging Best Practices to Power the Coming Century**
- Develop a sustainable financial plan
- Make fundraising a central feature of our academic planning and leadership culture [double annual giving to the campus over the next two years]
- Bolster and position staff to more effectively support the academic mission
- Expand, build and maintain an excellent physical infrastructure
- Ensure a high-quality, ubiquitous, secure and robust information technology infrastructure

**More:** provost.uci.edu/strategic-plan/index.html
Ahead of Their Time
In the spirit of UCI’s forward-thinking founders, campus researchers see beyond the present to create a brilliant future

By Kathryn Bold

Imagine a day, 20 years from now, when you’re chauffeured home from work by your self-driving fuel cell car. You roll up to your solar-powered house, not worried that your lawn is dying because you don’t have one—water shortages have turned grass into an unaffordable luxury.

You’re greeted at the door by a robotic dog (they’re already popular in Japan), and your house—which senses you by your wristwatch, cellphone or other wearable technology—turns the thermostat to your liking, flips on lights and lowers shades. After changing out of your suit (one that has adjusted to your body temperature throughout the day) you settle onto the couch and the television switches to your favorite show: “Survivor: The Moon.”

Such Jetsons-type scenarios aren’t the stuff of science fiction at the University of California, Irvine. Since its founding 50 years ago, the campus has attracted those who refuse to be limited by the past while focusing on future innovations. The university’s researchers, scholars, thinkers and dreamers not only envision these kinds of possibilities but are making them a reality.

Here are some views of tomorrow from individuals who see beyond the present and examples of the work being done on campus today that could make a difference in people’s lives over the next half-century.

**Machines Take the Wheel**

By the time UCI celebrates its centennial in 2065, cars may not fly, but they’ll be able to drive themselves—and the shift toward machine-operated vehicles is coming on fast.

“At least three automotive companies will have cars with driverless technologies on board by 2017,” says Gregory Washington, dean of UCI’s Henry Samueli School of Engineering. “The person behind the wheel will have to do very little to command the car.”

Such vehicles, like the pod-shaped model recently unveiled by Google, will be guided by preprogrammed route data. Steering wheels and pedals won’t be necessary. Sensors and lasers will “ping” other cars for greater awareness of the surroundings.

The communication systems that let these autos “talk” to each other and the roads they travel, however, would be vulnerable to attackers. “This would not only compromise car information but pose significant risk to the health and safety of human lives,” says Mohammad Al Faruque, assistant professor of electrical engineering & computer science at UCI.

Al Faruque, who holds three U.S. patents, is developing security solutions to protect self-driving cars from hackers and other threats.
Homes too will become automated. They’ll welcome their occupants by unlocking doors, turning on lights, adjusting the thermostat, lowering the blinds and switching on the television, Washington says. UCI students incorporated some of this technology in Casa del Sol, their entry in the 2015 U.S. Department of Energy Solar Decathlon, an international collegiate competition to design and build the best solar-powered house.

“The home is integrated with your lifestyle,” Washington says. “This is going to be the home of the future.”

Inspired by the drought-resistant, sun-loving California poppy, Casa del Sol features eco-friendly energy and water systems, wastewater recycling, vertical landscaping and other innovations. Like a flower, the house opens up during the day, with adjustable panels letting in the sun, and closes up at night to maintain a pleasant temperature.

“Society is at a difficult standstill, where we have to decide between further sacrificing Mother Nature or our own comfort,” says Teagan Barnes, a fourth-year mechanical engineering major. “This competition gives me and my team the opportunity to demonstrate that you can make the changes affordably and comfortably.”

UCI’s California Plug Load Research Center, which aims to improve energy efficiency in the use and design of consumer electronics, is making other advances on the home front.

Housed at the California Institute for Telecommunications & Information Technology, CalPlug has a living room simulation called the Wall of Power. The display, equipped with everyday entertainment and household devices connected to electrical outlets, lets people turn these items on and off while seeing their energy consumption in real time.

CalPlug is now partnering with DirecTV and Southern California Edison to create a product that will allow customers to monitor their electricity usage on their television sets.

“With a click of their remote, consumers will immediately understand how much electricity they’ve used to date, what price tier that puts them in, and their remaining allotment if they want to avoid another tier increase,” explains G.P. Li, electrical engineering professor and Calit2/CalPlug director. “This personalized feedback will teach people how to adopt a more energy-efficient lifestyle and enjoy some real-time savings.”
Fahrenheit-Friendly Fabric

Alon Gorodetsky, assistant professor of chemical engineering & materials science and chemistry, is applying his knowledge of reflectin — a protein found in squid’s skin — to develop a self-regulating thermal material.

Tomorrow’s fashion forecast calls for clothing that’s tailored to your body temperature, thanks to some creative UCI scientists. Jackets will heat up when you feel a chill and drop a few degrees when you’re too toasty.

Alon Gorodetsky, assistant professor of chemical engineering & materials science and chemistry, and colleagues have partnered with Under Armour sportswear to create a next-generation fabric that captures and releases body heat.

“Our goal is to develop technology so that each person can regulate his or her own thermal comfort, which potentially would let buildings expand their temperature set points by just a few degrees in each direction,” Gorodetsky says. “We would then need far less energy for heating and cooling office buildings. That could save 1 to 2 percent of all energy used in the U.S. per year.”

Gorodetsky’s project stems from his studies of squid, those undersea masters of disguise that have an amazing ability to blend in with their environment and hide from predators. With a $2.8 million grant from the Department of Energy’s Advanced Research Projects Agency, he’s applying what he’s learned about the squid’s dynamic color- and shape-changing properties to produce the proposed material, called Thermocomfort cloth.

“Our goal is to develop technology so that each person can regulate his or her own thermal comfort.”

James Hicks, interim vice chancellor for research and professor of ecology & evolutionary biology:

When I think about the advances made in science and technology over the past 50 years and use those changes as guideposts, I predict that 2065 will usher in a world driven by an integration of computer and information sciences, engineering and biology.

The next 50 years will see the integration of humans and machines. Humans will be implanted with microchips that continuously monitor vital signs that track, in real time, our health.

There will be biomarkers for disease, measured in real time, that result in instantaneous diagnosis and healthcare delivery.

If body parts wear out or fail, we’ll grow new ones from our own cells, or better yet — using advances in materials and embedded smart systems — we’ll [have] limbs and organs that never wear out.

More on James Hicks: bit.ly/ucimag_winter2016_Hicks
A Different Kind of Baby Monitor

Some of the interdisciplinary work being done at UCI will affect human beings even before they’re born.

TinyKicks, a startup company launched out of the campus’s Applied Innovation institute, will produce a device created in the lab of Michelle Khine, associate professor of biomedical engineering, that makes it easy to monitor fetal activity, safeguarding the health of unborn babies.

Doctors typically advise pregnant women to keep a daily record of the number of times they feel their fetus kick; a drop in the count can signal a problem. TinyKicks' wearable smart sensor, similar in size to a Band-Aid, captures the unborn infant's movement and sends the data to the mother’s smartphone, eliminating the subjectivity of self-reporting.

“For the past several years, our lab has been working on soft, flexible and thin electronics that can be mounted on the skin,” Khine says. “Dr. Gareth Forde, an OB-GYN at UCI, asked us if we could help develop some technology to monitor fetal movement. It was the perfect marriage of medical need and technological capabilities.”

It’s not the first time Khine has come up with a cool invention: She became a star in the scientific world in 2009 when she figured out a way to use a child’s toy – Shrinky Dinks – and her toaster oven to make sophisticated microfluidics prototypes that sparked a whole new type of technology.

“It was the perfect marriage of medical need and technological capabilities.”

Michelle Khine, associate professor of biomedical engineering, invented a small, flexible electronic device that can be placed on a pregnant woman’s skin to monitor her unborn baby’s kicks, sending the information directly to a smartphone.

Steve Zylius / UCI
Running Dry

“It’s not possible to talk about the next 50 years without talking about global warming,” says Gregory Benford, UCI professor emeritus of physics & astronomy and an acclaimed writer whose work is considered “hard science fiction” – offering more plausible renditions of the future that draw on his research as well as his imagination.

A shortage of water, fossil fuels and other natural resources will be felt in every aspect of people’s lives, he says. Lush landscaping and green lawns will disappear from suburban yards – a trend that’s just starting to take hold in drought-plagued California.

“You still might see some greenery but only around hotels and resorts,” Benford says. “It will look a lot more like Phoenix.” Native plants and rock gardens will be the norm.

He anticipates that in California overpopulation and dwindling water supplies will result in a migration from the south end of the state to the north, above Sacramento, where there are fewer people and more land and resources.

“You’ll see a colonization of the north,” Benford says. “It’s no longer ‘Go west, young man.’ There’s no West left.” He envisions a new tech area sprouting up north of Silicon Valley and warns that Oregon will have to brace itself for a California invasion.

While fake grass and cacti are visible signs of shrinking water supplies, Travis Huxman, professor of ecology & evolutionary biology and director of UCI’s Center for Environmental Biology, sees an opportunity to enhance local habitats.
Currently, UCI biologists are working with Facilities Management staff in using the campus as a “living laboratory” to understand how planting and landscape management affects water and energy budgets as well as human use of the environment.

“Homeowners will see the benefits of using less water, growing native plants – such as sagebrush and manzanita, two perennial natives – and attracting the local biodiversity into their yards and lives,” Huxman says. “Not only will this save money, but it will help preserve this global biodiversity hotspot that is the California eco-region.”

UCI researchers are also raising awareness of the potentially devastating water loss people don’t see: the drop in underground reserves.

Two UCI-led studies released in June, for instance, show that human consumption is rapidly draining some of the world’s largest aquifers. The work is the first to offer a comprehensive view of global groundwater losses via data from space, using readings generated by NASA’s twin GRACE satellites that measure dips and bumps in Earth’s gravity, which is affected by the weight of water.

In addition, a research team led by Amir AghaKouchak, UCI assistant professor of civil & environmental engineering, has been awarded $1.1 million by NASA to integrate satellite data with new statistical methods developed at UCI to improve drought monitoring and prediction. The resulting system could prove vital to farmers struggling to maintain crops on parched land and could enable all water users to take preventive measures in the face of future shortages.
patients whose limbs have been impaired by a stroke or spinal cord injury don robotic arms, gloves with special sensors and other high-tech devices designed to help get them moving again.

David Reinkensmeyer, iMove director, hopes that robotic devices, coupled with the kind of stem cell therapies being developed at UCI, will someday help patients live better, more active lives. “To see a person who’s been injured recover completely may seem like science fiction, but that’s what we all dream about,” says Reinkensmeyer, professor of mechanical & aerospace engineering, anatomy & neurobiology.

One exoskeleton called PAM/POGO (Pelvic Assist Manipulator/Pneumatically Operated Gait Orthosis) gives patients with spinal cord injury full range of motion in their legs and pelvis while they train on a treadmill. “It helps you stand and start moving,” he notes. It’s another step that UCI is taking toward a better future.

No vision of the future would be complete without robots running the world – and sometimes running amok – and indeed, Benford says, “robots are going to be everywhere.” He and his wife, Elisabeth Malartre, have written a book on the subject called Beyond Human: Living with Robots & Cyborgs.

Machines will do everything from fighting fires to fighting wars, the couple predict. They’ll be used in factories and warehouses to lift heavy goods and in hospitals to perform delicate surgery.

Robots are “more precise than a human hand,” Benford says. “They’ll be especially useful in serving the old. They can move patients, replacing human caregivers. They’re also cheaper than humans and don’t become irritated.”

Technology will also change humans inside and out, rebuilding joints, elbows and hearts, he notes, adding that limb prostheses, artificial skin, electronic retinas, cochlear implants and other artificial parts will become increasingly sophisticated – and lifelike.

Inside UCI’s iMove “collaboratory” at Sue & Bill Gross Hall: A CIRM Institute, the merging of machines and humans – the premise of such films as “Alien” and “The Terminator” – has become a reality. Here, technology will also change humans inside and out, rebuilding joints, elbows and hearts, he notes, adding that limb prostheses, artificial skin, electronic retinas, cochlear implants and other artificial parts will become increasingly sophisticated – and lifelike.

One exoskeleton called PAM/POGO (Pelvic Assist Manipulator/Pneumatically Operated Gait Orthosis) gives patients with spinal cord injury full range of motion in their legs and pelvis while they train on a treadmill. “It helps you stand and start moving,” he notes.

It’s another step that UCI is taking toward a better future.
From Beads to Bitcoin

The way people pay for things is changing, UCI experts say. Will paper money become passé?

By Kathryn Bold

In a cluttered storage room in UCI’s Social & Behavioral Sciences building, Bill Maurer, dean of social sciences, rummages through shelves filled with old foreign bills, vintage Monopoly games, Venetian glass beads and New Guinea shell necklaces once used as currency, and other examples of real and play money. Maurer’s not auditioning for an episode of “Hoarders.” As founding director of UCI’s Institute for Money, Technology & Financial Inclusion, he uses the loot for educational purposes.

Maurer, a cultural anthropologist, is not only interested in how people paid for stuff in the past and what that says about their society but also curious about what forms payment will take in the future. (He is, after all, an unabashed Trekkie, having once dressed up as Captain Kirk to raise funds for University of California scholarships.)

What will be in people’s wallets – if they even have wallets – also concerns business owners, technology and security experts, and anyone who hopes to make a profit in the digital age.

Defending the Dollar

When considering which types of currency will survive and which will go the way of the cowry shell, many people expect cash, coins and paper checks to disappear in their lifetime, Maurer says.

“Everyone thinks these ancient technologies are on their way out,” he wrote in a commentary titled “Extinct by 2020: The Swipe” for Visa’s Tech Matters website. But he’s betting against the demise of the dollar bill and other cold, hard cash.

“Cash is part of a huge public system,” Maurer says. “It’s accessible to everyone; there’s no barrier to using it.” Anyone can pick up a dollar and spend it – there’s no need to open an account and no fee for using cash.

“It can be transferred freely, whereas with almost any electronic medium, the transaction does not settle at par,” he continues. “Say you pay $10 for something on a credit card; the merchant may only receive $9.78. Merchants pay the fees for accepting credit card transactions, and those costs are passed on to us.”

Babysitters, laundromats, dog walkers, parking meters, hotel and restaurant staff, taxi drivers – plenty of business operations still rely on cash.

While there are drawbacks – cash can be stolen, get lost or disintegrate, especially if accidentally put through the wash – it will forever have an advantage over digital currency.

“Cash and coins always work,” Maurer says, “even when the lights go out, even in a war zone.”
Going Paperless

Consider one of the more recent artifacts in Maurer’s collection: “It’s called a knuckle-buster,” he says, showing off a metal contraption used to manually process credit card transactions. The machine got its name because cashiers sometimes nicked their knuckles when moving its slider back and forth to imprint a card’s embossed information on multiple carbon copies of a sales slip.

Once a common sight at checkout counters, the knuckle-buster has all but disappeared from stores. Most merchants now rely on an electronic point-of-sale device that reads a card’s magnetic strip through an action called a “swipe.”

Yet, in a case that shows how difficult it can be for societies to transition from one mode of payment to another, knuckle-busters were pressed back into service as recently as June 2014 at 200 P.F. Chang’s restaurants when the company’s electronic credit card system was breached.

“Paper and metal come in handy,” Maurer notes wryly.

Easy Credit?

No one doubts the convenience of credit and debit cards. Those with magnetic strips have been in widespread use since they were introduced by IBM in the early 1970s. But security problems with the cards and the advent of smartphones and other mobile technologies have many people speculating about what will take plastic’s place.

“Right now, they’re working to build a cheaper, faster, more secure system of electronic settlements than a debit or credit transfer,” Maurer says. “So far, none of the devices through which we access value has really stuck. It’s still the plastic card. But we’re certainly seeing a lot of interest in changing the technology of money.”

For merchants, keeping up with digital technology is
crucial, says Vijay Gurbaxani, the Taco Bell Endowed Professor of Information Technology Management in UCI’s Paul Merage School of Business.

“The world we grew up in is changing into one that’s far more digital, and that applies to money and payment systems,” says Gurbaxani, who directs the school’s Center for Digital Transformation, which helps businesses stay abreast of technology. Through workshops, peer-to-peer forums, research partnerships and other programs, the center shares information on the rapid transformations caused by IT so that executives and managers can create new strategies for success (see related story on page 34).

“Companies must reinvent themselves continually,” he says. “They have to understand what evolving digital technologies do to their business.”

To stay competitive, for instance, they have to consider investing in such innovations as apps that allow customers to make purchases with just their smartphone, he notes. Starbucks and Target are among the retailers who’ve already done so.

“Payment apps are proliferating,” Gurbaxani says. “It speaks to how much change we’re observing.”

One example he cites of a company embracing technology is the Walt Disney Co., which knows a thing or two about Tomorrowland. Disney has invested more than $1 billion in MyMagic+, a cashless system featuring a colorful wristband that works as an automated entry pass at the company’s Florida parks. Guests can use the Magicband to pay for food, mouse ears and other merchandise; avoid long lines by accessing FastPass; and even open their hotel room door.

Such mobile systems, though, are still tied to credit cards and bank accounts. “Apple Pay, Google Wallet, PayPal – they all link to existing payment mechanisms,” Gurbaxani observes.

### Going Off the Rails

Electronic transactions only appear to be instantaneous to the consumer; they’re actually routed through traditional financial institutions, which take a day or two to process them.

“The information is transferred on a mobile device, but you’re still going back to the rails,” says Maurer, referring to the worldwide network of banks and financial services companies (MasterCard, Visa) connected to each other physically, via cable. (“Rails” is the payment industry’s term for value transfer infrastructure dating back to when telegraph lines ran alongside railroad tracks during the period of westward expansion.)

“Over the next 50 years, there’ll be a lot of experimentation with new gizmos to access money, but the real change will take place in the value infrastructure,” he says. Those [payment] systems will exist solely in the digital world and offer faster and cheaper means of electronic payment.

One such system, bitcoin, lets users purchase stuff by pressing “send” on their wallet app. The network has many critics due to security concerns and wild fluctuations in the bitcoin’s value. (Bitcoin has a volatility 18 times greater than the U.S. dollar, according to finance expert Mark T. Williams.) There’s no bank or central authority acting as an intermediary to regulate or control the currency.

“It’s very hard to predict where bitcoin will go, even though more and more companies are accepting it,” Gurbaxani says. “Many consumers are uncomfortable with the idea of a currency that isn’t backed by a country, though some form of peer-to-peer payment system will take hold in the future.”

While acknowledging its flaws, Maurer considers bitcoin a harbinger of a future type of decentralized digital payment system that will eventually gain acceptance.

“What’s interesting is the computer infrastructure behind it,” he says. “I’ve joked with my graduate students that we have to see bitcoin as an art project. It can be seen as elegant, even if it’s not ready” for the market.

Whether or not bitcoin eventually replaces plastic, Maurer feels sure of two things: Some form of secure digital currency is around the corner; and 50 years from now, people will still have quarters and other coins to jangle in their pockets and toss into fountains.

“The coin has been around for 3,000 years,” he says. “It’s one of the oldest pieces of technology we’ve got. I don’t see it dying anytime soon.”

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Being able to anticipate future trends can make or break a business. Trouble is, no one has a crystal ball to say what will be the next Uber and what will flop like, well, a floppy disk.

That’s where The Paul Merage School of Business’s Center for Digital Transformation comes in. It teaches students and executives how to successfully navigate changes in the global business environment driven by rapidly advancing digital technologies.

“You have to understand what the digital revolution does to your business,” says center director Vijay Gurbaxani.

“You have the new that threatens the old. Our goal is to help companies undergo this transformation.”

In a recent report for the center, “Time for a Reboot,” he cites examples of established businesses that choked when new digital offerings cut demand for their products. Among the “digital roadkill”: Blockbuster (from 9,000 video rental stores in 2004 to bust in 2010), Eastman Kodak (the 131-year-old film pioneer went bankrupt in 2012) and Borders (the bookseller was “Amazoned out of existence”).

Even smart technology enterprises can find themselves...
playing catch-up to competitors if they don’t jump on emerging trends fast enough, Gurbaxani says.

“One example is Microsoft – it took quite a while for the company to move into the cloud,” he says, referring to the network of remote servers that allows users to store, process and manage data over the Internet instead of on their local server or personal computer.

Microsoft has lagged behind market leader Amazon, which got a head start in the cloud competition and now dominates the industry.

Another example cited by Gurbaxani: self-driving cars. Traditional auto makers have been slow to pursue the new technology, leaving the road wide open for an industry outsider such as Google to take the lead.

“Google is already testing prototypes of an entirely self-driving car, while car manufacturers are adding driverless components in small increments, like the self-parking feature or lane-change assist,” Gurbaxani says. “They see driver-assisted cars as a threat because they have a lot invested in cars that people drive.”

The businesses most likely to flourish in the future are those that will find a way to match an unmet demand with new technology, he says. That includes companies like Uber.

In just five years, Uber has become a multibillion-dollar enterprise because it offers a faster, cheaper, more convenient alternative to taxi and traditional car services, Gurbaxani says. Anyone wanting a ride from point A to point B can get a lift by using a cellphone app. Recent protests in France by taxi drivers whose livelihood is threatened by Uber illustrate how businesses that don’t evolve can find themselves stuck in idle.

And that’s not all. Uber is expanding to encompass grocery and food delivery, Gurbaxani says.

“What’s even more impressive is that Uber is investing heavily in self-driving cars,” he notes. “When was the last time we saw a 5-year-old company invest in disrupting itself? But that’s how fast the world is changing, and many companies don’t have the luxury of waiting anymore.”

To encourage executives to embrace digital technologies, the UCI center offers peer-to-peer forums, support for research, conferences and educational programs.

“We draw in faculty members from different disciplines, primarily from The Paul Merage School of Business and the Donald Bren School of Information & Computer Sciences, to share their knowledge” with the community, Gurbaxani says.

As he told the Business Transformation Academy, an interdisciplinary global think tank, the move to a new digital economy “is very challenging and fraught with risk.”

He added: “Businesses with better strategic foresight of where the digital world is heading and businesses that are able to leverage this understanding to adapt to a changing environment will be more successful.”

Video: bit.ly/ucimag_winter2016_BusinessVideo

““You have to understand what the digital revolution does to your business.””

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**Future Buzz**

***Bonnie Nardi*, informatics professor and anthropologist:***

With four (adorable) grandchildren, the future seems very real to me. In one future, wealth continues to accumulate in fewer and fewer hands, an undeniable trend we see today. Essential technological infrastructures of communication, commerce, healthcare and education lie outside democratic processes and lock down decision-making in the corporate sector, another current trend.

In a second future, technology supports an elegant scaling down to low-impact lifestyles in recognition of the finiteness of the great – and, I hope, not late – planet Earth.

Our economic system is rebalanced to distribute wealth equitably using technological systems such as time banking, freecycling, crowdworking, 3-D printing and technically enhanced permaculture.

The second future seems utopian but is actually reality-based, given the political instability of inequality and finite resources. The second future is the one I want for my grandkids!

Orange County philanthropists Sue and Bill Gross have donated nearly $800 million to numerous worthy causes, mostly those that improve education, research and healthcare around the world. Their latest contribution, though, may have the most lasting impact.

In January 2016, the Grosses committed $40 million to the University of California, Irvine to establish a nursing school and assist in the construction of a new building to house it. The largest single gift ever to UCI, the donation will help put the university in a leadership position to address the coming evolution in American patient care.

According to recent reports from the U.S. Bureau of Labor Statistics, the nation will need more than 1 million new registered nurses by 2022. And an increase in nurse practitioners – registered nurses with advanced degrees who can provide many of the same services as primary care physicians – will be necessary to cover the looming shortage of these frontline doctors. Training these nurses will require additional experienced nursing faculty.

The Gross gift will enable the continued growth of UCI’s nursing program, which has gained an admirable reputation since its founding less than a decade ago. The highly selective program – which offers fully accredited bachelor’s, master’s and doctoral degrees – could admit just 4 percent of undergraduate applicants in the fall of 2015 due to space limitations. In February 2015, NurseJournal.org named it one of the top 10 programs in the western United States for quality, value and satisfaction, and its nurse practitioner faculty is consistently ranked within the country’s top 25.
“We’re proud to partner with UCI to help solve some of the most pressing healthcare needs of our generation,” said Sue Gross, president of the Gross Family Foundation. “We expect our support for a nursing school to have a broad impact, as the demand for nurses and their teachers touches the heart of our healthcare system.”

When approved, the Sue and Bill Gross School of Nursing will be the fourth nursing school in the UC system. The gift will fund the construction of the Sue and Bill Gross Nursing and Health Sciences Hall on campus, which will allow the school to hire new faculty and nearly double current student enrollment. This includes a sizeable increase in admissions to the graduate degree program, which supplies future nursing educators.

Moreover, the funding will broaden the reach of community partnerships addressing the healthcare needs of underserved populations, such as off-campus programs focused on nutrition and wellness, prenatal care, and complex clinical cases requiring a team-based or coordinated approach.

The donation continues the Grosses’ generous support of UCI. In 2006, their foundation gave $10 million to create a stem cell research center and help fund a state-of-the-art facility for this work. They were awarded the 2012 UCI Medal – the university’s highest honor – for their exceptional contributions to UCI’s mission of teaching, research and public service.

“The Sue and Bill Gross School of Nursing plans to recruit a faculty with substantial experience and essential credentials in nursing education; a curriculum dedicated to meeting healthcare requirements; and an approach that furthers relevant solutions, technologies and applications,” says Dr. Howard Federoff, vice chancellor of health affairs and dean of the School of Medicine. “The school will have the capacity to stimulate an increase in graduate degree program admissions – essentially, the source of future nursing educators. In doing so, we hope to play a significant role in improving the profession itself, enhancing interest and satisfaction in a revitalized nursing workforce in the United States.”

### Nursing: At a Glance

**Inaugural class:** Initial cohort of bachelor’s students enrolled in 2007 and graduated in 2009.

**Current number of students:** 175 bachelor’s, 33 master’s, four postgraduate and eight doctoral students

**Degrees and programs offered:** B.S.; M.S. with either a family nurse practitioner concentration or an adult/gerontological primary care nurse practitioner concentration; Ph.D.; and a postgraduate nurse practitioner certificate program

**Start of nurse practitioner master’s program:** UCI began educating nurse practitioners in 1996 in the Department of Family Medicine via a post-master’s degree certificate program. In 2004, the university began collaborating with California State University, Fullerton to provide family nurse practitioner coursework for their master’s students while continuing the post-master’s program. In 2009, UCI admitted its first master’s-level nurse practitioner students.

**Moved into Berk Hall:** fall 2011

**Start of doctoral program:** fall 2013

**Highlight:** In 2011, nursing science received a $1.5 million federal grant to establish Orange County’s first nurse-managed clinic – the SOS-El Sol Wellness Center at the El Sol Science & Arts Academy in downtown Santa Ana.

“We expect our support for a nursing school to have a broad impact, as the demand for nurses and their teachers touches the heart of our healthcare system.”
Mentoring Made the Difference

At UCI, LaShonda Carter ’15 found others who helped her realize her dreams

By David Earl
LaShonda Carter ’15 always had the ability to thrive in academia, but it took an act of motherly love – her desire to be an inspiration for her son – to discover that aptitude.

Today, with assistance from scholarships, mentors and caring faculty at UCI, she’s embarking on a doctorate in the humanities and helping other students who need just a little encouragement to succeed in college.

In the 1990s, Carter attended a Los Angeles high school with predominantly African American and Hispanic students. She performed well, earning a 3.7 GPA. But she wasn’t a top student, and the message she received from counselors and teachers was that only the very best could survive in college and beyond.

“I graduated with the Silver Seal of Honor,” she says. “And I didn’t think that was good enough. My high school didn’t support going to college, so I didn’t even think about it.”

Instead, Carter went straight into the workforce from high school. She spent much of her early adulthood as a hairstylist and mom to son Jordan Haywood. But when she noticed her son’s waning interest in his studies, she decided it was time to ignore past doubts and become an inspiration for the future. She enrolled at Cerritos College to earn an associate’s degree in English.

Carter aced her classes and, in the process, demonstrated to Jordan the value of pursuing the highest levels of academic success. In contrast to her high school experience 14 years earlier, faculty and mentors at Cerritos College encouraged her to transfer to UCI.

As an Anteater, she discovered a world that not only valued her voice but demanded it. Mentors across the School of Humanities – in both English and African American studies – challenged Carter to think broadly about the world and to consider how she wanted to engage and shape it. She also found valuable help and guidance through the Undergraduate Research Opportunities Program, which pairs students from all academic disciplines with faculty mentors to facilitate research and creative activities.

“At UCI, faculty spoke to me not as a student who’s different but as a student who should be here,” she says. “It makes all the difference in the world when you’re part of a community that believes you deserve to be there.”

Assistance from a variety of sources allowed Carter to dive deeply into her newly discovered scholarly passions. The UCI Town & Gown Scholarship and the School of Humanities’ Hester A. Laddey Memorial Award, Hannah J. Caldwell Student Award and Lindon Barrett Memorial Award were invaluable. As a participant in the Center for Educational Partnerships’ SAGE Scholars program, she also received counseling on building her professional skills and coaching through her postgraduate interviews.

“Private support allowed me more freedom to focus and flourish in my studies,” Carter says.

She and her son moved onto campus, and the student who had gotten so little mentorship in high school spent her senior year mentoring recent transfer students and serving as a peer tutor in writing, providing the encouragement she never had. (In June 2015, she earned bachelor’s degrees in English and African American studies.)

At home, Jordan might not love doing his homework every night, but he’s started talking about his own college degree not as an “if” but as a “when.”

This past fall, Carter began her doctoral program in culture & theory at UCI, and she’s doing it for someone new.

“The undergraduate degree? That was for Jordan,” says Carter, who hopes to teach at a university someday. “This one’s for me.”

“At UCI, faculty spoke to me not as a student who’s different but as a student who should be here.”
Tipping Point

UCI’s skyscraper-sized center, 7-foot-6 Mamadou Ndiaye, defends against Santa Clara. Coming off last season’s first-ever NCAA Division I Tournament run, the Anteaters made headlines early in 2015-16 play by fielding the tallest starting lineup in college basketball history.
A Different Path

By Erwin Chemerinsky  Dean, UCI School of Law

Neither of my parents went to college. My dad worked in a home improvement store on the South Side of Chicago, and my mom always worked in the home. My brother is an electrician in Chicago, not far from where we grew up. I obviously took a different path, attending Northwestern University and Harvard Law School before becoming a lawyer, a law professor and now a dean. I have spent an enormous amount of time thinking about how I came to take such a different path.
Perhaps some of it can be attributed to my grandmother. Around the time I was born, she was diagnosed with a brain tumor. Her mobility was greatly limited, but I spent a good deal of time with her in the first years of my life. She constantly read to me, and by the time I started school, I could read on my own. I wasn’t much older when I taught myself how to multiply and divide — long before this was taught in school — in order to calculate batting and earned run averages. As a result, I was labeled a “smart child” and was treated that way by teachers.

Unquestionably, my parents, especially my father, played a huge role in the path I have taken. No parent could have been more encouraging. In middle school, my passion flared for the science fairs, and he made sure I had everything I needed to create a project that took first place in my grade at school, my district and Chicago. He arranged for me to take the test for admission to the University of Chicago Laboratory Schools, then and now one of the most prestigious schools in the country. Although it was a huge stretch, he found the money needed to pay the tuition that wasn’t covered by a partial scholarship.

I was the only person in my neighborhood to go to the Lab School, and it was a 30- to 45-minute ride each way on the Chicago city buses. But I quickly discovered that it was worlds away from anything I had ever experienced.

I remember that first day of high school, sitting at a table in the cafeteria and listening to my classmates discussing their summer trips to Europe. The farthest I had ever been was to my aunt’s house in Gary, Indiana. Their life experiences and sophistication were vastly different from mine. I felt painfully out of place.

But I stumbled onto the debate team my freshman year of high school, and an incredible man, the debate coach, Earl Bell, had a significant impact on my life. He worked with the debaters every day after school and took us to tournaments every weekend. He and I spent about an hour every night on the phone, talking about the details of our team and strategies for upcoming debates. Now I realize that he also was teaching me countless life lessons, including how to thrive in a place that was so foreign to me.

In my junior year, my dad developed a serious illness and needed surgery and was out of work for a long time. There was no family income, and so there were no funds for me to continue at the Lab School. I already was receiving the maximum scholarship allowed under the rules. Bell, though, told school administrators he would quit unless they provided the funds to let me stay. They did. He paid the costs for me to attend the debate tournaments until my dad got back to work.

By this time, I had begun to feel comfortable at the Lab School and had finally made friends there. My senior year, I was chosen to be president of the student government and was very much a part of the school.

Because I had attended the Lab School, my transition to college was easy. I had already gone through many of the things that first generation college students experience.

“Because of my own experience … I realize the challenges faced by those who are the first in their family to go to college.”

I have four children and often think about how their experiences differ from mine. Both of their parents are not only college and law school graduates but also law professors. They have been around academics and college campuses their whole lives. Their parents are far more involved in their schools and schoolwork than my parents were. I don’t remember my parents ever helping with my homework.

Because of my own experience, I am acutely conscious of the powerful role of social class in our society. I realize the challenges faced by those who are the first in their family to go to college. I worry about whether our colleges do enough to help these students. I never forget how incredibly fortunate I am for the wonderful opportunities I have had and how much I was helped by others. I hope that colleges and universities will be more attentive and do more for students who are the first in their family to pursue higher education.
“Whatever goals we establish for the years to come are not for us alone to accomplish.”

Howard Gillman
Chancellor

Solar Dreams

Individuals tour Casa del Sol, Team Orange County’s entry in the U.S. Department of Energy’s 2015 Solar Decathlon, an international collegiate competition to design and build the best solar-powered home. Inspired by the California poppy, the home opens during the day, with adjustable panels letting in the sun, and closes up at night to maintain a comfortable temperature. It also strategically allows sunlight into the home during the winter and provides shade from the sun in the summer. A joint project of UCI, Chapman University, Irvine Valley College and Saddleback College, the 1,000-square-foot casa, which was on display at the Orange County Great Park, features eco-friendly energy and water systems, wastewater recycling, xeriscaping and other innovations. Team Orange County’s creation placed ninth out of 14 entries overall but was a close second in the engineering category. Judges called it “the most innovative in the entire competition.”

Video: https://www.youtube.com/watch?v=UcEK2oBorj4
Like falling dominoes on steroids, Doar’s creations rely on synchronized sledgehammers, crashing pianos, toy sharks, chainsaws, catapults and other quirky props. The mesmerizing results have gone viral on YouTube and turned heads at major art museums.

“I’ve always built stuff, but making something that just sat there wasn’t enough,” Doar says. “I wanted it to get up and walk away from you.”

In a tour of his cluttered Los Angeles workshop – part flea market, part mad scientist’s lab – the 43-year-old...
recounts his unusual career path, tells humorous tales about his past and tests some of his latest gadgets.

The son of a Baptist minister mom and electrical engineer dad, Doar first exhibited MacGyver-ish tendencies as a child. He built a suspension bridge from toothpicks and dental floss for his G.I. Joe action figure, designed downhill karts that rumbled through his North Carolina neighborhood and dug a patchwork of holes in the backyard, hoping to establish a “Hogan’s Heroes” tunnel network.

After high school, Doar hopscotched through various odd jobs – tour bus guide, commercial fisherman, special education teacher, jalopy racer, artist – and five colleges before a life-changing encounter in Ireland.

While participating in a robot talent show in Dublin, he met University of California, Irvine alumnus Garnet Hertz, M.F.A. ’05, Ph.D. ’09, who cajoled him into enrolling in UCI’s graduate arts, computation and engineering program. The fusion of technological and creative training “took my art to the next level,” Doar says. But it also left him puzzled about what to do after graduation. “With an M.F.A., it’s not like you have job interviews lined up,” he notes.

Once again, Hertz intervened. In 2009, he forwarded a strange request from the rock band OK Go, which needed science geeks to create a Rube Goldberg machine for a music video. Doar got on board and eventually built about 30 percent of the half-mile-long contraption, he says. Titled “This Too Shall Pass,” the video exploded online, garnering millions of YouTube eyeballs, extensive media coverage and appearances at the L.A. County Museum of Art and New York’s Museum of Modern Art.

That set off a chain reaction of new assignments, including devices for Stephen Colbert’s former television show, a Red Bull promotional stunt and several corporate shindigs. Doar also built a mechanical sculpture for Google that used a lawn mower, belt sander and ice ax to drop an olive into a martini glass. When asked if his own house has similar gizmos to make toast or empty the trash, he deadpans, “No, I’m married.”

On average, it takes about three weeks for the UCI grad and his crew – a welder, a carpenter and a former Navy SEAL – to design and construct one of their visual feasts. Getting all the parts to work properly is typically a headache. The OK Go video, for example, required numerous takes (and 10 smashed television sets) before all the triggers operated without a hitch.

“If everything goes as planned, that’s sort of a disappointment,” says Doar, who regards each machine as almost a living creature. “You come in with your ideas, and the piece has its own ideas. So you have to collaborate with the materials.”

The ingredients vary wildly – Doar’s workshop houses everything from mini-trampolines and a gong to bullet casings and a cardboard Ronald Reagan cutout – but two props seem to be constants.

“I have so many sledgehammers and bowling balls, it’s ridiculous,” he says, explaining that both items possess inherent comedic properties. “You look at them and say, ‘I know something’s going to happen with that.’”

The final element, lurking in the background of all his work, is Doar’s mischievous sense of humor. “Want me to set it on fire?” he quips as a photographer snaps pictures of him demonstrating a medieval-style catapult. Later, after he winces under the glare of a spotlight and someone jokingly asks, “Where were you on the night of …,” Doar instantly blurts: “She was dead when I found her.”

“Adweek” magazine recently listed Doar as one of “10 visual artists who are changing the way we see advertising, and the world.”

Hollywood has also taken notice. A forthcoming film called “The Book of Henry” is set to feature one of his pieces. Doar declines to reveal much about his contribution, except to say that it employs a moo can toy.

Meanwhile, he’s busy devising gadgetry for a television show and other clients. He says he has enough hare-brained ideas to last a lifetime. And after that? Will there be a mechanized send-off to the afterworld? Maybe.

“When I was 20, I played around with funerary concepts,” Doar says. “And I came up with the idea of a coffin attached to a rocket engine that you could launch out over the sea and then it would explode.”

No doubt a sledgehammer and bowling ball would be along for the ride.

Video: https://youtu.be/fz2ApgsBzXo
Marinela Gombosev ’05, electrical engineering

She’s tangled with lightning bolts, brain waves and a renegade cousin of duct tape. Marinela Gombosev, whose family fled war-torn Bosnia when she was 9, has traveled an unusual career path. At Parker Hannifin’s aerospace division, she put her UCI electrical engineering degree to work designing lightning-proof flight control circuitry for small business jets – and watching the equipment get tested with simulated bolts of electricity. From there, she jumped into the medical field, leading a team of 20 engineers in developing an allergy testing device. She simultaneously moonlighted as CEO of Hugo’s Amazing Tape, a reusable tape that sticks only to itself. The two gigs earned her a spot on OC Metro’s Hot 25 list of movers and shakers in Orange County. Now she’s executive vice president of operations and marketing for Evoke Neuroscience, which sells a machine that measures and analyzes brain functions. Among other benefits, it may help with early detection of dementia.

Jeffrey Maganis ’07, economics

Imagine having a power outlet in your purse, briefcase or – if you’re camping in the wilderness – backpack. Pocket-sized power packs that can fire up everything from laptops to hair dryers are among the gadgets offered by ChargeTech.com, the brainchild of UCI alum Jeffrey Maganis. The company also peddles cellphone charging kiosks that help coffee shops, restaurants and retailers lure customers whose mobile devices need some juice. “Our mission is to allow people to power anything, anywhere,” Maganis says. With 20,000 cellphone charging stations nationwide, his client roster includes McDonald’s, Whole Foods, Harrah’s, even a church on Wall Street. Maganis, a onetime hedge fund trader who grew up in Long Beach, caught the entrepreneurial bug while studying economics at UCI and selling refurbished iPods and iPhones from his Vista del Campo apartment.
In Memoriam

Jack W. Peltason, chancellor emeritus

Jack W. Peltason, president emeritus of the University of California and chancellor emeritus of UCI, died March 21 after a lengthy battle with Parkinson’s disease. He was 91. A noted political scientist, Peltason arrived at UCI as a founding dean and vice chancellor. He left in 1967 to head the University of Illinois at Urbana-Champaign for a decade. Afterward, he became the nation’s chief spokesman for higher education when he was named president of the American Council on Education in Washington, D.C. In 1984, he returned to UCI as its second chancellor. He was inaugurated as the 16th president of the University of California in 1992. Many honors and distinctions were bestowed on him throughout his career, including the President’s Medal, the UC’s highest honor, in 2014.


Video: bit.ly/ucimag_winter2016_Tribute

Lyman W. Porter, professor emeritus of business

Lyman W. Porter, professor emeritus of business and a mainstay of the UCI faculty for several decades, died July 2. He was 85. Porter came to UCI in 1967 as a professor of management (with a joint appointment in psychology) and assistant dean of the Graduate School of Administration – now The Paul Merage School of Business – after rising from lecturer to full professor of psychology at UC Berkeley. As assistant dean, he was instrumental in starting the GSA’s doctoral program. He served as dean of the school from 1972 to 1983.


Chris Burden, M.F.A. ’71

Artist Chris Burden, whose iconic “Urban Light” display at the Los Angeles County Museum of Art has become a luminous symbol of L.A., died of melanoma May 10 at the age of 69. Burden earned a master’s in fine arts at UCI in 1971. His thesis was “Five Day Locker,” a performance piece that entailed locking himself inside a 2-foot-by-2-foot-by-3-foot locker in the Claire Trevor School of the Arts for five days.


Clayton Garrison, founding arts dean

Clayton Garrison, founding dean of the School of Fine Arts, died July 27 at the age of 93. He was a visionary stage director, choreographer and theater professor who left a lasting imprint on UCI and what’s now known as the Claire Trevor School of the Arts. Garrison was invited by founding Chancellor Daniel G. Aldrich Jr. to create a “department of arts” in 1964, the year before the campus opened. He served as dean of the school for its first 17 years and remained for nine more years teaching acting and running UCI’s monthlong satellite Music Theatre Program in New York.


Irwin Rose, Nobel laureate and pioneering enzyme researcher

Nobel laureate and UCI biochemist Irwin “Ernie” Rose, who did groundbreaking work on enzymes critical to breaking down and disposing of unwanted proteins in plants and animals, died June 2 in Deerfield, Massachusetts. He was 88. Rose and two other researchers discovered how cells regulate the presence of certain proteins by marking unwanted ones with the polypeptide ubiquitin. Once labeled, the proteins are broken down rapidly in cellular “waste disposers” called proteasomes. For the work, Rose shared the 2004 Nobel Prize in chemistry with Aaron Ciechanover and Avram Hershko of the Israel Institute of Technology.

More: bit.ly/ucimag_winter2016_Rose
Tacos of Tomorrow

Grasshopper tacos made by visiting eco-chef Roger Feely during a demonstration of drought-friendly cooking were a big hit at the 50th anniversary’s Festival of Discovery in Aldrich Park.
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Alumni show their Anteater pride at the UCI Engineering Alumni Society’s first networking event, “Leveraging UCI to Launch Your Startup.”